Supplementary Information for:

#### Acquisition of Absorption and Fluorescence Spectral Data Using Chatbots

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#### 125 pages in total

In the following, any text, statement, number, or reference (#%\$@\*) that is at odds with authentic, generally accepted concepts, information, or value is denoted for clarity in two ways: (i) rendered in Bold font; and (ii) listed below each instance with the note in Bold font: **QUESTIONABLE:** #%\$@\*. Other instances of the use of Bold font are not meant to comprise questionable material.

## Molar absorption coefficient

# What is the molar absorption coefficient of naphthalene?

The molar absorption coefficient of naphthalene depends on the wavelength of light being absorbed and the specific solvent used. In general, at its principal absorption peak around 216 nm in nonpolar solvents like hexane, the molar absorption coefficient of naphthalene is approximately  $(15,400 \, \text{text}\{M\}^{-1})$ . However, this value can vary depending on experimental conditions and the specific solvent used.

# What is the molar absorption coefficient of 8-anilino-1-naphthalenesulfonic acid?

The molar absorption coefficient of 8-anilino-1-naphthalenesulfonic acid (ANS) depends on the wavelength of light being absorbed and the specific solvent used. In general, ANS exhibits absorbance maxima around 375 nm in aqueous solution. The molar absorption coefficient of ANS at this wavelength is approximately  $(5000 \, \text{text}{M}^{-1})$ . However, this value can vary depending on the specific conditions of the experiment and the concentration of ANS.

# What is the molar absorption coefficient of anthracene?

# D ChatGPT 3.5

The molar absorption coefficient of anthracene depends on the wavelength of light being absorbed and the specific solvent used. In general, at its principal absorption peak around 374 nm in nonpolar solvents like cyclohexane, the molar absorption coefficient of anthracene is approximately  $(10,300 \, \text{text}{M}^{-1})$ . However, this value can vary depending on experimental conditions and the specific solvent used.

# What is the molar absorption coefficient of 9,10-diphenylanthracene?

The molar absorption coefficient of 9,10-diphenylanthracene (DPA) depends on the wavelength of light being absorbed and the specific solvent used. In general, DPA exhibits absorption maxima **around 333 nm** in nonpolar solvents like toluene. At this wavelength, the molar absorption coefficient of DPA is approximately  $(30,000 \, \text{text}M^{-1})$ . However, this value can vary depending on experimental conditions and the specific solvent used.

#### QUESTIONABLE: around 333 nm QUESTIONABLE: 30,000 \, \text{M}^{-1}\text{cm}^{-1}\

What is the molar absorption coefficient of quinine?

# ChatGPT 3.5

The molar absorption coefficient of quinine depends on the wavelength of light being absorbed and the specific solvent used. Quinine exhibits absorbance maxima around 350 nm in acidic solutions. At this wavelength, the molar absorption coefficient of quinine is approximately  $(11,000 \, \text{text}{M}^{-1})$  ( $11,000 \, \text{text}{M}^{-1}$ ). However, this value can vary depending on experimental conditions and the specific solvent used.



The molar absorption coefficient of acridine orange depends on the wavelength of light being absorbed and the specific solvent used. In general, acridine orange exhibits absorption maxima **around 490 nm** and 440 nm in aqueous solution. At these wavelengths, the molar absorption coefficients of acridine orange are approximately  $(4.0 \times 10^4 \setminus \text{text} M^{-1} \times 1)$  and  $(2.5 \times 10^4 \setminus \text{text} M^{-1} \times 1)$ , respectively. These values can vary depending on experimental conditions and the pH of the solution.

### **QUESTIONABLE: around 490 nm**

# What is the molar absorption coefficient of coumarin 1?

# D ChatGPT 3.5

The molar absorption coefficient of Coumarin 1 (7-methoxycoumarin) depends on the wavelength of light being absorbed and the specific solvent used. In general, Coumarin 1 exhibits absorption maxima around **350 nm** in ethanol. At this wavelength, the molar absorption coefficient of Coumarin 1 is approximately  $(2.6 \times 10^{4} , \times 10^{4} - 1) \times (-1)$ . However, this value can vary depending on experimental conditions and the specific solvent used.

### QUESTIONABLE: 7-methoxycoumarin QUESTIONABLE: 350 nm

# What is the molar absorption coefficient of fluorescein?

The molar absorption coefficient of fluorescein depends on the wavelength of light being absorbed and the specific solvent used. In general, fluorescein exhibits absorption maxima around 494 nm and 460 nm in aqueous solution. At these wavelengths, the molar absorption coefficients of fluorescein are approximately  $(80,000 \, \text{text}{M}^{-1})$  and  $(22,000 \, \text{text}{M}^{-1})$  and  $(22,000 \, \text{text}{M}^{-1})$ , respectively. These values can vary depending on experimental conditions and the pH of the solution.

What is the molar absorption coefficient of rhodamine 6G?

# ChatGPT 3.5

The molar absorption coefficient of rhodamine 6G depends on the wavelength of light being absorbed and the specific solvent used. In general, rhodamine 6G exhibits absorption maxima around 525 nm in ethanol. At this wavelength, the molar absorption coefficient of rhodamine 6G is approximately  $(1.08 \times 10^5 , \det\{M\}^{-1}) \times (-1)$ . However, this value can vary depending on experimental conditions and the specific solvent used.



The molar absorption coefficient of chlorophyll a depends on the wavelength of light being absorbed and the specific solvent used. In general, chlorophyll a exhibits absorption maxima around 430 nm and 660 nm in ethanol. At these wavelengths, the molar absorption coefficients of chlorophyll a are approximately  $(75,000 \, \text{text}{M}^{-1})$  and  $(23,000 \, \text{text}{M}^{-1})$  and  $(23,000 \, \text{text}{M}^{-1})$ , respectively. These values can vary depending on experimental conditions and the solvent used.

QUESTIONABLE: 23,000 \, \text{M}^{-1}\text{cm}^{-1}\

What is the molar absorption coefficient of chlorophyll b?

The molar absorption coefficient of chlorophyll b depends on the wavelength of light being absorbed and the specific solvent used. In general, chlorophyll b exhibits absorption maxima around 453 nm and 642 nm in ethanol. At these wavelengths, the molar absorption coefficients of chlorophyll b are approximately  $(45,000 \, text{M}^{-1})text{cm}^{-1})$  and  $(22,000 \, text{M}^{-1})text{cm}^{-1})$ , respectively. These values can vary depending on experimental conditions and the solvent used.

QUESTIONABLE: 45,000 \, \text{M}^{-1}\text{cm}^{-1}\) and \(22,000 \, \text{M}^{-1}\text{cm}^{-1}\)

# What is the molar absorption coefficient of chlorophyll d?

The molar absorption coefficient of chlorophyll d depends on the wavelength of light being absorbed and the specific solvent used. Chlorophyll d exhibits absorption maxima at longer wavelengths compared to chlorophylls a and b due to its modification of the chlorophyll molecule's structure, allowing it to absorb light in deeper water. The exact molar absorption coefficient values for chlorophyll d may not be as widely reported as those for chlorophylls a and b, but they generally

fall within the same order of magnitude. These values can also vary depending on experimental conditions and the solvent used.

# What is the molar absorption coefficient of chlorophyll f?

The molar absorption coefficient of chlorophyll f, like chlorophyll d, may not be as extensively reported as chlorophylls a and b. Chlorophyll f absorbs light at longer wavelengths compared to chlorophylls a, b, and d, allowing it to capture light in deeper water. The exact molar absorption coefficient values for chlorophyll f can vary depending on experimental conditions and the specific solvent used.

# What is the molar absorption coefficient of tetraphenylporphyrin?

# ChatGPT 3.5

The molar absorption coefficient of tetraphenylporphyrin (TPP) depends on the wavelength of light being absorbed and the specific solvent used. In general, TPP exhibits absorption maxima around 420 nm in nonpolar solvents like toluene. At this wavelength, the molar absorption coefficient of TPP is approximately  $(2.5 \times 10^{5} , \times 10^{5} , \times 10^{-1})$ . However, this value can vary depending on experimental conditions and the specific solvent used.

# What is the molar absorption coefficient of indocyanine green?

The molar absorption coefficient of indocyanine green (ICG) depends on the wavelength of light being absorbed and the specific solvent or medium in which it is dissolved. In biological applications, such as in blood or tissue, ICG typically exhibits absorption maxima around 780 nm to 805 nm, where its molar absorption coefficient can range from  $(1 \times 10^5 \, \times 10$ 



The molar absorption coefficient of Alexa Fluor 488 depends on the wavelength of light being absorbed and the specific solvent or medium in which it is used. Alexa Fluor 488 is typically excited by light in the blue to green range, with absorption maxima around 495 nm. At this wavelength, the molar absorption coefficient of Alexa Fluor 488 can be approximately  $(7.6 \times 10^4 \, \ 1)^{-1} \times 10^{-1} \)$ . However, this value can vary depending on the specific conditions of the experiment and the solvent used.

What is the molar absorption coefficient of naphthalene?

## ChatGPT 40

The molar absorption coefficient (also known as the molar extinction coefficient) of naphthalene at its absorption maximum (around 220 nm) in ethanol is approximately  $23,700 \text{ M}^{-1}\text{cm}^{-1}$ . This value can vary depending on the solvent and specific experimental conditions.

## QUESTIONABLE: 23,700 M<sup>-1</sup>cm<sup>-1</sup>

# What is the molar absorption coefficient of 8-anilino-1-naphthalenesulfonic acid?

## ChatGPT 40

The molar absorption coefficient (also known as molar extinction coefficient) of 8-anilino-1-naphthalenesulfonic acid (ANS) is typically around  $(4,950 \, \text{M}^{-1}\text{cm}^{-1})$  at its absorption maximum of approximately 350 nm in water. This value can vary slightly depending on the solvent and specific experimental conditions used.



# The molar absorption coefficient of anthracene varies with the wavelength of light. At its principal absorption peak around 252 nm in ethanol, the molar absorption coefficient is approximately \(

absorption peak around 252 nm in ethanol, the molar absorption coefficient is approximately  $(8600 \, text{M}^{-1}\text{cm}^{-1})$ . Anthracene also has a secondary absorption peak around 350 nm with a molar absorption coefficient of approximately  $(400 \, text{M}^{-1}\text{cm}^{-1})$ . These values can vary slightly depending on the solvent and specific experimental conditions used.

QUESTIONABLE: 8600 \, \text{M}^{-1}\text{cm}^{-1} \ QUESTIONABLE: 400 \, \text{M}^{-1}\text{cm}^{-1} \

# What is the molar absorption coefficient of 9,10-diphenylanthracene?

The molar absorption coefficient of 9,10-diphenylanthracene (DPA) depends on the wavelength of light being absorbed and the specific solvent used. In general, at its principal absorption peak around 354 nm in solvents like ethanol, the molar absorption coefficient of 9,10-diphenylanthracene is approximately  $(22,000 \, \text{text}{M}^{-1})$ . However, this value can vary depending on experimental conditions and the specific solvent used.

## QUESTIONABLE: 22,000 \, \text{M}^{-1}\text{cm}^{-1}

What is the molar absorption coefficient of quinine?

## ChatGPT 40

The molar absorption coefficient of quinine varies depending on the solvent and the wavelength of light being absorbed. In 0.1 M sulfuric acid, quinine exhibits an absorption peak around 347 nm. The molar absorption coefficient at this wavelength is approximately  $(5,810 \, text{M}^{-1})$  This value can vary slightly depending on the specific experimental conditions.



The molar absorption coefficient of acridine orange depends on the wavelength of light being absorbed and the specific solvent used. In aqueous solution, acridine orange typically exhibits an **absorption maximum around 493 nm**. At this wavelength, the molar absorption coefficient of acridine orange is approximately  $(7.0 \times 10^4 \, \times 10^4 \, \times 10^4 \)$ . This value can vary depending on experimental conditions and the specific solvent used.

**QUESTIONABLE: absorption maximum around 493 nm** 

QUESTIONABLE: 7.0 \times 10^4 \, \text{M}^{-1}\text{cm}^{-1} \

What is the molar absorption coefficient of coumarin 1?

# ChatGPT 40

The molar absorption coefficient of Coumarin 1 (also known as 7-methoxycoumarin or 7-methoxy-4-methylcoumarin) depends on the wavelength of light being absorbed and the specific solvent used. In general, Coumarin 1 exhibits an absorption maximum around **350 nm** in ethanol. At this wavelength, the molar absorption coefficient of Coumarin 1 is approximately  $(2.9 \times 10^{4} )$ ,  $text{M}^{-1}text{cm}^{-1}$ . This value can vary depending on experimental conditions and the specific solvent used.

# QUESTIONABLE: also known as 7-methoxycoumarin or 7-methoxy-4-methylcoumarin QUESTIONABLE: 350 nm



The molar absorption coefficient of fluorescein depends on the wavelength and the solvent used. In aqueous solution at pH 9, fluorescein exhibits an absorption peak around 494 nm. The molar absorption coefficient at this wavelength is approximately  $(83,000 \, text{M}^{-1}\text{cm}^{-1})$ . This high value makes fluorescein a widely used dye in various fluorescence applications.

What is the molar absorption coefficient of rhodamine 6G?

## ChatGPT 40

The molar absorption coefficient of rhodamine 6G depends on the wavelength of light being absorbed and the specific solvent used. In ethanol, rhodamine 6G exhibits a strong absorption peak around 530 nm. At this wavelength, the molar absorption coefficient is approximately  $(116,000 \, text{M}^{-1})text{cm}^{-1})$ . This high value contributes to its strong fluorescence and widespread use in various fluorescence applications.



The molar absorption coefficient of chlorophyll a depends on the wavelength of light being absorbed and the specific solvent used. In general, chlorophyll a exhibits two major absorption maxima around 430 nm (blue region) and 662 nm (red region) in organic solvents like ethanol. The molar absorption coefficients at these wavelengths are approximately  $(1.17 \times 10^5 \ \text{M}^{-1} \times 10^5 \ \text{M}^{-1} \times 10^{-1} \ \text{m}^{-1})$  at 430 nm and  $(8.63 \times 10^{-4} \ \text{M}^{-1} \times 10^{-5} \ \text{M}^{-1})$  at 662 nm. These values can vary slightly depending on the specific experimental conditions and solvent used.

What is the molar absorption coefficient of chlorophyll b?

### ChatGPT 40

The molar absorption coefficient of chlorophyll b depends on the wavelength of light being absorbed and the specific solvent used. In general, chlorophyll b exhibits absorption maxima around 453 nm and 642 nm in ethanol. At these wavelengths, the molar absorption coefficients of chlorophyll b are approximately  $(54,000 \, text{M}^{-1}\text{cm}^{-1})$  and  $(40,000 \, text{M}^{-1}\text{cm}^{-1})$ , respectively. These values can vary depending on experimental conditions and the solvent used.

### QUESTIONABLE: 54,000 \, \text{M}^{-1}\text{cm}^{-1}



The molar absorption coefficient of chlorophyll d depends on the wavelength of light being absorbed and the specific solvent used. Chlorophyll d exhibits absorption maxima around 402 nm and 662 nm in organic solvents such as acetone or ethanol. At these wavelengths, the molar absorption coefficients of chlorophyll d are approximately  $(63,000 \, text{M}^{-1}\text{cm}^{-1})$  and  $(21,000 \, text{M}^{-1}\text{cm}^{-1})$ , respectively. These values can vary depending on experimental conditions and the specific solvent used.

#### QUESTIONABLE: 662 nm QUESTIONABLE: \(21,000 \, \text{M}^{-1}\text{cm}^{-1}



## ChatGPT 40

The molar absorption coefficient of chlorophyll f depends on the wavelength of light being absorbed and the specific solvent used. Chlorophyll f has absorption maxima around 706 nm and 740 nm in organic solvents. The molar absorption coefficients at these wavelengths are approximately  $(71,000 \, \text{text}M^{-1})\$  and  $(48,000 \, \text{text}M^{-1})\$ , respectively. These values can vary depending on the experimental conditions and the specific solvent used.

### QUESTIONABLE: 740 nm QUESTIONABLE: 48,000 \, \text{M}^{-1}\text{cm}^{-1}\

# What is the molar absorption coefficient of tetraphenylporphyrin?

# Sector ChatGPT 40

he molar absorption coefficient of tetraphenylporphyrin (TPP) varies depending on the wavelength and solvent used. TPP typically exhibits a strong absorption peak (Soret band) around 419 nm in toluene. At this wavelength, the molar absorption coefficient of TPP is approximately  $(5.3 \times 10^5 , \det M^{-1}) \times (-1) \times (-1)$ . Additionally, TPP has Q-bands at longer wavelengths, but these have lower molar absorption coefficients compared to the Soret band.

# What is the molar absorption coefficient of indocyanine green?

The molar absorption coefficient of indocyanine green (ICG) depends on the wavelength of light being absorbed and the specific solvent used. In aqueous solution, ICG exhibits a strong absorption maximum around 780 nm. At this wavelength, the molar absorption coefficient of ICG is approximately  $(1.36 \times 10^5 \, \text{text}M^{-1} \times 10^{-1})$ . This high molar absorption coefficient is one of the reasons ICG is widely used in medical imaging and diagnostic applications.



The molar absorption coefficient of Alexa Fluor 488 is approximately  $(71,000 \ March M^{-1})$  text $(m)^{-1}$  at its absorption maximum around 495 nm in aqueous solution. This high molar absorption coefficient, along with its high fluorescence quantum yield, makes Alexa Fluor 488 a popular choice for various fluorescence-based applications.

# What is the molar absorption coefficient of naphthalene?

The molar absorption coefficient (also known as the molar extinction coefficient) of Naphthalene is **6000 cm-1M-1** in Cyclohexane [3]. This value was reported by Berlman in 1971 [1]. However, please note that the molar absorption coefficient can depend on various factors such as the solvent, the concentration, and the temperature. It's always best to refer to the original sources or specific experimental data for the most accurate information [1] [3]. If you need further assistance, feel free to ask!

Source: Conversation with Copilot, 5/24/2024 Extinction Coefficient [Naphthalene] | AAT Bioquest Naphthalene - omlc.org Database of Absorption and Fluorescence Spectra of >300 Common ... SOLVED:Solutions of naphthalene in ethanol absorb at λ=312 ... - Numerade The Thomas Group - PTCL, Oxford en.wikipedia.org

# What is the molar absorption coefficient of 8-anilino-1-naphthalenesulfonic acid?

# Copilot

The molar absorption coefficient (also known as the molar absorptivity or extinction coefficient) of 8-anilino-1-naphthalenesulfonic acid is **4.95** in 0.1 M phosphate at pH 6.8 [1]. This value is typically used in Beer's Law to relate the absorption of light to the properties of the material the light is traveling through. Please note that this value can vary depending on the solvent and the conditions under which the measurement is taken.

Source: Conversation with Copilot, 5/24/2024

8-Anilino-1-naphthalenesulfonic acid ammonium salt - MilliporeSigma

8-Anilinonaphthalene-1-sulfonic acid - Wikipedia

Synthesis and Spectral Properties of 8-Anilinonaphthalene-1-sulfonic ...

8-Anilino-1-naphthalenesulfonic acid - SCBT

8-Anilino-1-naphthalenesulfonic acid 82-76-8 - MilliporeSigma

http://pubs.acs.org/journal/acsodf

## **QUESTIONABLE: 4.95**



The molar absorption coefficient (also known as the molar absorptivity or extinction coefficient) of anthracene is  $9,700 \text{ cm}^{-1}\text{M}^{-1}$  in cyclohexane [1]. This value is typically used in Beer's Law to relate the absorption of light to the properties of the material the light is traveling through. Please note that this value can vary depending on the solvent and the conditions under which the measurement is taken.

Source: Conversation with Copilot, 5/24/2024

Extinction Coefficient [Anthracene] | AAT Bioquest Anthracene - omlc.org Anthracene - NIST Chemistry WebBook 9,10-Diphenylanthracene en.wikipedia.org

# What is the molar absorption coefficient of 9,10-diphenylanthracene?

# Copilot

The molar absorption coefficient (also known as the molar absorptivity or extinction coefficient) of 9,10-diphenylanthracene is **14,000** cm<sup>-1</sup>M<sup>-1</sup> at 372.5nm [1]. This value is typically used in Beer's Law to relate the absorption of light to the properties of the material the light is traveling through. Please note that this value can vary depending on the solvent and the conditions under which the measurement is taken. The measurements were made by R.-C. A. Fuh on 06-26-1995 using a Cary 3 [1].

Source: Conversation with Copilot, 5/24/2024 9,10-Diphenylanthracene 9,10-Diphenylanthracene - Wikipedia 9,10-Diphenylanthracene | C26H18 | ChemSpider [9,10-Diphenylanthracene] - De Gruyter en.wikipedia.org

What is the molar absorption coefficient of quinine?

# Copilot

The molar absorption coefficient (also known as the molar absorptivity or extinction coefficient) of quinine is  $5,700 \text{ cm}^{-1}\text{M}^{-1}$  at 349.0nm [1]. This value is typically used in Beer's Law to relate the absorption of light to the properties of the material the light is traveling through. Please note that this value can vary depending on the solvent and the conditions under which the measurement is taken. The measurements were made by Irvin in 1948 [1].

Source: Conversation with Copilot, 5/24/2024 <u>Quinine sulfate</u> <u>Quinine | C20H24N2O2 | ChemSpider</u> <u>Characterization of Quinine and Its Determination - Colby College</u> <u>Singlet and Triplet State Properties and Singlet Oxygen ... - Springer</u> <u>Quinine sulfate</u> <u>http://webpages.acs.ttu.edu/dpappas/index.html</u> <u>en.wikipedia.org</u>

# What is the molar absorption coefficient of acridine orange?

The molar absorption coefficient (also known as the molar extinction coefficient) of Acridine Orange is **27,000** cm<sup>-1</sup>M<sup>-1</sup> [1]. This value was obtained at a wavelength of **430.8** nm [1]. Please note that this value can vary depending on the conditions and the method of measurement. Always refer to the specific conditions under which the measurement was taken for accurate data. Source: Conversation with Copilot, 5/24/2024

Acridine orange - omlc.org

Characterization of Acridine Orange in Homogeneous Media: A Supportive ...

Extinction Coefficient [Acridine Orange] | AAT Bioquest

Luminescence of the solid complexes of acridine orange with RNA

Extinction Coefficient [Acridine Orange] | AAT Bioquest

en.wikipedia.org



The molar absorption coefficient of Coumarin 1 is approximately  $23,500 \text{ cm}^-1/\text{M}$  at 373.2 nm [1]. This value was determined using a spectral bandwidth of 1.0 nm, a signal averaging time of 0.133 sec, a data interval of 0.25 nm, and a scan rate of 112.5 nm/min [1]. Please note that these values can vary depending on the conditions and the method of measurement.

Source: Conversation with Copilot, 5/24/2024

Coumarin 1 - omlc.org

Absorption spectra of coumarin and its derivatives

<u>The Influence of Temperature on Coumarin 153 Fluorescence</u> ... - Springer Synthesis, Characterization, Optical, Electrochemical and Current ... en.wikipedia.org



The molar absorption coefficient (also known as the molar absorptivity or extinction coefficient) of fluorescein is **70,000** cm<sup>-1</sup>M<sup>-1</sup> [1]. This value is typically used in Beer's Law to relate the absorption of light to the properties of the material the light is traveling through. Please note that this value can vary depending on the solvent and the conditions under which the measurement is taken. The measurements were made at 485nm [2] [3].

Source: Conversation with Copilot, 5/24/2024 <u>What is the molar extinction coefficient of fluorescein?</u> <u>Fluorescein - ISB Server Wahoo</u> <u>1.1: Fluorescein - UMass</u> <u>Fluorescein (F7505) - Product Information Sheet - MilliporeSigma</u> <u>Fluorescein - Wikipedia</u>

### What is the molar extinction coefficient of fluorescein? en.wikipedia.org

What is the molar absorption coefficient of rhodamine 6G?

# Copilot

The molar absorption coefficient (also known as the molar absorptivity or extinction coefficient) of Rhodamine 6G varies depending on the solvent and conditions under which the measurement is taken. Here are some reported values:

- 1. In ethanol, it is 9.70 x 10<sup>4</sup> L mole<sup>-1</sup> cm<sup>-1</sup> for the chloride form [1].
- 2. A value of **11,800 M<sup>-1</sup> cm<sup>-1</sup>** has also been reported [4].
- 3. Another source reports a value of 8.3 x  $10^4$  dm<sup>3</sup> mole<sup>-1</sup> cm<sup>-1</sup> [3].

4. The absorption values were collected using a spectral bandwidth of 1.0 nm, a signal averaging time of 0.133 sec, a data interval of 0.25 nm, and a scan rate of 112.5 nm/min. These measurements were scaled to make the molar extinction coefficient match the value of **116,000 cm<sup>-1</sup> M<sup>-1</sup>** at 529.8nm [2].

Please note that these values can vary depending on the solvent and the conditions under which the measurement is taken. Always refer to the specific conditions under which the measurements were taken when using these values.

Source: Conversation with Copilot, 5/24/2024

Rhodamine 6G\* - Luxottica

Rhodamine 6G Structural Changes in Water/Ethanol Mixed Solvent - Springer

Available online a t www.scho larsresearchlibrary

Rhodamine 6G - omlc.org

en.wikipedia.org

# What is the molar absorption coefficient of chlorophyll a?

# Copilot

The peak molar absorption coefficient of chlorophyll a exceeds  $10^5 \text{ M}^{-1} \text{ cm}^{-1}$  [1] [2]. This value is among the highest for small-molecule organic compounds [1] [2]. Please note that these values can vary depending on the conditions and the method of measurement. For instance, the extinction coefficient for the long wavelength peak of chlorophyll a at 665.5 nm is 71.4 L mmol^-1 cm^-1 [3].

Source: Conversation with Copilot, 5/24/2024 <u>Chlorophyll - chemeurope.com</u> <u>Chlorophyll - Wikipedia</u> 1.2.2 - Chlorophyll absorption and photosynthetic action spectra <u>Chlorophyll a - omlc.org</u> <u>Determination of the Absorbance Spectrum of Chlorophyll</u> <u>en.wikipedia.org</u>

# What is the molar absorption coefficient of chlorophyll b?

The molar absorption coefficient of chlorophyll b is **159,100 cm^-1/M** at **453.0 nm** [1]. This value was determined using a spectral bandwidth of 1.0 nm, a signal averaging time of 0.133 sec, a data interval of 0.25 nm, and a scan rate of 112.5 nm/min [1]. The extinction coefficient for the long wavelength peak of chlorophyll b at 652 nm is 38.6 L mmol^-1 cm^-1 [2]. Please note that these values can vary depending on the conditions and the method of measurement.

Source: Conversation with Copilot, 5/24/2024

Chlorophyll b - omlc.org

1.2.2 - Chlorophyll absorption and photosynthetic action spectra

Plant Physiology - College of Saint Benedict and Saint John's University

Plant Physiology - College of Saint Benedict and Saint John's University

en.wikipedia.org



The molar absorption coefficient for the long wavelength peak of chlorophyll d at 697 nm is 63.7 L mmol<sup>-1</sup> cm<sup>-1</sup> [1]. Please note that these values can vary depending on the conditions and the method of measurement. The molar absorption coefficient, also known as the molar extinction coefficient, is a measure of how strongly a chemical species absorbs light at a given wavelength. It is an intrinsic property of the species; the actual absorbance, or optical density, of a sample is dependent on the path length of the light through the sample and on the concentration of the species.

Source: Conversation with Copilot, 5/24/2024

1.2.2 - Chlorophyll absorption and photosynthetic action spectra

The Beer-Lambert Law - Chemistry LibreTexts

Determination of the Absorbance Spectrum of Chlorophyll

What is the molar absorption coefficient of chlorophyll f?

The molar absorption coefficient for the long wavelength peak of chlorophyll f at 707 nm is 71.1 L mmol<sup>-1</sup> cm<sup>-1</sup> [1]. Please note that these values can vary depending on the conditions and the method of measurement. The molar absorption coefficient, also known as the molar extinction coefficient, is a measure of the probability of the electronic transition. It indicates how strongly a chemical species absorbs light at a given wavelength. It is an intrinsic property of the species; the actual absorbance, or optical density, of a sample is dependent on the path length of the light through the sample and on the concentration of the species.

Source: Conversation with Copilot, 5/24/2024

1.2.2 - Chlorophyll absorption and photosynthetic action spectra Absorption and Fluorescence Spectral Database of Chlorophylls and The Beer-Lambert Law - Chemistry LibreTexts

#### SPECTROSCOPIC ANALYSIS OF CHLOROPHYLL Determination of the Absorbance Spectrum of Chlorophyll http://www.photochemcad.com Getty Images

# What is the molar absorption coefficient of tetraphenylporphyrin?

# Copilot

The molar absorption coefficient (also known as the molar absorptivity or extinction coefficient) of tetraphenylporphyrin (TPP) varies depending on the solvent and conditions under which the measurement is taken. Here are some reported values:

1. A value of **4,450** M<sup>-1</sup>cm<sup>-1</sup> at 532 nm has been reported [1].

2. Another source reports a value of **18,900** cm<sup>-1</sup>M<sup>-1</sup> at 515.0 nm [2]. The absorption values were collected using a spectral bandwidth of 1.0 nm, a signal averaging time of 0.133 sec, a data interval of 0.25 nm, and a scan rate of 112.5 nm/min [2].

Please note that these values can vary depending on the solvent and the conditions under which the measurement is taken. Always refer to the specific conditions under which the measurements were taken when using these values.

Source: Conversation with Copilot, 5/24/2024

Answered: iv. Tetraphenylporphyrin (TPP) has a... | bartleby

Tetraphenylporphyrin, [TPP]

Zinc tetraphenylporphyrin, [ZnTPP]

Answered: iv. Tetraphenylporphyrin (TPP) has a... | bartleby

en.wikipedia.org

# What is the molar absorption coefficient of indocyanine green?

The molar absorption coefficient of Indocyanine Green (ICG) is complex and depends on its concentration and the solvent it's in [1]. ICG has different molar extinction coefficients for different concentrations [1]. It tends to aggregate in water at high concentrations, which means that the effective absorption does not increase linearly with increasing concentration [1]. Furthermore, ICG tends to degrade with exposure to light [1].

When ICG is added to blood plasma, it is rapidly bound to proteins in the serum, which also changes its absorption spectrum [1]. To predict the absorbance of a particular solution of ICG, if Beer's law was valid, then all that would be needed would be to multiply the molar extinction coefficient at your particular wavelength with the molar concentration and the path length [1].

Unfortunately, due to these complexities, a single value for the molar absorption coefficient of ICG is not readily available. For accurate results, it's recommended to measure the absorption coefficient under the specific conditions of your experiment [1].

Source: Conversation with Copilot, 5/24/2024

Optical Absorption of Indocyanine Green (ICG)

Photophysical Properties of Indocyanine Green in the Shortwave Infrared ...

Absorption of short wavelengths of endoillumination in indocyanine ...

Light absorbing properties of indocyanine green (ICG) in ... - Springer

#### https://doi.org/10.1002/cptc.202100045 en.wikipedia.org

# What is the molar absorption coefficient of Alexa Fluor 488?

The molar absorption coefficient of Alexa Fluor 488 is approximately **73,000 cm^-1/M** [1]. This value was determined at the absorption maximum [4]. Please note that these values can vary depending on the conditions and the method of measurement. The molar absorption coefficient, also known as the molar extinction coefficient, is a measure of how strongly a chemical species absorbs light at a given wavelength. It is an intrinsic property of the species; the actual absorbance, or optical density, of a sample is dependent on the path length of the light through the sample and on the concentration of the species.

Source: Conversation with Copilot, 5/24/2024 <u>Extinction Coefficient [Alexa Fluor 488] | AAT Bioquest</u> <u>The Alexa Fluor Dye Series—Note 1.1 - Thermo Fisher Scientific</u> <u>Alexa Fluor® 488 Protein Labeling Kit - Thermo Fisher Scientific</u> <u>Extinction Coefficient [Alexa Fluor 488] | AAT Bioquest</u>

Alexa Fluor<sup>TM</sup> 488 C5 Maleimide - Thermo Fisher Scientific

What is the molar absorption coefficient of naphthalene?

The molar absorption coefficient ( $\epsilon$ ) of naphthalene is around 6000 cm<sup>-1</sup>M<sup>-1</sup> in cyclohexane solvent [1, 2].

https://omlc.org/spectra/PhotochemCAD/html/001.html

It's important to note that this value is specific to the solvent used. The molar absorption coefficient can vary depending on the surrounding environment of the molecule.

What is the molar absorption coefficient of 8-anilino-1-naphthalenesulfonic acid?

## Gemini

Unfortunately, I couldn't find a readily available resource specifying the exact molar absorption coefficient ( $\epsilon$ ) for 8-anilino-1-naphthalenesulfonic acid (ANS) at a specific wavelength.

However, some resources provide extinction coefficients which are related to molar absorption coefficient. One source lists the extinction coefficient (EmM) of ANS as 18.0 at 270 nm and 8.0 at 375 nm, likely in ethanol solvent (<u>https://www.mpbio.com/us/8-anilino-1-naphthalene-sulfonic-acid</u>).

Keep in mind that extinction coefficient (EmM) is related to  $\epsilon$  through the following equation:

 $\varepsilon = \text{EmM} / (\text{molecular weight})$ 

where:

\*  $\varepsilon$  is the molar absorption coefficient (L mol<sup>-1</sup> cm<sup>-1</sup>)

\* EmM is the extinction coefficient (often unitless or cm<sup>2</sup>/mol)

\* molecular weight is the weight of one mole of the molecule (g/mol)

Using the provided extinction coefficient and the molecular weight of ANS (299.344 g/mol), you can calculate the approximate molar absorption coefficient at those specific wavelengths.

# What is the molar absorption coefficient of anthracene?

## Gemini

The molar absorption coefficient ( $\epsilon$ ) of anthracene depends on the solvent it's dissolved in. Here's what I found:

In cyclohexane, the molar absorption coefficient of anthracene is around 9,700 cm<sup>-1</sup>M<sup>-1</sup> [1, 2]. <u>https://omlc.org/spectra/PhotochemCAD/html/022.html</u>

https://www.aatbio.com/resources/extinction-coefficient

Remember, this value is specific to cyclohexane. The molar absorption coefficient can change based on the solvent used.

# What is the molar absorption coefficient of 9,10-diphenylanthracene?

## Gemini

I couldn't find a definitively reported molar absorption coefficient ( $\epsilon$ ) for 9,10-diphenylanthracene online [1, 2]. It likely depends on the solvent used, as is the case with many other molecules.

Here are some resources that mention 9,10-diphenylanthracene's absorption properties but don't provide a specific  $\varepsilon$  value:

\* [OMLC](<u>https://omlc.org/spectra/PhotochemCAD/html/021.html</u>) mentions absorption data for 9,10-diphenylanthracene.

\* [PhotochemCAD](<u>https://www.photochemcad.com/databases/common-compounds/polycyclic-aromatic-hydrocarbons/910-diphenylanthracene</u>) lists an absorption coefficient value at 372.5 nm, but it may not be a molar extinction coefficient.

If you have a specific solvent in mind, you can try searching for literature on the absorption properties of 9,10-diphenylanthracene in that solvent.

# What is the molar absorption coefficient of quinine?

## Gemini

The molar absorption coefficient ( $\epsilon$ ) of quinine depends on the solvent and the specific wavelength of light. However, here's some information that should be helpful:

\* \*\*Quinine sulfate in 0.5 M H2SO4\*\*: This is a common reference system for quinine. In this solvent and at a wavelength of \*\*347.5 nm\*\*, the molar absorption coefficient is around \*\*5,700  $M^{-1}cm^{-1**}$  [1, 2].

\*\*Sources:\*\*

\*https://omlc.org/spectra/PhotochemCAD/html/081.html

\*<u>https://us.vwr.com/store/product/23879188/quinine-sulfate-dihydrate-fluorescence-reference-standard-anaspec-inc</u>

\*\*Additional points to consider:\*\*

\* The molar absorption coefficient of quinine can vary slightly depending on the specific literature source.

\* If you're interested in a different solvent or wavelength, you might need to search for specialized scientific literature on quinine's absorption properties in that particular context.

# What is the molar absorption coefficient of acridine orange?

# Gemini

The molar absorption coefficient ( $\epsilon$ ) of acridine orange is around \*\*27,000 cm<sup>-1</sup>M<sup>-1</sup>\*\* [1]. This value is typically reported for acridine orange dissolved in \*\*water (ddH<sub>2</sub>O)\*\* or \*\*phosphate-buffered saline (PBS)\*\* [1].

Here's a helpful resource:

\* \*\*Acridine Orange Extinction Coefficient\*\*

https://www.aatbio.com/products/acridine-orange-10-mg-ml-solution-in-water

\*\*Important points to remember:\*\*

\* The  $\varepsilon$  value of 27,000 cm<sup>-1</sup>M<sup>-1</sup> might vary slightly depending on the specific literature source.

\* If high precision is required, it's always best to consult specific literature for the exact  $\varepsilon$  value at your desired wavelength and solution conditions.

# What is the molar absorption coefficient of coumarin 1?

## Gemini

The molar absorption coefficient ( $\epsilon$ ) of coumarin 1 is \*\*23,500 cm<sup>-1</sup>M<sup>-1</sup>\*\* at a wavelength of \*\*373.25 nm\*\* [1]. This value is specifically for coumarin 1 dissolved in \*\*ethanol\*\*.

Here's the reference for this information:

\* [OMLC Coumarin 1](<u>https://omlc.org/spectra/PhotochemCAD/html/045.html</u>)

\*\*Keep in mind:\*\*

\* The molar absorption coefficient can vary depending on the solvent used. If you're interested in a different solvent for coumarin 1, you might need to search for specialized scientific literature on its absorption properties in that particular solvent.

# What is the molar absorption coefficient of fluorescein?

# Gemini

The molar absorption coefficient ( $\epsilon$ ) of fluorescein varies slightly depending on the specific wavelength, but here's a common value:

\* \*\*Around 70,000 M<sup>-1</sup>cm<sup>-1</sup> at a wavelength of 485 nm\*\* [1, 2].

\*\*Sources:\*\*

\*https://www.aatbio.com/catalog/fluoresceins

\*https://omlc.org/spectra/PhotochemCAD/html/010.html

\*\*Additional points to consider:\*\*

\* The pH of the solution can also affect the molar absorption coefficient of fluorescein. It exhibits a slight dependence between pH 5 and 9 [2].

\* If high precision is required, it's best to consult specific literature for the exact  $\varepsilon$  value at your desired wavelength and solution conditions.

# What is the molar absorption coefficient of rhodamine 6G?

Rhodamine 6G's molar absorption coefficient ( $\epsilon$ ) depends on the solvent it's in. Here's some information:

\* In \*\*ethanol\*\*: The molar absorption coefficient of rhodamine 6G is around \*\*116,000  $\text{cm}^{-1}\text{M}^{-1**}$  at a wavelength of \*\*529.75 nm\*\* [1, 2].

\*\*Sources:\*\*

\*<u>https://www.photochemcad.com/</u>

\*https://www.aatbio.com/products/rhodamine-6g-cas-989-38-8

\*\*Important points to consider:\*\*

\* The value mentioned above is specific to ethanol. The molar absorption coefficient will change for different solvents.

\* Some sources might express the value as an extinction coefficient (EmM), which is related to  $\varepsilon$  through the molecular weight of rhodamine 6G.

# What is the molar absorption coefficient of chlorophyll a?

### Gemini

Chlorophyll a has a very high molar absorption coefficient ( $\epsilon$ ) among organic compounds, exceeding \*\*105,000 M<sup>-1</sup>cm<sup>-1</sup>\*\* [1]. However, it's important to note that this value is not constant and depends on the specific wavelength of light.

Here's a breakdown of the key points:

\* \*\*Peak absorption\*\*: Chlorophyll a exhibits two main peaks in its absorption spectrum, typically around \*\*430 nm (blue) and 665 nm (red)\*\* [1, 2].

\* \*\*Molar absorption coefficient\*\*: The  $\varepsilon$  value will be highest at these peak wavelengths, with the value at 430 nm being slightly higher than at 665 nm [2]. The exact value can vary depending on the specific reference, but it falls within the range mentioned above (over 105,000 M<sup>-1</sup>cm<sup>-1</sup>). Here are some helpful resources:

\* [Chlorophyll a absorption peaks](https://www.chemeurope.com/en/encyclopedia/Chlorophyll.html)

\* [OMLC Chlorophyll a spectrum](https://omlc.org/spectra/PhotochemCAD/html/122.html) (This source mentions a value of  $111,700 \text{ cm}^{-1}\text{M}^{-1}$  at 427.8 nm)

\*\*Additional considerations:\*\*

\* The solvent used can slightly influence the  $\varepsilon$  value of chlorophyll a. However, the impact is generally less significant compared to the variation across different wavelengths.

\* If you need a precise  $\varepsilon$  value for a specific application, it's recommended to consult scientific literature that reports the coefficient at your desired wavelength, considering the solvent used.

# What is the molar absorption coefficient of chlorophyll b?

# Gemini

Chlorophyll b, similar to chlorophyll a, exhibits a high molar absorption coefficient ( $\epsilon$ ) that depends on the specific wavelength of light. Here's what we know:

\* \*\*Peak absorption\*\*: Chlorophyll b has two main absorption peaks, typically around \*\*453 nm (blue) and 645 nm (red)\*\* [1, 2].

\* \*\*Molar absorption coefficient\*\*: The  $\varepsilon$  value will be highest at these peak wavelengths. However, chlorophyll b generally has a lower  $\varepsilon$  compared to chlorophyll a [1].

Here's a breakdown of the  $\varepsilon$  for chlorophyll b:

\* \*\*Values are typically lower than chlorophyll a:\*\* While specific references may vary, the  $\varepsilon$  for chlorophyll b at its peak wavelengths is generally around \*\*50,000 - 60,000 cm<sup>-1</sup>M<sup>-1</sup>\*\* [1, 2]. \* \*\*Specific values\*\*:

\* Around 62,000 cm<sup>-1</sup>M<sup>-1</sup> at 643.3 nm in diethyl ether [1].

\* Around 56,260 cm<sup>-1</sup>M<sup>-1</sup> at 643.3 nm (referenced from 46.61 x  $10^3$  M<sup>-1</sup>cm<sup>-1</sup> at 646.8 nm in 90% acetone) [2].

\*\*Resources:\*\*

\* [Chlorophyll b absorption spectrum]( <u>https://epic.awi.de/28829/1/Jef1997k.pdf</u>)

\* [OMLC Chlorophyll b spectrum]( <u>https://omlc.org/spectra/PhotochemCAD/html/125.html</u>) \*\*Additional considerations:\*\*

\* The solvent used can slightly affect the  $\varepsilon$  value of chlorophyll b.

\* For a precise  $\varepsilon$  value for your specific application, consult scientific literature that reports the coefficient at your desired wavelength and solvent.

# What is the molar absorption coefficient of chlorophyll d?

# Gemini

Chlorophyll d, a red-shifted chlorophyll found in some oxygenic photosynthetic organisms, has a well-defined molar absorption coefficient ( $\epsilon$ ). Here's the key information:

\* \*\*Peak absorption\*\*: Chlorophyll d exhibits its peak absorption around \*\*697 nm (red)\*\* [1].

\* \*\*Molar absorption coefficient\*\*: The  $\varepsilon$  value at this peak wavelength is approximately \*\*63,680 x 10<sup>3</sup> L mol<sup>-1</sup> cm<sup>-1</sup>\*\* [1].

https://pubmed.ncbi.nlm.nih.gov/22395150/

\*\*Source:\*\*

\* \*\*Extinction coefficient for red-shifted chlorophylls: chlorophyll d and chlorophyll f\*\* [1]: This study provides  $\varepsilon$  values for chlorophyll d and f determined in 100% methanol.

\*\*Important points to remember:\*\*

\* The  $\varepsilon$  value provided is specific to chlorophyll d dissolved in \*\*100% methanol\*\*. The coefficient can vary depending on the solvent used.

\* The extinction coefficient ( $\epsilon$ ) used in the reference can be converted to molar absorption coefficient using the following equation:

molar absorption coefficient ( $\epsilon$ ) = extinction coefficient (EmM) / (molecular weight) where:

\*  $\varepsilon$  is the molar absorption coefficient (L mol<sup>-1</sup> cm<sup>-1</sup>)

\* EmM is the extinction coefficient (often unitless or  $cm^2/mol$ )

\* molecular weight is the weight of one mole of the molecule (g/mol)

The reference provides the extinction coefficient (EmM) as 63.68 x 10<sup>3</sup> in their specific case.

# What is the molar absorption coefficient of chlorophyll f?

Chlorophyll f, another red-shifted chlorophyll, also has a defined molar absorption coefficient ( $\epsilon$ ), although it might be less readily available compared to chlorophyll a and b. Here's what I found:

\* \*\*Peak absorption \*\*: Chlorophyll f exhibits its peak absorption around \*\*705 nm (red) \*\* [1]. \* \*\*Molar absorption coefficient \*\*: The  $\varepsilon$  value at this peak wavelength is approximately \*\*57,500 x 10<sup>3</sup> L mol<sup>-1</sup> cm<sup>-1</sup>\*\* [1].

https://pubmed.ncbi.nlm.nih.gov/22395150/

\*\*Source:\*\*

\* \*\*Extinction coefficient for red-shifted chlorophylls: chlorophyll d and chlorophyll f\*\* [1]: This study provides  $\varepsilon$  values for chlorophyll d and f determined in 100% methanol.

\*\*Important points to remember:\*\*

\* The  $\varepsilon$  value provided is specific to chlorophyll f dissolved in \*\*100% methanol\*\*. The coefficient can vary depending on the solvent used.

\* Similar to chlorophyll d, the reference uses the extinction coefficient (EmM), which can be converted to molar absorption coefficient ( $\epsilon$ ) using the equation mentioned previously.

While this reference offers a starting point, information on chlorophyll f's  $\varepsilon$  might be scarcer compared to the more common chlorophylls a and b. If you require high precision or information for a different solvent, consider searching for specialized scientific literature focused on chlorophyll f and its absorption properties in your specific context.

# What is the molar absorption coefficient of tetraphenylporphyrin?

### Gemini

The molar absorption coefficient ( $\epsilon$ ) of tetraphenylporphyrin (TPP) depends on the wavelength of light and the solvent it's dissolved in. Here's what I found:

\* There are variations in reported values, but a common reference point is:

\* Around \*\*18,900 cm<sup>-1</sup> $M^{-1}$ \* at a wavelength of \*\*515 nm\*\* [1].

\*\*Source:\*\*

\* [OMLC Tetraphenylporphyrin](<u>https://omlc.org/spectra/PhotochemCAD/html/099.html</u>)

\*\*Additional points to consider:\*\*

\* Other reported values for TPP's  $\varepsilon$  at 515 nm include 4450 M<sup>-1</sup>cm<sup>-1</sup> and 600,000 cm<sup>-1</sup>M<sup>-1</sup>, highlighting the importance of referencing the specific source [2, 3].

\* The solvent can significantly impact the  $\varepsilon$  value.

\* If you need a precise value for your specific application, it's recommended to consult scientific literature on the absorption properties of TPP in your chosen solvent and at your desired wavelength.

Here are some additional resources that might be helpful:

\* Chegg - Tetraphenylporphyrin Absorption [invalid URL removed] (This source mentions a value of 4450 M<sup>-1</sup>cm<sup>-1</sup> at 532 nm)

# What is the molar absorption coefficient of indocyanine green?

# Gemini

The molar absorption coefficient ( $\epsilon$ ) of indocyanine green (ICG) depends on the wavelength of light. Here's what we know:

\* \*\*High absorption in near-infrared (NIR) region:\*\* ICG is particularly useful for biomedical applications due to its strong absorption in the NIR region (around 700-900 nm) [1, 2].

\*\*\*Peak absorption\*\*: The peak absorption of ICG typically occurs around \*\*780 nm\*\* [2, 3]. Here's a breakdown of the ε value for ICG at its peak wavelength:

\* \*\*Range\*\*: The reported molar absorption coefficient of ICG at 780 nm can vary slightly depending on the source, but it generally falls within the range of \*\*2.3 x  $10^5 \text{ M}^{-1}\text{cm}^{-1}$  to 2.6 x  $10^5 \text{ M}^{-1}\text{cm}^{-1}$ \*\* [2, 3, 4].

\*\*Here are some helpful resources:\*\*

\* [Indocyanine green | Fluorescent Dyes]: This source lists an extinction coefficient of 223,000 M-1 at an unspecified wavelength [1]. You can potentially use this as a starting point, but keep in mind the need for conversion to molar absorption coefficient if necessary.

\* [Indocyanine Green - AAT Bioquest]: This source mentions an extinction coefficient of 230,000 cm-1M-1, likely at a specific wavelength but not explicitly stated [2].

\* [Indocyanine green-loaded perfluorocarbon nanoemulsions for bimodal 19 F-magnetic resonance/nearinfrared fluorescence imaging and subsequent phototherapy]: This study reports a molar extinction coefficient of  $2.621 \times 10^5 \text{ M}^{-1} \text{cm}^{-1}$  at 780 nm [3].

https://qims.amegroups.org/article/view/2232/html

\*\*Additional considerations:\*\*

\* The solvent used can slightly affect the  $\varepsilon$  value of ICG. However, the impact is generally less significant compared to the variation across different wavelengths.

\* If you need a precise  $\varepsilon$  value for a specific application, it's recommended to consult scientific literature that reports the coefficient at your desired wavelength, considering the solvent used.

# What is the molar absorption coefficient of Alexa Fluor 488?

## Gemini

The molar absorption coefficient ( $\epsilon$ ) of Alexa Fluor 488 is \*\*73,000 cm<sup>-1</sup>M<sup>-1</sup>\*\* [1, 2]. This value is widely reported and consistent across several resources.

Here are some reliable sources confirming this value:

\* \*\*Thermo Fisher Scientific - Alexa Fluor Dye Series\*\*: This is the official information page from the manufacturer, Thermo Fisher Scientific [1]. It lists the  $\varepsilon$  value for Alexa Fluor 488 as 73,000 cm<sup>-1</sup>M<sup>-1</sup>.

https://www.thermofisher.com/us/en/home/references/molecular-probes-the-handbook/technicalnotes-and-product-highlights/the-alexa-fluor-dye-series.html

\* \*\*AAT Bioquest - Extinction Coefficient [Alexa Fluor 488]\*\*: This resource provides a table listing the  $\varepsilon$  value for Alexa Fluor 488 as 73000 cm-1M-1 [2].

https://www.aatbio.com/resources/extinction-coefficient/alexa\_fluor\_488

It's important to note that the  $\varepsilon$  value provided is most likely measured in \*\*water (ddH<sub>2</sub>O)\*\* or \*\*phosphate-buffered saline (PBS)\*\*, which are common solvents used in biological applications involving Alexa Fluor 488. The  $\varepsilon$  value can vary slightly depending on the specific solvent used.

What is the molar absorption coefficient of naphthalene?

## Gemini Advanced

rption wavelength of 275 nm. <u>https://omlc.org/spectra/PhotochemCAD/html/001.html</u> You can find this information on the following resources: \*\*AAT Bioquest:\*\* <u>https://www.aatbio.com/resources/extinction-coefficient/naphthalene</u> \*\*OMLC:\*\* <u>https://omlc.org/spectra/PhotochemCAD/html/001.html</u> It's important to note that the molar absorption coefficient can vary slightly depending on the solvent used. However, the value in cyclohexane is widely used as a reference.

What is the molar absorption coefficient of 8-anilino-1-naphthalenesulfonic acid?

## Gemini Advanced

The molar absorption coefficient (ε) of 8-anilino-1-naphthalenesulfonic acid (ANS) can vary depending on the solvent and pH of the solution. Here are some reported values: \* \*\*In ethanol:\*\*

\*  $\varepsilon = 18,000 \text{ M}^{-1} \text{cm}^{-1}$  at 270 nm

https://www.mpbio.com/us/8-anilino-1-naphthalene-sulfonic-acid

\*  $\varepsilon = 8,000 \text{ M}^{-1} \text{cm}^{-1}$  at 375 nm

https://www.mpbio.com/us/8-anilino-1-naphthalene-sulfonic-acid

\* \*\*In 0.1 M phosphate buffer (pH 6.8):\*\*

\*  $\epsilon = 4,950 \text{ M}^{-1}\text{cm}^{-1}$  at 350 nm

You can find this information in the following resources:

\* \*\*Sigma-Aldrich product information:\*\*

https://www.sigmaaldrich.com/deepweb/assets/sigmaaldrich/product/documents/362/696/a3125p is.pdf

\* \*\*MP Biomedicals:\*\*

https://www.mpbio.com/us/8-anilino-1-naphthalene-sulfonic-acid

It's crucial to consider the specific conditions of your experiment when using these values, as the molar absorption coefficient can significantly affect your results.

What is the molar absorption coefficient of anthracene?

## Gemini Advanced

The molar absorption coefficient ( $\epsilon$ ) of anthracene is 9700 cm<sup>-1</sup>M<sup>-1</sup> in cyclohexane at its peak absorption wavelength of 356 nm.

https://omlc.org/spectra/PhotochemCAD/html/022.html

You can find this information on the following resources:

\* \*\*AAT Bioquest:\*\*

https://www.aatbio.com/resources/extinction-coefficient/anthracene

\* \*\*OMLC:\*\*

#### https://omlc.org/spectra/PhotochemCAD/html/022.html

Please note that the molar absorption coefficient can vary slightly depending on the solvent used.

# What is the molar absorption coefficient of 9,10-diphenylanthracene?

#### Gemini Advanced

The molar absorption coefficient of 9,10-diphenylanthracene (DPA) is not readily available from commonly used online resources. However, it's known that its extinction coefficient in cyclohexane at 372.5 nm is  $14,000 \text{ cm}^{-1}\text{M}^{-1}$ .

https://omlc.org/spectra/PhotochemCAD/html/021.html

Here are some suggestions for finding the molar absorption coefficient:

\* Search for scientific papers or technical data sheets that specifically focus on 9,10diphenylanthracene.

\* Contact a chemical supplier that sells 9,10-diphenylanthracene and inquire about its molar absorption coefficient.

The OMLC database provides the absorption spectrum of DPA but not the molar absorption coefficient directly:

\* \*\*OMLC Spectral Data for 9,10-Diphenylanthracene:\*\* https://omlc.org/spectra/PhotochemCAD/html/021.html

What is the molar absorption coefficient of quinine?

### Gemini Advanced

The molar absorption coefficient of quinine sulfate in 0.05 M  $H_2SO_4$  is 5700 M<sup>-1</sup>cm<sup>-1</sup> at its peak absorption wavelength of 349 nm.

https://omlc.org/spectra/PhotochemCAD/html/080.html

You can find this information on the following resources:

\* \*\*OMLC:\*\*

https://omlc.org/spectra/PhotochemCAD/html/080.html

\* \*\*PhotochemCAD:\*\*

<u>https://www.photochemcad.com/databases/common-compounds/heterocycles/quinine-sulfate</u> Please note that the molar absorption coefficient can vary slightly depending on the solvent and pH of the solution.



### Gemini Advanced

The molar absorption coefficient of acridine orange depends on the wavelength and the solvent. However, the most commonly cited value is:

\* \*\*27,000 cm<sup>-1</sup>M<sup>-1</sup> at **492 nm** in ethanol\*\*

https://www.aatbio.com/resources/extinction-coefficient/acridine\_orange

This value can be found in several resources, including:

\* \*\*AAT Bioquest:\*\*

https://www.aatbio.com/resources/extinction-coefficient/acridine\_orange

\* \*\*OMLC:\*\*

https://omlc.org/spectra/PhotochemCAD/html/032.html

Please note that the molar absorption coefficient may vary in different solvents or at different pH levels. It's crucial to consider the specific conditions of your experiment when working with acridine orange.

## QUESTIONABLE: 492 nm

# What is the molar absorption coefficient of coumarin 1?

## Gemini Advanced

The molar absorption coefficient of coumarin 1 in ethanol at its peak absorption wavelength of 373 nm is  $23,500 \text{ cm}^{-1}\text{M}^{-1}$ .

https://omlc.org/spectra/PhotochemCAD/html/045.html

You can find this information on the following resources:

\* \*\*PhotochemCAD:\*\*

https://www.photochemcad.com/databases/common-compounds/coumarins/coumarin-1

\* \*\*OMLC:\*\*

https://omlc.org/spectra/PhotochemCAD/html/045.html

It's important to note that this value was obtained under specific experimental conditions, and the molar absorption coefficient may vary slightly in different solvents or at different wavelengths.

# What is the molar absorption coefficient of fluorescein?

## Gemini Advanced

The molar absorption coefficient (ɛ) of fluorescein is dependent on the pH and solvent. https://www.researchgate.net/publication/237450651\_The\_Effect\_of\_Solvent\_and\_pH\_on\_the\_ Effect\_of\_Solvent\_and\_pH\_on\_the\_

<u>Fluorescence\_Excitation\_and\_Emission\_Spectra\_of\_Solutions\_Containing\_Fluorescein</u> However, there are some widely accepted values:

\*\*In 0.1 N NaOH (pH > 11):\*\*

\*  $\varepsilon = 92,300 \text{ M}^{-1} \text{ cm}^{-1}$  at 490 nm (Seybold, 1969b)

\* This value is often used as a reference standard.

\*\*In other solvents and pH conditions:\*\*

\* Values vary depending on the specific solvent and pH.

\* Some sources report an average value of 70,000 M<sup>-1</sup>cm<sup>-1</sup> for general use.

You can find further information on the molar absorption coefficient of fluorescein in these resources:

\* \*\*OMLC Spectral Data for Fluorescein:\*\*

https://omlc.org/spectra/PhotochemCAD/html/037.html

\* \*\*AAT Bioquest:\*\*

https://www.aatbio.com/products/fluorescein-cas-2321-07-5

(Provides information on the extinction coefficient)

\* \*\*Determination of the molar absorption coefficient of fluorescein sodium:\*\* https://pubmed.ncbi.nlm.nih.gov/1541332/ It is crucial to consider the specific conditions of your experiment when working with fluorescein, as the molar absorption coefficient can significantly affect your results.

# What is the molar absorption coefficient of rhodamine 6G?

## rhodamine 6G, molar absorption coefficient (ε), Gemini Advanced

## Gemini Advanced

The molar absorption coefficient of rhodamine 6G in ethanol at its peak absorption wavelength of 530 nm is  $116,000 \text{ M}^{-1}\text{cm}^{-1}$ .

https://omlc.org/spectra/PhotochemCAD/html/083.html

You can find this information on the following resources:

\* \*\*AAT Bioquest:\*\*

https://www.aatbio.com/resources/extinction-coefficient/rhodamine\_6g

\* \*\*PhotochemCAD:\*\*

https://www.photochemcad.com/databases/common-compounds/xanthenes/rhodamine-6g \* \*\*OMLC:\*\*

https://omlc.org/spectra/PhotochemCAD/html/083.html

It's important to note that the molar absorption coefficient can vary slightly depending on the solvent used and the concentration of the dye.

# What is the molar absorption coefficient of chlorophyll a?

# Gemini Advanced

The molar absorption coefficient of chlorophyll a varies depending on the solvent and the specific wavelength. Here are some commonly cited values:

\* \*\*In diethyl ether:\*\*

\*  $1.12 \times 10^{5} M^{-1} cm^{-1}$  at 430 nm (Seely & Jensen, 1965)

\* 8.04 x  $10^4$  M<sup>-1</sup>cm<sup>-1</sup> at 662 nm (Seely & Jensen, 1965)

\* \*\*In acetone:\*\*

\* 8.77 x  $10^4$  M<sup>-1</sup>cm<sup>-1</sup> at 664.3 nm (Jeffrey & Humphrey, 1975)

\* \*\*In 90% acetone:\*\*

\* 7.875 x 10<sup>4</sup> M<sup>-1</sup>cm<sup>-1</sup> at 662.7 nm (Jeffrey & Humphrey, 1975)

You can find more information and absorption spectra for chlorophyll a on the following resources:

\* \*\*OMLC:\*\*

https://omlc.org/spectra/PhotochemCAD/html/123.html

\* \*\*Jeffrey, S. W., & Humphrey, G. F. (1975). New spectrophotometric equations for determining chlorophylls a, b, c1 and c2 in higher plants, algae and natural phytoplankton:\*\*

https://epic.awi.de/28828/1/Jef1997j.pdf

Please note that these are just a few examples, and the molar absorption coefficient of chlorophyll a can vary depending on the specific experimental conditions.

# What is the molar absorption coefficient of chlorophyll b?

## Gemini Advanced

The molar absorption coefficient of chlorophyll b varies depending on the solvent and the specific wavelength. Here are some commonly cited values:

\* \*\*In diethyl ether:\*\*

### \* 5.62 x 10<sup>4</sup> M<sup>-1</sup>cm<sup>-1</sup> at 453 nm (Vernon, 1960)

\* 4.69 x 10<sup>4</sup> M<sup>-1</sup>cm<sup>-1</sup> at 642 nm (Vernon, 1960)

\* \*\*In 90% acetone:\*\*

\* 4.661 x 10<sup>4</sup> M<sup>-1</sup>cm<sup>-1</sup> at 646.8 nm (Jeffrey & Humphrey, 1975)

You can find more information and absorption spectra for chlorophyll b on the following resources:

\* \*\*OMLC:\*\*

https://omlc.org/spectra/PhotochemCAD/html/125.html

\* \*\*Jeffrey, S. W., & Humphrey, G. F. (1975). New spectrophotometric equations for determining chlorophylls a, b, c1 and c2 in higher plants, algae and natural phytoplankton:\*\* https://epic.awi.de/28829/1/Jef1997k.pdf

Please note that these are just a few examples, and the molar absorption coefficient of chlorophyll b can vary depending on the specific experimental conditions.

#### QUESTIONABLE: 5.62 x 10<sup>4</sup> M<sup>-1</sup>cm<sup>-1</sup> OUESTIONABLE: Vernon, 1960

QUESTIONABLE: Vernon, 1960

# What is the molar absorption coefficient of chlorophyll d?

The molar absorption coefficient of chlorophyll d depends on the solvent and the wavelength of light. In methanol, the molar extinction coefficient ( $\epsilon$ ) of chlorophyll d is:

\*  $63.68 \times 10^{3} \text{ L} \cdot \text{mol}^{-1} \cdot \text{cm}^{-1}$  at 697 nm

https://pubmed.ncbi.nlm.nih.gov/22395150/

This value was determined by Chen et al. (2012) using Inductively Coupled Plasma Mass Spectrometry to measure the concentration of chlorophyll d and then relating it to its absorbance at the specified wavelength.

\*\*Reference:\*\*

\* Chen, M., Schliep, M., Willows, R. D., Cai, Z.-L., Neilan, B. A., & Scheer, H. (2012). Extinction coefficient for red-shifted chlorophylls: chlorophyll d and chlorophyll f. Biochimica et Biophysica Acta (BBA) - Bioenergetics, 1817(3), 344–349.

QUESTIONABLE: Chen, M., Schliep, M., Willows, R. D., Cai, Z.-L., Neilan, B. A., & Scheer, H. (2012). Extinction coefficient for red-shifted chlorophylls: chlorophyll d and chlorophyll f. Biochimica et Biophysica Acta (BBA) - Bioenergetics, 1817(3), 344–349.

# What is the molar absorption coefficient of chlorophyll f?

## Gemini Advanced

The molar absorption coefficient of chlorophyll f varies depending on the solvent and wavelength. In methanol, the molar extinction coefficient ( $\epsilon$ ) of chlorophyll f is:

\* 7.10 x  $10^4$  L·mol<sup>-1</sup>·cm<sup>-1</sup> at 437 nm

\* 5.68 x  $10^4$  L·mol<sup>-1</sup>·cm<sup>-1</sup> at 706 nm

These values were determined by Chen et al. (2012) using Inductively Coupled Plasma Mass Spectrometry to measure the concentration of chlorophyll f and then relating it to its absorbance at the specified wavelengths.

\*\*Reference:\*\*

\* Chen, M., Schliep, M., Willows, R. D., Cai, Z.-L., Neilan, B. A., & Scheer, H. (2012). Extinction coefficient for red-shifted chlorophylls: chlorophyll d and chlorophyll f. Biochimica et Biophysica Acta (BBA) - Bioenergetics, 1817(3), 344–349.

QUESTIONABLE: Chen, M., Schliep, M., Willows, R. D., Cai, Z.-L., Neilan, B. A., & Scheer, H. (2012). Extinction coefficient for red-shifted chlorophylls: chlorophyll d and chlorophyll f. Biochimica et Biophysica Acta (BBA) - Bioenergetics, 1817(3), 344–349.

# What is the molar absorption coefficient of tetraphenylporphyrin?

The molar absorption coefficient of tetraphenylporphyrin (TPP) can vary depending on the solvent used and the specific wavelength. However, a widely accepted value is:

\* \*\*In benzene:\*\*  $4.8 \times 10^5 \text{ M}^{-1} \text{ cm}^{-1}$  at the Soret band (around 415 nm)

This value is often used as a reference for calculating the concentration of TPP in solution using the Beer-Lambert law.

You can find additional information and absorption spectra for TPP on these resources:

\* \*\*OMLC:\*\*

https://omlc.org/spectra/PhotochemCAD/html/099.html

\* \*\*PhotochemCAD:\*\*

https://www.photochemcad.com/databases/common-compounds/porphyrins/h2tpp

Please note that other values for the molar absorption coefficient have been reported in the literature, ranging from  $1.89 \times 10^5 \text{ M}^{-1} \text{ cm}^{-1}$  to  $4.7 \times 10^5 \text{ M}^{-1} \text{ cm}^{-1}$  at the Soret band, depending on the solvent and experimental conditions.

What is the molar absorption coefficient of indocyanine green?

The molar absorption coefficient of indocyanine green (ICG) varies depending on the solvent and wavelength of light.

In aqueous solutions, the molar absorption coefficient ( $\epsilon$ ) of ICG is approximately: \* \*\*7.8 x 10<sup>4</sup> M<sup>-1</sup>cm<sup>-1</sup> at 780 nm\*\*

However, ICG tends to aggregate in water at high concentrations, which affects its absorption properties. This means the effective absorption does not increase linearly with increasing concentration.

You can find more information about the complex light absorption behavior of ICG and its dependency on concentration and solvent on the OMLC website:

https://omlc.org/spectra/icg/

Additionally, you can find more information about the emission and absorption properties of ICG in Intralipid solution at this ResearchGate link:

https://www.researchgate.net/publication/8518400\_Emission\_and\_absorption\_properties\_of\_ind ocyanine\_green\_in\_Intralipid\_solution

### QUESTIONABLE: 7.8 x 10<sup>4</sup> M<sup>-1</sup>cm<sup>-1</sup>

# What is the molar absorption coefficient of Alexa Fluor 488?

### Gemini Advanced

The molar absorption coefficient of Alexa Fluor 488 is:

\* \*\*91,400 M<sup>-1</sup> cm<sup>-1</sup> at 495 nm\*\*

This value is specific for Alexa Fluor 488 conjugated to secondary antibodies and is typically provided by the manufacturer, Thermo Fisher Scientific.

You can find this information and other spectral properties of Alexa Fluor dyes on the Thermo Fisher website:

\* \*\*Fluorescence Quantum Yields and Lifetimes for Alexa Fluor Dyes:\*\*

https://www.thermofisher.com/us/en/home/references/molecular-probes-the-

handbook/tables/fluorescence-quantum-yields-and-lifetimes-for-alexa-fluor-dyes.html

# What is the molar absorption coefficient of naphthalene?

## 🜙 Meta AI

The molar absorption coefficient of naphthalene is <sup>1 2</sup>:

\* 6000 cm-1M-1 in cyclohexane

\* 6000 cm-1M-1 in DMF at 15 mg L-1

The molar absorption coefficient is a measure of how well a substance absorbs light at a specific wavelength. It is an important parameter in spectroscopy and is used to quantify the amount of light absorbed by a sample. The coefficient is usually denoted by the symbol  $\varepsilon$  and is expressed in units of M-1cm-1, where M is the molarity of the solution and cm is the path length of the light through the sample.

The molar absorption coefficient of naphthalene is an important parameter in understanding its spectroscopic properties. The values of 6000 cm-1M-1 in cyclohexane and DMF at 15 mg L-1 indicate that naphthalene absorbs light strongly at specific wavelengths. This information can be useful in various applications such as analytical chemistry and materials science.

https://omlc.org/spectra/PhotochemCAD/html/001.html

https://www.aatbio.com/resources/extinction-coefficient/naphthalene

# What is the molar absorption coefficient of 8-anilino-1-naphthalenesulfonic acid?

# 💛 Meta AI

The molar absorption coefficient of 8-anilino-1-naphthalenesulfonic acid (ANS) is not specified. However, here are some key points about ANS <sup>1 2</sup>:

8-Anilino-1-naphthalenesulfonic acid (ANS) is a hydrophobic fluorescent probe.

It is used to detect protein aggregation and protein denaturation.

ANS is used as a probe to detect the hydrophobicity of protein regions.

It is used in studies of protein folding intermediates, and in research on the binding pockets of some carrier proteins.

ANS is an amphipathic molecule composed of a hydrophobic anilinonaphthalene group and a charged sulfonate group.

ANS is a useful fluorescent probe for proteins on polyacrylamide gels.

It is also used as a fluorescent probe for the estimation of the critical micelle concentration (CMC) of surfactants.

ANS is a hydrophobic polarity sensitive fluorescent dye useful as a site probe to detect conformational changes in cell and micelle membranes and molecules such as proteins.

I was unable to find the molar absorption coefficient of 8-anilino-1-naphthalenesulfonic acid (ANS). However, ANS is a useful probe for detecting protein hydrophobicity and conformational changes, and it has various applications in protein research. If you have any further questions or concerns, please do not hesitate to ask!

https://www.researchgate.net/figure/a-Molecular-structure-of-8-anilino-1-naphthalenesulfonicacid-ANS-b-Normalized fig1\_348496115

https://www.mpbio.com/uk/8-anilino-1-naphthalene-sulfonic-acid

# What is the molar absorption coefficient of anthracene?

# ノ Meta AI

The molar absorption coefficient of anthracene is <sup>1</sup>:

\* 9,700 cm-1/M at 356.2 nm

\* 9,700 cm-1M-1 in cyclohexane <sup>2</sup>

This coefficient is an important parameter in spectroscopy and is used to quantify the amount of light absorbed by a sample. The coefficient is usually denoted by the symbol  $\varepsilon$  and is expressed in units of M-1cm-1, where M is the molarity of the solution and cm is the path length of the light through the sample.

The molar absorption coefficient of anthracene is an important parameter in understanding its spectroscopic properties. This information can be useful in various applications such as analytical chemistry and materials science.

https://omlc.org/spectra/PhotochemCAD/html/022.html

https://www.aatbio.com/resources/extinction-coefficient/anthracene

# What is the molar absorption coefficient of 9,10-diphenylanthracene?

# Meta AI

The molar absorption coefficient of 9,10-diphenylanthracene is <sup>1</sup>:

\* 14,000 cm-1/M at 372.5 nm

This coefficient is an important parameter in spectroscopy and is used to quantify the amount of light absorbed by a sample. The coefficient is usually denoted by the symbol  $\varepsilon$  and is expressed in units of M-1cm-1, where M is the molarity of the solution and cm is the path length of the light through the sample.

The molar absorption coefficient of 9,10-diphenylanthracene is an important parameter in understanding its spectroscopic properties. The value of 14,000 cm-1/M at 372.5 nm indicates that this molecule absorbs light strongly at specific wavelengths. This information can be useful in various applications such as analytical chemistry and materials science.

https://omlc.org/spectra/PhotochemCAD/html/021.html

# What is the molar absorption coefficient of quinine?

# Meta AI

The molar absorption coefficient of quinine is <sup>1</sup>:

\* 5,700 cm-1/M at 349.0 nm (Irvin, 1948)

Here are some other details about quinine <sup>1</sup>:

The fluorescence emission spectrum of quinine sulfate dissolved in 0.05 M H2SO4

The excitation wavelength was 310nm

The quantum yield of this molecule is 0.546 (Eaton, 1988)

This spectrum was collected by in the summer of 1995 using a Spex FluoroMax

The excitation and emission monochromators were set at 1 mm, giving a spectral bandwidth of 4.25 nm

The data interval was 0.5 nm and the integration time was 2.0 sec

The molar absorption coefficient of quinine is an important parameter in understanding its spectroscopic properties. The value of 5,700 cm-1/M at 349.0 nm indicates that quinine absorbs light strongly at specific wavelengths. This information can be useful in various applications such as analytical chemistry and materials science.

https://omlc.org/spectra/PhotochemCAD/html/080.html



# Meta AI

The molar absorption coefficient of Acridine Orange is:

- \* 27,000 cm-1/M at 430.8 nm <sup>1</sup>
- \* 27,000 cm-1M-1 <sup>2</sup>
- \* 27,000 cm -1 M -1 <sup>3</sup>
- \* 27.000 cm -1 M -1 <sup>4</sup>

Please note that the values may vary depending on the source and conditions.

The molar absorption coefficient of Acridine Orange is 27,000 cm-1/M at 430.8 nm. The absorption and emission spectra of Acridine Orange are important for its applications in various fields. The values may vary depending on the source and conditions.

https://omlc.org/spectra/PhotochemCAD/html/032.html

https://www.aatbio.com/resources/extinction-coefficient/acridine\_orange

https://www.aatbio.com/products/acridine-orange

https://www.aatbio.com/products/acridine-orange-10-mg-ml-solution-in-water

# What is the molar absorption coefficient of coumarin 1?

# 🜙 Meta AI

The molar absorption coefficient of Coumarin 1 is <sup>1</sup>:

\* 23,500 cm-1/M at 373.2 nm

The absorption values were collected using a spectral bandwidth of 1.0 nm, a signal averaging time of 0.133 sec, a data interval of 0.25 nm, and a scan rate of 112.5 nm/min. These measurements were scaled to make the molar extinction coefficient match the value of 23,500cm-1/M at 373.2nm. Closing:

The molar absorption coefficient of Coumarin 1 is 23,500 cm-1/M at 373.2 nm. This value was calculated using a Cary 3 and a spectral bandwidth of 1.0 nm. The values may vary depending on the source and conditions.

https://omlc.org/spectra/PhotochemCAD/html/045.html

What is the molar absorption coefficient of fluorescein?

# 🖊 Meta AI

The molar absorption coefficient of fluorescein is <sup>1</sup>:

\* 92,300 cm-1/M at 500.2 nm

\* Other important details about fluorescein are:

Absorbance (nm): 487

Extinction coefficient (cm -1 M -1): 80,000

Excitation (nm): 498

Emission (nm): 517

Quantum yield: 0.79 and 0.95

Please note that the values may vary depending on the source and conditions.

The molar absorption coefficient of fluorescein is 92,300 cm-1/M at 500.2 nm. The absorption and emission spectra of fluorescein are important for its applications in various fields. The values may vary depending on the source and conditions.

https://omlc.org/spectra/PhotochemCAD/html/037.html

What is the molar absorption coefficient of rhodamine 6G?

J Meta AI

The molar absorption coefficient of rhodamine 6G is <sup>1 2 3</sup>:

\* 116,000 cm-1/M at 529.8 nm

\* Other important details about rhodamine 6G are:

Absorbance (nm): 530

Excitation (nm): 525

Emission (nm): 548

Quantum yield: 0.95

Please note that the values may vary depending on the source and conditions.

The molar absorption coefficient of rhodamine 6G is 116,000 cm-1/M at 529.8 nm. The absorption and emission spectra of rhodamine 6G are important for its applications in various fields. The values may vary depending on the source and conditions.

https://omlc.org/spectra/PhotochemCAD/html/083.html

https://www.aatbio.com/resources/extinction-coefficient/rhodamine\_6g https://www.aatbio.com/products/rhodamine-6g-cas-989-38-8

What is the molar absorption coefficient of chlorophyll a?

# ノ Meta AI

The molar absorption coefficient of chlorophyll a is:

\* 1.261E+05 M-1cm-1 and 1.884E+05 M-1cm-1 at the first peak <sup>1</sup>

- \* 111,700cm-1/M at 427.8nm <sup>2</sup>
- \* 1.250×105 L·mol-1·cm-1 in water <sup>3</sup>

Please note that the values may vary depending on the source and conditions.

The molar absorption coefficient of chlorophyll a varies depending on the source and conditions. The values were calculated at different wavelengths and using different solvents. For more information, please refer to academic sources and research papers.

https://www.seas.upenn.edu/~belab/LabProjects/1997/BE210S97W7R01

https://omlc.org/spectra/PhotochemCAD/html/123.html

https://www.chegg.com/homework-help/questions-and-answers/b-given-molar-absorptioncoefficient-chlorophyll-water-1250-times-10-5-mathrm-~l-cdot-math-q110032555

## QUESTIONABLE: and 1.884E+05 M-1cm-1

What is the molar absorption coefficient of chlorophyll b?

The molar absorption coefficient of chlorophyll b is: \*159,100cm-1/M at 453.0nm<sup>1</sup>

453 nm and 642 nm  $^{2}$ 

The molar absorption coefficient is a measure of how well a substance absorbs light at a specific wavelength. It is an important parameter in spectroscopy and is used to quantify the amount of light absorbed by a sample <sup>1</sup>.

The molar absorption coefficient of chlorophyll b is an important parameter in understanding its spectroscopic properties. The values of 159,100cm-1/M at 453.0nm and 453 nm and 642 nm indicate that chlorophyll b absorbs light strongly at specific wavelengths. This information can be useful in various applications such as analytical chemistry and materials science.

https://omlc.org/spectra/PhotochemCAD/html/125.html https://www.chemeurope.com/en/encyclopedia/Chlorophyll.html

# What is the molar absorption coefficient of chlorophyll d?

# 🖊 Meta AI

I'm sorry, but I couldn't find the molar absorption coefficient of chlorophyll d. However, I found the molar absorption coefficient of chlorophyll a and b<sup>1</sup>:

Chlorophyll a: 111,700 cm-1/M at 427.8 nm

Chlorophyll b: 159,100 cm-1/M at 453.0 nm

Please note that the values may vary depending on the source and conditions.

The molar absorption coefficient of chlorophyll a and b can be an important parameter in understanding its spectroscopic properties. The values of 111,700 cm-1/M at 427.8 nm and 159,100 cm-1/M at 453.0 nm indicate that chlorophyll a and b absorb light strongly at specific wavelengths. This information can be useful in various applications such as analytical chemistry and materials science.

https://omlc.org/spectra/PhotochemCAD/html/123.html

# What is the molar absorption coefficient of chlorophyll f? Meta AI

I'm sorry, but I couldn't find the molar absorption coefficient of chlorophyll f. However, I found the molar absorption coefficient of other chlorophylls <sup>1</sup>:

Chlorophyll a: The peak molar absorption coefficient of chlorophyll a exceeds 105 M-1 cm-1.

Chlorophyll a (in diethylether): approximate absorbance maxima of 430 nm and 662 nm

Chlorophyll b (in diethylether): approximate absorbance maxima of 453 nm and 642 nm Please note that the values may vary depending on the source and conditions.

The molar absorption coefficient of chlorophyll a and b can be an important parameter in understanding its spectroscopic properties. The values of chlorophyll a exceeding 105 M-1 cm-1 and chlorophyll b of 453 nm and 642 nm indicate that chlorophyll a and b absorb light strongly at specific wavelengths. This information can be useful in various applications such as analytical chemistry and materials science.

https://www.chemeurope.com/en/encyclopedia/Chlorophyll.html



## Meta AI

The molar absorption coefficient of tetraphenylporphyrin is <sup>1 2 3</sup>:

## 4450 M-1 cm-1 at 532 nm

## 18,900 cm-1/M at 515.0 nm

The molar absorption coefficient is a measure of how well a substance absorbs light at a specific wavelength. It is an important parameter in spectroscopy and is used to quantify the amount of light absorbed by a sample <sup>1 2 3</sup>.

The molar absorption coefficient of tetraphenylporphyrin is an important parameter in understanding its spectroscopic properties. The values of 4450 M-1 cm-1 at 532 nm and 18,900 cm-1/M at 515.0 nm indicate that tetraphenylporphyrin absorbs light strongly at specific wavelengths. This information can be useful in various applications such as analytical chemistry and materials science.

https://omlc.org/spectra/PhotochemCAD/html/101.html https://omlc.org/spectra/PhotochemCAD/html/099.html https://www.chegg.com/homework-help/questions-and-answers/iv-tetraphenylporphyrin-tppmolar-absorption-coefficient-4450-mathrm-m-1-mathrm-~cm-1-532--q104927229

## QUESTIONABLE: 4450 M-1 cm-1 at 532 nm

What is the molar absorption coefficient of indocyanine green?

## Meta AI

Here is some information about the molar absorption coefficient of indocyanine green <sup>1 2</sup>:

\* Molar extinction coefficient of ICG in water at 0.01mM and 1mM concentrations

\* Molar extinction coefficient of ICG in 22.5% albumin at 0.01mM and 1mM ICG concentrations

\* Extinction Coefficient ( $\epsilon$ ) = 230,000 cm-1M-1

Please note that the values may vary depending on the source and conditions.

The molar absorption coefficient of indocyanine green can be an important parameter in understanding its spectroscopic properties. The values of molar extinction coefficient of ICG in water at 0.01mM and 1mM concentrations and molar extinction coefficient of ICG in 22.5% albumin at 0.01mM and 1mM ICG concentrations and extinction coefficient of 230,000 cm-1M-1 indicate that indocyanine green absorbs light strongly at specific wavelengths. This information can be useful in various applications such as analytical chemistry and materials science.

https://omlc.org/spectra/icg/

https://www.aatbio.com/catalog/indocyanine-green

What is the molar absorption coefficient of Alexa Fluor 488? Meta AI

The molar absorption coefficient of Alexa Fluor 488 is:

\* 73,000 cm-1M-1<sup>123</sup>

- \* 73,000 at emission maximum in cm-1M-1<sup>123</sup>
- \* 73,000 cm-1M-1 at 495/519 nm <sup>4</sup>

The molar absorption coefficient is a measure of how well a substance absorbs light at a specific wavelength. It is an important parameter in spectroscopy and is used to quantify the amount of light absorbed by a sample.

The molar absorption coefficient of Alexa Fluor 488 is an important parameter in understanding its spectroscopic properties. The values of 73,000 cm-1M-1 at 495/519 nm indicate that Alexa Fluor 488 absorbs light strongly at specific wavelengths. This information can be useful in various applications such as analytical chemistry and materials science.

https://www.thermofisher.com/us/en/home/references/molecular-probes-the-handbook/technicalnotes-and-product-highlights/the-alexa-fluor-dve-series.html

https://www.thermofisher.com/ca/en/home/references/molecular-probes-the-handbook/technicalnotes-and-product-highlights/the-alexa-fluor-dye-series.html https://www.thermofisher.com/uk/en/home/references/molecular-probes-the-handbook/technicalnotes-and-product-highlights/the-alexa-fluor-dye-series.html https://www.aatbio.com/resources/extinction-coefficient/alexa\_fluor\_488
#### 2. Fluorescence quantum yield

### What is the fluorescence quantum yield of naphthalene?

#### ChatGPT 3.5

The fluorescence quantum yield of naphthalene is approximately 0.25. This means that about 25% of the absorbed photons result in fluorescence emission.



The fluorescence quantum yield of 8-anilino-1-naphthalenesulfonic acid (ANS) is relatively high compared to naphthalene. It is typically around 0.28 to 0.33, indicating that between 28% to 33% of the absorbed photons result in fluorescence emission.

# What is the fluorescence quantum yield of anthracene?

#### D ChatGPT 3.5

The fluorescence quantum yield of anthracene is approximately 0.28. This means that about 28% of the absorbed photons result in fluorescence emission.

#### What is the fluorescence quantum yield of 9,10-diphenylanthracene?

#### ChatGPT 3.5

The fluorescence quantum yield of 9,10-diphenylanthracene (DPA) is quite high, typically around 0.98. This indicates that approximately 98% of the absorbed photons result in fluorescence emission.



The fluorescence quantum yield of quinine is quite high, typically around 0.54 to 0.58 in aqueous solution. This means that between 54% to 58% of the absorbed photons result in fluorescence emission.

### What is the fluorescence quantum yield of acridine orange?

#### ChatGPT 3.5

The fluorescence quantum yield of acridine orange can vary depending on its environment and concentration. In aqueous solution, the fluorescence quantum yield of acridine orange is typically around 0.7 to 0.85. This means that approximately 70% to 85% of the absorbed photons result in fluorescence emission.



Coumarin 1, **also known as 7-hydroxycoumarin**, has a fluorescence quantum yield that typically ranges from 0.15 to 0.40. This means that approximately 15% to 40% of the absorbed photons result in fluorescence emission.

#### QUESTIONABLE: also known as 7-hydroxycoumarin



The fluorescence quantum yield of fluorescein can vary depending on the solvent and conditions, but it is generally high. In aqueous solution, the fluorescence quantum yield of fluorescein is typically around 0.85 to 0.90. This means that approximately 85% to 90% of the absorbed photons result in fluorescence emission.



The fluorescence quantum yield of rhodamine 6G is quite high, typically around 0.95 to 0.99. This indicates that approximately 95% to 99% of the absorbed photons result in fluorescence emission.



The fluorescence quantum yield of chlorophyll a is relatively low, typically around 0.001 to 0.01. This means that only a very small percentage of the absorbed photons result in fluorescence emission, specifically around 0.1% to 1%.

What is the fluorescence quantum yield of chlorophyll b?

#### ChatGPT 3.5

The fluorescence quantum yield of chlorophyll b is also relatively low, similar to chlorophyll a. It is typically around 0.003 to 0.01. This means that only a very small percentage of the absorbed photons result in fluorescence emission, specifically around 0.3% to 1%.

# What is the fluorescence quantum yield of chlorophyll d?

The fluorescence quantum yield of chlorophyll d is quite low, similar to chlorophyll a and b. It is typically around 0.001 to 0.003. This means that only a very small percentage of the absorbed photons result in fluorescence emission, specifically around 0.1% to 0.3%.

## What is the fluorescence quantum yield of chlorophyll f?

#### ChatGPT 3.5

The fluorescence quantum yield of chlorophyll f is quite low, similar to other chlorophylls. It is typically around 0.001 to 0.003. This means that only a very small percentage of the absorbed photons result in fluorescence emission, specifically around 0.1% to 0.3%.

or

As of my last update, the fluorescence quantum yield of chlorophyll f hasn't been extensively studied or widely reported. Therefore, there isn't a widely accepted value for its fluorescence quantum yield available. It's possible that research since then has provided more information, but you might need to consult more recent literature or scientific sources for the latest data on chlorophyll f.

# What is the fluorescence quantum yield of tetraphenylporphyrin?

The fluorescence quantum yield of tetraphenylporphyrin (TPP) is quite high, typically around 0.15 to 0.25. This means that approximately 15% to 25% of the absorbed photons result in fluorescence emission.

# What is the fluorescence quantum yield of indocyanine green?

The fluorescence quantum yield of indocyanine green (ICG) is quite high, typically around 0.13 to 0.16. This means that approximately 13% to 16% of the absorbed photons result in fluorescence emission.

What is the fluorescence quantum yield of Alexa Fluor 488?

#### ChatGPT 3.5

The fluorescence quantum yield of Alexa Fluor 488 is quite high, typically around 0.92. This means that approximately 92% of the absorbed photons result in fluorescence emission.



#### ChatGPT 40

The fluorescence quantum yield of naphthalene in cyclohexane at room temperature is approximately 0.23. This value can vary slightly depending on the solvent and experimental conditions used.

### What is the fluorescence quantum yield of 8-anilino-1-naphthalenesulfonic acid?

### SchatGPT 40

The fluorescence quantum yield of 8-anilino-1-naphthalenesulfonic acid (ANS) is approximately 0.001 in water. However, this value can significantly increase in nonpolar or hydrophobic environments, such as when bound to proteins or membranes, where it can reach values around 0.4 to 0.5. The quantum yield of ANS is highly sensitive to its environment, making it a useful probe for studying protein folding and membrane interactions.



#### ChatGPT 40

The fluorescence quantum yield of anthracene in ethanol is approximately 0.27. This value can vary slightly depending on the solvent and experimental conditions used. Anthracene is known for its high fluorescence quantum yield compared to many other organic molecules.

What is the fluorescence quantum yield of 9,10-diphenylanthracene?

The fluorescence quantum yield of 9,10-diphenylanthracene is very high, typically around 0.90 to 0.95 in solvents such as cyclohexane or ethanol. This high quantum yield makes it a popular standard for fluorescence measurements and a useful compound in various photophysical studies.



#### ChatGPT 40

The fluorescence quantum yield of quinine is approximately 0.54 in 0.1 M sulfuric acid. This value is commonly used as a standard in fluorescence spectroscopy due to its well-characterized and relatively high quantum yield. The quantum yield can vary depending on the solvent and pH of the solution.



#### ChatGPT 40

The fluorescence quantum yield of acridine orange varies depending on the environment. In aqueous solution, its quantum yield is typically around 0.30 to 0.40. Acridine orange is known for its pH-dependent fluorescence properties and is widely used in biological staining and microscopy.

### What is the fluorescence quantum yield of coumarin 1?

#### ChatGPT 40

The fluorescence quantum yield of Coumarin 1 (also known as 7-methoxycoumarin or 7methoxy-4-methylcoumarin) is approximately 0.73 in ethanol. This high quantum yield, along with its favorable photophysical properties, makes Coumarin 1 a useful dye in fluorescence applications, including laser dyes and fluorescence spectroscopy.

#### QUESTIONABLE: also known as 7-methoxycoumarin or 7-methoxy-4-methylcoumarin



The fluorescence quantum yield of fluorescein is approximately 0.92 in 0.1 M sodium hydroxide (NaOH) solution. This high quantum yield, along with its strong absorbance and fluorescence characteristics, makes fluorescein a widely used fluorescent dye in various applications, including microscopy, flow cytometry, and fluorescence spectroscopy.



The fluorescence quantum yield of rhodamine 6G is approximately 0.95 in ethanol. This high quantum yield, along with its excellent photostability and strong fluorescence, makes rhodamine 6G a popular dye for various fluorescence applications, including laser dyes, fluorescence microscopy, and spectroscopy.

What is the fluorescence quantum yield of chlorophyll a?

#### ChatGPT 40

The fluorescence quantum yield of chlorophyll a is relatively low, typically around 0.30 in organic solvents such as diethyl ether. In vivo, within the photosynthetic apparatus, the quantum yield can be even lower due to efficient energy transfer processes. The exact value can vary depending on the solvent and specific experimental conditions.



#### ChatGPT 40

The fluorescence quantum yield of chlorophyll b is generally lower than that of chlorophyll a. In organic solvents such as diethyl ether, the fluorescence quantum yield of chlorophyll b is approximately 0.16. Similar to chlorophyll a, the quantum yield can vary depending on the solvent and specific experimental conditions, and it tends to be lower in vivo due to energy transfer processes within the photosynthetic apparatus.



The fluorescence quantum yield of chlorophyll d is generally lower compared to chlorophyll a and b. It is approximately 0.10 in organic solvents. This value can vary depending on the specific solvent and experimental conditions used. Chlorophyll d, like other chlorophylls, is involved in photosynthetic energy transfer processes, which can affect its fluorescence properties in vivo.



The fluorescence quantum yield of chlorophyll f is relatively low, typically around 0.10 in organic solvents. Chlorophyll f is similar to other chlorophylls in that its fluorescence properties can be significantly influenced by its environment, particularly within the photosynthetic apparatus where energy transfer processes occur.



The fluorescence quantum yield of tetraphenylporphyrin (TPP) is approximately 0.11 in toluene. This value can vary depending on the solvent and specific experimental conditions used. Tetraphenylporphyrin is often used in studies related to photochemistry and photophysics due to its well-defined photophysical properties.



#### ChatGPT 40

The fluorescence quantum yield of indocyanine green (ICG) is relatively low, typically around 0.02 in aqueous solution. This low quantum yield is due to its strong absorption and rapid non-radiative decay processes. Despite this, ICG is widely used in medical imaging and diagnostics due to its near-infrared fluorescence, which allows for deep tissue penetration and minimal background fluorescence in biological applications.



The fluorescence quantum yield of Alexa Fluor 488 is approximately 0.92. This high quantum yield, combined with its excellent photostability and bright fluorescence, makes Alexa Fluor 488 a popular choice for various fluorescence-based applications, including flow cytometry, fluorescence microscopy, and fluorescence resonance energy transfer (FRET) studies.



The fluorescence quantum yield of Naphthalene is 0.23 [1]. This value was reported by Berlman in 1971 [1]. However, please note that the quantum yield can depend on various factors such as the solvent, the concentration, and the temperature. It's always best to refer to the original sources or specific experimental data for the most accurate information [1]. If you need further assistance, feel free to ask!

Source: Conversation with Copilot, 5/24/2024 <u>Naphthalene - omlc.org</u> <u>A Guide to Recording Fluorescence Quantum Yields</u> <u>Naphthalene and its Derivatives: Efficient Fluorescence Probes for ...</u> <u>Fluorescence Measurements of Benzene, Naphthalene, Anthracene, Pyrene ...</u> <u>Naphthalene and its Derivatives: Efficient Fluorescence Probes for ...</u>

What is the fluorescence quantum yield of 8-anilino-1-naphthalenesulfonic acid?

The fluorescence quantum yield of 8-anilino-1-naphthalenesulfonic acid (ANS) is reported to be between **0.2 to 0.3** [4]. This value represents the ratio of photons absorbed to photons emitted through fluorescence, indicating the probability of the excited state being deactivated by fluorescence rather than by another, non-radiative mechanism [1]. Please note that the fluorescence intensity of ANS increases when the dye binds to the hydrophobic regions of a protein [1]. The protein-ANS complex has an emission spectrum which is shifted to a broad maximum at 470 nm

[1]. At pH 8, protein causes a 40-fold increase in the relative quantum yield compared to free ANS in solution [1].

Source: Conversation with Copilot, 5/24/2024

1-Anilino-8-naphthalenesulfonate: A fluorescent probe of membrane ...

8-Anilino-1-naphthalenesulfonic acid ammonium salt - MilliporeSigma

Synthesis and Spectral Properties of 8-Anilinonaphthalene-1-sulfonic ...

8-Anilino-1-naphthalenesulfonic acid for fluorescence, = 97.0 HPLC ...

<u>8-Anilino-1-naphthalenesulfonic acid for fluorescence, = 97.0 HPLC ...</u>

http://pubs.acs.org/journal/acsodf



The fluorescence quantum yield of anthracene is reported to be 0.36 [2]. This value represents the ratio of photons absorbed to photons emitted through fluorescence, indicating the probability of the excited state being deactivated by fluorescence rather than by another, non-radiative mechanism [1]. Please note that the fluorescence intensity and quantum yield can be influenced by the solvent and the presence of substituents [1]. For instance, 9,10-dimethylanthracene has a fluorescence quantum yield of about 70% [1].

Source: Conversation with Copilot, 5/24/2024

Anthracene - omlc.org

Photophysical characterization of the 9,10-disubstituted anthracene ...

[\*] and <u>A - Colorado State University</u>

Fluorescence Measurements of Benzene, Naphthalene, Anthracene, Pyrene ... en.wikipedia.org



#### 🖊 Copilot

The fluorescence quantum yield of 9,10-diphenylanthracene is reported to be 1 when dissolved in cyclohexane [1]. This value represents the ratio of photons absorbed to photons emitted through fluorescence, indicating the probability of the excited state being deactivated by fluorescence rather than by another, non-radiative mechanism [1]. Please note that the fluorescence intensity and quantum yield can be influenced by the solvent and the presence of substituents [1]. For instance, other fluorescence yields include **0.90** in cyclohexane [1].

Source: Conversation with Copilot, 5/24/2024

9,10-Diphenylanthracene

Photophysical characterization of the 9,10 ... - RSC Publishing

Fluorescence lifetimes and quantum yields of 9,10-diphenylanthracene ...

Reevaluation of absolute luminescence quantum yields of standard ...

en.wikipedia.org

### What is the fluorescence quantum yield of quinine?

#### Copilot

The fluorescence quantum yield of quinine varies depending on the solvent and conditions under which the measurement is taken. Here are some reported values:

\* A value of **0.546** has been reported for quinine sulfate dissolved in 0.5 M H2SO4 [1].

\* Another source reports a value of **0.561** for quinine bisulphate in aqueous 1N H2SO4 with excitation at 366 nm [2].

Please note that these values can vary depending on the solvent and the conditions under which the measurement is taken. Always refer to the specific conditions under which the measurements were taken when using these values. The fluorescence quantum yield gives the probability of the excited state being deactivated by fluorescence rather than by another, non-radiative mechanism [3].

Source: Conversation with Copilot, 5/24/2024

Quinine sulfate

Absolute measurement of the quantum yield of quinine bisulphate ....

Quantum yield - Wikipedia

A Guide to Recording Fluorescence Quantum Yields

Characterization of Quinine and Its Determination - Colby College

#### What is the fluorescence quantum yield of acridine orange?

### 🥟 Copilot

The fluorescence quantum yield of Acridine Orange is 0.2 [1]. This value was reported by Soep in 1972 [1]. Please note that the quantum yield can depend on the conditions, such as the solvent and the concentration. Always refer to the original sources for the most accurate information [1]. Source: Conversation with Copilot, 5/24/2024

Acridine orange - omlc.org

Photochem | Free Full-Text | Photodynamic Activity of Acridine Orange ...

Acridine Orange: A Review of Novel Applications for Surgical Cancer ...

Acridine Orange Staining: Principle, Procedure, Results

https://doi.org/10.3390/photochem3020014

en.wikipedia.org



The fluorescence quantum yield of Coumarin 1 is reported to be **0.73** [1]. However, it's worth noting that the fluorescence yield has also been reported to be **0.50** [1]. These values can vary depending on the conditions of the experiment, such as the solvent used. Please refer to the original sources for more detailed information [1].

Source: Conversation with Copilot, 5/24/2024

Coumarin 1 - omlc.org

Overview of coumarin-fused-coumarins: synthesis, photophysical ...

<u>Coumarin 6 - omlc.org</u> <u>Relative Quantum Yield Measurements of Coumarin Encapsulated ... - Springer</u> <u>en.wikipedia.org</u>

#### What is the fluorescence quantum yield of fluorescein?

#### Copilot

The fluorescence quantum yield ( $\Phi$ ) of fluorescein is **0.79** in ethanol (neutral) [1]. This value represents the efficiency of the fluorescence process, which is the ratio of photons emitted to photons absorbed [2]. Please note that this value can vary depending on the conditions and the method of measurement. Always refer to the specific conditions under which the measurement was taken for accurate data.

Source: Conversation with Copilot, 5/24/2024 What is the quantum yield of fluorescein? | AAT Bioquest Fluorescence - Chemistry LibreTexts A Guide to Recording Fluorescence Quantum Yields Fluorescein - omlc.org

3.5: Quantum Yield of Fluorescence - Chemistry LibreTexts

What is the fluorescence quantum yield of rhodamine 6G?

The fluorescence quantum yield of Rhodamine 6G is reported to be **0.95** when dissolved in ethanol [1]. This value represents the ratio of photons absorbed to photons emitted through fluorescence, indicating the probability of the excited state being deactivated by fluorescence rather than by another, non-radiative mechanism [1]. Please note that the fluorescence intensity and quantum yield can be influenced by the solvent and the presence of substituents [1]. For instance, Rhodamine 6G's fluorescence quantum yields are generally high (> 0.90), and this was ascribed to structural features (rigidity, planarity and presence of condensed rings) in the Rhodamine 6G molecule [3].

Source: Conversation with Copilot, 5/24/2024 <u>Rhodamine 6G - omlc.org</u> <u>Solvent Effects on the Spectral Properties of Rhodamine 6G: Estimation ...</u> <u>Rhodamine 6G - Wikipedia</u> <u>en.wikipedia.org</u>

What is the fluorescence quantum yield of chlorophyll a? Copilot

The fluorescence quantum yield of chlorophyll a is **0.25** [1]. This value is generally independent of the solvent and excitation wavelength [1]. The quantum yield gives the probability of the excited state being deactivated by fluorescence rather than by another, non-radiative mechanism [2]. Source: Conversation with Copilot, 5/24/2024

The Absolute Quantum Yields of the Fluorescence of Chlorophyll ... Chlorophyll fluorescence—a practical guide - Oxford Academic Chlorophyll fluorescence analysis: a guide to good practice and ... Chlorophyll Fluorescence | Temperature Dependant Quantum Yield Using Chlorophyll Fluorescence to Study Photosynthesis\* https://doi.org/10.1093/jxb/ert208 https://doi.org/10.1093/jexbot/51.345.659

# What is the fluorescence quantum yield of chlorophyll b?

The fluorescence quantum yield of chlorophyll b is **0.117** [1]. This value can vary depending on the solvent used. For instance, it is **0.11** for ether solutions and **0.06** for methanol solutions [2]. The quantum yield gives the probability of the excited state being deactivated by fluorescence rather than by another, non-radiative mechanism [3].

Source: Conversation with Copilot, 5/24/2024

Chlorophyll b - omlc.org

The Absolute Quantum Yields of the Fluorescence of Chlorophyll ...

A Guide to Recording Fluorescence Quantum Yields

Chlorophyll fluorescence analysis: a guide to good practice and ...

Control of the maximal chlorophyll fluorescence yield by the QB binding ...

https://doi.org/10.1093/jxb/ert208

# What is the fluorescence quantum yield of chlorophyll d?

I'm sorry, but I couldn't find the exact fluorescence quantum yield of Chlorophyll d in my search results. The quantum yield can depend on various factors such as the solvent, the concentration, and the temperature. It's always best to refer to the original sources or specific experimental data for the most accurate information. If you have access to a specific source or data, I would recommend referring to that. If you need further assistance, feel free to ask!

Source: Conversation with Copilot, 5/24/2024

Chlorophyll fluorescence analysis: a guide to good practice and ...

A Guide to Recording Fluorescence Quantum Yields

Using Chlorophyll Fluorescence to Study Photosynthesis\*

Chlorophyll Fluorescence | Temperature Dependant Quantum Yield

Chlorophyll fluorescence-a practical guide - Oxford Academic

https://doi.org/10.1093/jxb/ert208

# What is the fluorescence quantum yield of chlorophyll f?

The fluorescence quantum yield of Chlorophyll f in pyridine has been determined to be **0.16** [1]. This value was reported in a study published in 2014 [1]. However, please note that the quantum yield can depend on various factors such as the solvent, the concentration, and the temperature. It's always best to refer to the original sources or specific experimental data for the most accurate information [2]. If you need further assistance, feel free to ask!

Source: Conversation with Copilot, 5/24/2024

Excited state properties of chlorophyll f in organic solvents at ...

Chlorophyll fluorescence analysis: a guide to good practice and ...

A Guide to Recording Fluorescence Quantum Yields

Using Chlorophyll Fluorescence to Study Photosynthesis\*

Chlorophyll Fluorescence | Temperature Dependant Quantum Yield

https://doi.org/10.1093/jxb/ert208

### What is the fluorescence quantum yield of tetraphenylporphyrin?

#### Copilot

The fluorescence quantum yield of tetraphenylporphyrin (TPP) is reported to be 0.11 when dissolved in toluene [1]. This value represents the ratio of photons absorbed to photons emitted through fluorescence, indicating the probability of the excited state being deactivated by fluorescence rather than by another, non-radiative mechanism [1]. Please note that the fluorescence intensity and quantum yield can be influenced by the solvent and the presence of substituents [1]. For instance, the quantum yield of zinc tetraphenylporphyrin (ZnTPP) is **0.033** [4]. Source: Conversation with Copilot, 5/24/2024 <u>Tetraphenylporphyrin, [TPP]</u> <u>Zinc tetraphenylporphyrin, [ZnTPP]</u> <u>A Guide to Recording Fluorescence Quantum Yields</u>

Tetraphenylporphyrin - Wikipedia

en.wikipedia.org

What is the fluorescence quantum yield of indocyanine green? Copilot

The fluorescence quantum yield of Indocyanine Green (ICG) is **2.5%** in water [1]. However, ICG has several drawbacks such as aqueous instability and photodegradation, which can limit its use for in vitro and in vivo near-infrared fluorescence imaging [1]. Please note that the quantum yield can depend on various factors such as the solvent, the concentration, and the temperature. It's always best to refer to the original sources or specific experimental data for the most accurate information [1]. If you need further assistance, feel free to ask!

Enhancement of aqueous stability and fluorescence brightness of ...

A Review of Indocyanine Green Fluorescent Imaging in Surgery - Hindawi IOPscience Yield of fluorescence from indocyanine green in plasma and flowing ... https://doi.org/10.1155/2012/940585 en.wikipedia.org



### What is the fluorescence quantum yield of Alexa Fluor 488?

#### Copilot

The fluorescence quantum yield of Alexa Fluor 488 is 0.92 in water [1] [4] [5]. This value is generally accepted, but please note that the quantum yield can depend on various factors such as the solvent, the concentration, and the temperature. It's always best to refer to the original sources or specific experimental data for the most accurate information [1] [4] [5]. If you need further assistance, feel free to ask!

Source: Conversation with Copilot, 5/24/2024 <u>Fluorescence quantum yields (QY) and lifetimes (τ) for Alexa Fluor dyes ...</u> <u>Quantum Yield [Alexa Fluor 488] | AAT Bioquest</u> <u>What is the quantum yield of Alexa Fluor 488? | AAT Bioquest</u> <u>Fluorochromes Brightness Chart - Boston University</u> <u>Quantum Yield [Alexa Fluor 488] | AAT Bioquest</u> <u>Fluorescence of Alexa Fluor Dye Tracks Protein Folding - PLOS</u>



The fluorescence quantum yield of naphthalene is reported to be around 0.23 when dissolved in cyclohexane [2]. This value indicates that for every 100 photons absorbed by the naphthalene molecule, about 23 photons are re-emitted as fluorescence. https://omlc.org/spectra/PhotochemCAD/html/001.html

What is the fluorescence quantum yield of 8-anilino-1-naphthalenesulfonic acid?

#### Gemini

Unfortunately, there isn't readily available information on the specific fluorescence quantum yield of 8-anilino-1-naphthalenesulfonic acid (ANS) itself.

Here's what we know:

ANS has low fluorescence in water [2].

Its fluorescence intensity increases significantly when bound to hydrophobic regions of proteins [2].

Research papers discuss the relative increase in quantum yield upon binding to proteins compared to free ANS in solution. One source mentions a 40-fold increase at pH 8 [2]. This implies the free ANS in solution has a intrinsically low quantum yield.

Finding the exact quantum yield value might require further research or contacting a supplier who may have measured this specific property. https://pubs.acs.org/doi/10.1021/acsomega.9b03002

#### What is the fluorescence quantum yield of anthracene?

#### Gemini

The fluorescence quantum yield of anthracene is around 0.36 [1, 2]. This means that roughly 36% of the absorbed photons by anthracene are re-emitted as fluorescence.

It's important to note that the specific value can vary slightly depending on the solvent and other experimental conditions. The value of 0.36 comes from a study in cyclohexane [2]. https://pubs.acs.org/doi/10.1021/acsomega.9b03002

What is the fluorescence quantum yield of 9,10-diphenylanthracene?

The fluorescence quantum yield of 9,10-diphenylanthracene (DPA) is reported to be quite high, around 0.8 - 1.0 in various solvents like cyclohexane, ethanol, benzene [2, 3]. This indicates a very efficient fluorescence process, where close to 80-100% of absorbed photons are re-emitted as fluorescence.

Here are some sources for further reference:

A study reporting a value of 0.9 - 0.95 in different solvents [3]: Fluorescence quantum yield determinations. 9,10-Diphenylanthracene as a reference standard in different solvents | The Journal of Physical Chemistry - ACS Publications

https://pubs.acs.org/doi/10.1021/j100550a010

Information on the absorption and fluorescence spectra of DPA, mentioning a quantum yield of 1 9,10-Diphenylanthracene - OMLC

What is the fluorescence quantum yield of quinine?

#### Gemini

Quinine is a well-established reference material for determining fluorescence quantum yield, but the specific value depends on the solvent it's in:

0.1 M Perchloric Acid: This is the preferred solvent for quinine as a reference standard. In this environment, the fluorescence quantum yield is a consistent  $0.60 \pm 0.007$ . This value is reliable and shows minimal temperature dependence between 20-45°C [1].

https://pubmed.ncbi.nlm.nih.gov/30907575/

0.05 M Sulfuric Acid: While sometimes used, sulfuric acid is not recommended due to variations in quantum yield. The value in sulfuric acid solutions can be around 0.546, but it decreases with increasing temperature [2]. This temperature dependence makes it less reliable for standardization purposes.

https://www.researchgate.net/publication/331995736\_Goodbye\_to\_Quinine\_in\_Sulfuric\_Acid\_S\_olutions\_as\_a\_Fluorescence\_Quantum\_Yield\_Standard

Here are some additional points to consider:

The fluorescence process describes how efficiently a molecule emits light after absorbing a photon. <u>https://www.thermofisher.com/us/en/home/life-science/cell-analysis/cell-analysis-learning-</u>

center/molecular-probes-school-of-fluorescence/fluorescence-basics/fluorescence-

fundamentals/process-fluorescence.html

A quantum yield of 0.6 indicates that for every 100 photons absorbed by quinine in 0.1 M perchloric acid, roughly 60 photons are re-emitted as fluorescence.

https://www.chegg.com/homework-help/questions-and-answers/quinine-fluorescence-quantumyield-equal-approximately-1--light-10-15-photons-mathrm-s-1-i-q125995889

If you're working with quinine for fluorescence measurements, it's crucial to specify the solvent and potentially account for temperature variations, especially if using sulfuric acid.

For further reference, you can consult these sources:

Goodbye to Quinine in Sulfuric Acid Solutions as a Fluorescence Quantum Yield Standard [1]: This research highlights the limitations of sulfuric acid and recommends perchloric acid for reliable measurements.

https://pubmed.ncbi.nlm.nih.gov/30907575/

Quinine sulfate - OMLC [2]: This website provides a quantum yield value for quinine in sulfuric acid (likely at room temperature) but emphasizes the importance of considering solvent and potential temperature dependence.

# What is the fluorescence quantum yield of acridine orange?

#### Gemini

The fluorescence quantum yield of acridine orange (AO) depends on several factors, including its environment:

Monomeric vs. Dimeric Form: Acridine orange can exist as a monomer (single molecule) or dimer (two molecules bound together). The fluorescence intensity and quantum yield are significantly higher for the monomeric form [1, 2].

Solvent: The solvent can influence the equilibrium between monomer and dimer. Studies report varying quantum yield values depending on the solvent used [1, 3].

Here's a breakdown of what to expect:

Monomeric Acridine Orange: Reported values for the fluorescence quantum yield of monomeric AO range from 0.1 to 0.6 in different solvents like ethanol, water, and buffers [1, 2, 3].

Challenges in Quantifying Monomer Emission: Isolating the emission specifically from the monomeric form can be difficult. The presence of dimers can lead to underestimation of the true quantum yield for the monomer.

Here are some references for further reading:

Interactions of acridine orange with double stranded nucleic acids. Spectral and affinity studies PubMed This research discusses the impact of dimerization on fluorescence and mentions a quantum yield of 0.2 for AO in basic ethanol (likely dominated by monomers).

#### https://gemini.google.com/u/1/pubmed.ncbi.nlm.nih.gov/32716432

Fluorescence decay and quantum yield characteristics of acridine orange and proflavine bound to DNA PubMed This study explores the fluorescence properties of AO bound to DNA, but doesn't provide a specific quantum yield value for free AO in solution.

https://gemini.google.com/u/1/pubmed.ncbi.nlm.nih.gov/880342

Acridine orange - OMLC OMLC This website lists a value of 0.2 for AO in basic ethanol, likely representing a mixed population of monomers and dimers.

https://gemini.google.com/u/1/omlc.org/spectra/PhotochemCAD/html/032.html

If you're interested in the specific quantum yield of acridine orange in your experiment, it's crucial to consider the factors mentioned above and potentially employ techniques to favor the monomeric form or account for its contribution to the overall fluorescence.

#### QUESTIONABLE: https://gemini.google.com/u/1/pubmed.ncbi.nlm.nih.gov/32716432

### What is the fluorescence quantum yield of coumarin 1?

#### Gemini

There are two reported values for the fluorescence quantum yield of coumarin 1 (also known as 7-(Diethylamino)-4-methylcoumarin) in the literature:

0.73: This value is reported on the OMLC website (OMLC coumarin 1) with a reference to Jones (1985).

https://gemini.google.com/u/1/omlc.org/spectra/PhotochemCAD/html/045.html

0.50: This value is also found on the OMLC website, but with a reference to Reynolds (1975). https://omlc.org/spectra/PhotochemCAD/html/045.html

These discrepancies highlight the potential variations in measured quantum yield depending on factors like:

Solvent: The solvent used can significantly impact the fluorescence properties of coumarin 1. The specific studies referenced above might have used different solvents.

https://www.researchgate.net/publication/234914778 Effect\_of\_solvent\_polarity\_on\_the\_photop hysical\_properties\_of\_Coumarin-1\_dye

Measurement Techniques: Different methods for measuring quantum yield can lead to slight variations in the final value.

If you require a specific value for your experiment, it's recommended to:

Consider the solvent you'll be using and try to find a literature reference with a matching solvent for the closest possible value.

If you can't find a matching solvent reference, consider performing your own measurement using a reliable technique like the integrating sphere method.

# What is the fluorescence quantum yield of fluorescein?

The fluorescence quantum yield of fluorescein depends on the environment it's in, particularly the solvent and pH.

https://www.mdpi.com/2227-9040/6/3/26

Here's a breakdown:

High Quantum Yield (0.9 - 0.98): Fluorescein exhibits a very high quantum yield, around 0.9 - 0.98, in specific conditions:

0.1 N Sodium Hydroxide (NaOH): This is a commonly referenced standard condition with a reported quantum yield of  $0.925 \pm 0.015$  [1].

https://www.researchgate.net/publication/11368136\_Fluorescence\_Quantum\_Yields\_and\_Their\_ Relation\_to\_Lifetimes\_of\_Rhodamine\_6G\_and\_Fluorescein\_in\_Nine\_Solvents\_Improved\_Abso lute\_Standards\_for\_Quantum\_Yields#:~:text=From%20this%20work%20and%20an,it%20is%2 00.950%2B%2F%2D0.015.

Basic Solutions (High pH): Fluorescein generally performs better in basic environments due to its ionic state. Studies suggest values as high as 0.98 in D2O (heavy water) at high pH [2].

Lower Quantum Yield: Factors that can decrease the quantum yield of fluorescein include: Neutral or Acidic Solutions: Lower pH can lead to a decrease in quantum yield.

https://www.researchgate.net/figure/Fluorescence-spectra-of-fluorescein-in-aqueous-solutionswith-indicated-pH-values-Fig\_fig2\_252107055

Different Solvents: While high in NaOH, the quantum yield can vary in other solvents like ethanol (around 0.79) [3].

Interactions with Other Molecules: Interactions with biomolecules or quenching agents can decrease the excited state lifetime and lower the quantum yield.

Here are some references for further information:

Fluorescence quantum yields and their relation to lifetimes of rhodamine 6G and fluorescein in nine solvents: PubMed This research provides the standard value for 0.1 N NaOH.

https://pubmed.ncbi.nlm.nih.gov/12003120/

Fluorescence properties of twenty fluorescein derivatives: PubMed This study highlights the influence of pH and substitution on the quantum yield.

https://pubmed.ncbi.nlm.nih.gov/24510430/

Fluorescein - OMLC: OMLC This website offers information on the fluorescence properties of fluorescein in different solvents, including varying quantum yield values.

https://gemini.google.com/u/1/omlc.org/spectra/PhotochemCAD/html/010.html

When referencing the fluorescence quantum yield of fluorescein, it's important to specify the solvent and potentially the pH for accurate representation.

### What is the fluorescence quantum yield of rhodamine 6G?

#### Gemini

Similar to fluorescein, the fluorescence quantum yield of rhodamine 6G (R6G) depends on the surrounding environment, particularly the solvent.

https://www.researchgate.net/publication/228553744\_Solvent\_effect\_on\_absolute\_fluorescence\_ quantum\_yield\_of\_Rhodamine\_6G\_determined\_using\_transient\_thermal\_lens\_technique

Here's what you need to know:

High Quantum Yield (around 0.95): Rhodamine 6G exhibits a very good quantum yield, typically around 0.95, under specific conditions:

Ethanol: This is a commonly referenced standard solvent for R6G, with a reported quantum yield of  $0.95 \pm 0.015$  [1].

https://pubmed.ncbi.nlm.nih.gov/12003120/

Variations in Quantum Yield: The value can deviate slightly depending on the solvent:

Other Solvents: Studies suggest variations in quantum yield for R6G in different solvents, like a higher value (0.98) reported in D2O (heavy water) [2].

https://bioone.org/journalArticle/Download?urlId=10.1562%2F0031-8655%282002%29075%3C0327%3AFQYATR%3E2.0.CO%3B2 Environmental Factors: Factors like concentration, aggregate formation, and excited state absorption can also influence the absolute values [3].

https://www.researchgate.net/publication/258635084\_Fluorescence\_spectroscopy\_of\_Rhodamin e\_6G\_Concentration\_and\_solvent\_effects

Here are some references for further reading:

Fluorescence quantum yields and their relation to lifetimes of rhodamine 6G and fluorescein in nine solvents: PubMed This research provides the standard value for R6G in ethanol.

https://pubmed.ncbi.nlm.nih.gov/12003120/

Determination of the absolute fluorescence quantum yield of rhodamine 6G with optical and photoacoustic methods: PubMed This paper discusses absolute methods for determining R6G quantum yield.

https://pubmed.ncbi.nlm.nih.gov/22340112/

Solvent effect on absolute fluorescence quantum yield of Rhodamine 6G determined using ultrasonic method: engineering.purdue.edu This study highlights the influence of solvent on R6G quantum yield.

https://engineering.purdue.edu/CMUXE/Publications/Harilal/1999-MPLB-Bin.pdf

When mentioning the fluorescence quantum yield of rhodamine 6G, specifying the solvent provides a clearer picture of its fluorescence efficiency.

# What is the fluorescence quantum yield of chlorophyll a?

#### Gemini

Chlorophyll a exhibits a well-established fluorescence quantum yield of around 0.32 [1]. <u>https://omlc.org/spectra/PhotochemCAD/html/123.html</u>

This value indicates that for every 100 photons absorbed by chlorophyll a, roughly 32 photons are re-emitted as fluorescence.

Here's a reliable reference for this information:

Chlorophyll a - OMLC OMLC This website provides the fluorescence emission spectrum of chlorophyll a and mentions a quantum yield of 0.32, referencing Weber (1957).

https://omlc.org/spectra/PhotochemCAD/html/123.html

It's important to note that the fluorescence quantum yield of chlorophyll a can be slightly influenced by factors like:

Solvent: While not a major factor, the specific solvent used for dissolving chlorophyll a might cause minor variations in the quantum yield.

Measurement Conditions: The specific methodology and instrumentation used for the measurement can lead to slight variations in the reported value.

However, the value of 0.32 is a widely accepted and reliable estimate for the fluorescence quantum yield of chlorophyll a in most biological environments.

What is the fluorescence quantum yield of chlorophyll b?

The fluorescence quantum yield of chlorophyll b is lower compared to chlorophyll a. Here's what you should know:

Lower Quantum Yield: Studies report values for chlorophyll b fluorescence quantum yield in the range of 0.06 - 0.11 [1, 2].

https://pubs.aip.org/aip/jcp/article/20/8/1315/202670/The-Absolute-Quantum-Yields-of-the-Fluorescence-of

This means a smaller portion of absorbed light is re-emitted as fluorescence compared to chlorophyll a (0.32).

Solvent Dependence: The specific value can vary slightly depending on the solvent environment. Here are some reported examples:

Ether Solutions: A commonly used solvent for chlorophyll studies shows a quantum yield around 0.11 for chlorophyll b [1].

https://pubs.aip.org/aip/jcp/article/20/8/1315/202670/The-Absolute-Quantum-Yields-of-the-Fluorescence-of

Methanol Solutions: Chlorophyll b in methanol exhibits a lower quantum yield, reported to be around 0.06 [1].

https://pubs.aip.org/aip/jcp/article/20/8/1315/202670/The-Absolute-Quantum-Yields-of-the-Fluorescence-of

Here are some references for further information:

The Absolute Quantum Yields of the Fluorescence of Chlorophyll Solutions AIP Publishing This research paper is the primary source for the reported values of chlorophyll b quantum yield in different solvents (ether and methanol).

https://gemini.google.com/u/1/pubs.aip.org/doi/10.1063/1.1734834

Chlorophyll fluorescence—a practical guide Journal of Experimental Botany This article provides a general overview of chlorophyll fluorescence but doesn't mention specific quantum yield values. https://gemini.google.com/u/1/academic.oup.com/jxb/article/51/345/659/652534

It's important to consider the solvent used when referencing the fluorescence quantum yield of chlorophyll b. For biological systems, the specific environment within the plant or organism might influence the exact value as well.

### What is the fluorescence quantum yield of chlorophyll d?

#### Gemini

Unfortunately, readily available information on the specific fluorescence quantum yield of chlorophyll d is scarce. Here's what we know:

Limited Research: Compared to chlorophyll a and b, chlorophyll d is less common and has been the subject of fewer studies. This translates to a lack of widely reported or established values for its fluorescence quantum yield.

Possible Resources: Here are some avenues for further exploration, though they might not provide a definitive answer:

Scientific Publications: Searching academic databases like Google Scholar or PubMed with keywords like "chlorophyll d," "fluorescence," and "quantum yield" might yield research papers that discuss its fluorescence properties. These papers might not explicitly mention the quantum yield but could offer insights into its fluorescence behavior.

Specialized Websites: Websites dedicated to spectroscopy or photochemical data might have information on chlorophyll d, though the quantum yield might not be readily available.

If you require the fluorescence quantum yield of chlorophyll d for a specific application, it might be necessary to consult with researchers specializing in chlorophyll pigments or attempt your own measurement using techniques like the integrating sphere method.

### What is the fluorescence quantum yield of chlorophyll f?

#### Gemini

Information on the specific fluorescence quantum yield of chlorophyll f is very limited, similar to chlorophyll d. Here's why:

Less Common Chlorophyll: Chlorophyll f is a less abundant chlorophyll variant compared to a and b. This translates to fewer research efforts dedicated to its photophysical properties.

Limited Data Availability: Due to its lower abundance, there's a lack of widely reported or established values for the fluorescence quantum yield of chlorophyll f.

Finding a definitive fluorescence quantum yield value for chlorophyll f might be challenging. Here are some suggestions for further exploration:

Scientific Literature Search: Utilize academic databases like Google Scholar or PubMed with keywords like "chlorophyll f," "fluorescence," and "quantum yield." Research papers discussing its fluorescence properties, even without mentioning the quantum yield, might offer insights.

Specialized Websites: Websites focused on spectroscopy or photochemical data might have information on chlorophyll f, but the quantum yield might not be readily available.

Alternative Approaches: If the quantum yield is crucial for your research, consider:

Consulting with researchers specializing in chlorophyll pigments.

Attempting your own measurement using techniques like the integrating sphere method. However, this would require access to specialized equipment and expertise.

Overall, while information on chlorophyll f fluorescence exists, a definitive quantum yield value is likely not readily available through a simple web search. Consider the alternative approaches mentioned above for further exploration.

What is the fluorescence quantum yield of tetraphenylporphyrin?

#### Gemini

The fluorescence quantum yield of tetraphenylporphyrin (TPP) varies slightly depending on the solvent and measurement conditions. Here's what you can expect:

Reported Values: Studies report fluorescence quantum yields for TPP in the range of 0.03 - 0.11 in different solvents like toluene, DMF (dimethylformamide), and cyclohexane [1, 2, 3]. Common Values:

Toluene: A frequently referenced solvent shows a quantum yield around 0.04 [1, 2].

DMF: Studies using DMF report values closer to 0.11 [3].

Here are some references for further information:

Zinc tetraphenylporphyrin, [ZnTPP]: OMLC This website provides a value of 0.033 for TPP in toluene.

https://gemini.google.com/u/1/omlc.org/spectra/PhotochemCAD/html/100.html

Supporting Information for - The Royal Society of Chemistry: Royal Society of Chemistry This reference mentions a value of 0.11 for TPP in DMF, using a reference standard for comparison. https://pubs.acs.org/doi/10.1021/jo01288a053 Synthesis and Photophysical Properties of Porphyrins with Fluorenyl Pendant Arms: HAL This study explores modifications to TPP and mentions a base value of 0.10 for unmodified TPP (likely in a common solvent).

https://gemini.google.com/u/1/hal-02945971

When referring to the fluorescence quantum yield of tetraphenylporphyrin, it's ideal to specify the solvent for better clarity.

#### QUESTIONABLE: in the range of 0.03 -

QUESTIONABLE: A frequently referenced solvent shows a quantum yield around 0.04 QUESTIONABLE: This website provides a value of 0.033 for TPP in toluene.

# What is the fluorescence quantum yield of free base tetraphenylporphyrin? [Extra query]

#### Gemini

The fluorescence quantum yield of free base tetraphenylporphyrin (H2TPP) is generally lower compared to its metal-complexed counterparts. Here's what you can expect:

Lower Quantum Yield: Studies report values for H2TPP fluorescence quantum yield in the range of 0.05 - 0.11, with variations depending on the solvent [1, 2, 3]. This is lower than metalloporphyrins like ZnTPP (zinc tetraphenylporphyrin) which can have values around 0.033 (already lower than free-base TPP in some solvents).

Solvent Dependence: Similar to tetraphenylporphyrin, the specific value can change based on the solvent environment. Here are some reported examples:

Toluene: A common solvent shows values around 0.07 - 0.10 for H2TPP [1, 2].

DMF (dimethylformamide): Studies suggest a potentially higher value in DMF, possibly reaching 0.11 [3].

Here are some references for further information:

Fluorescence properties of meso-tetrafurylporphyrins: Indian Academy of Sciences This research uses H2TPP ( $\varphi f = 0.11$ ) as a standard for free-base porphyrins in toluene.

https://gemini.google.com/u/1/repository.ias.ac.in/104546/1/0161-0166

Photophysics of Soret-excited free base tetraphenylporphyrin and its zinc analog in solution: National Institutes of Health (.gov) This study explores the photophysical properties of H2TPP in various solvents, but doesn't provide specific quantum yield values.

https://pubmed.ncbi.nlm.nih.gov/23973595/

Synthesis and Photophysical Properties of Porphyrins with Fluorenyl Pendant Arms: HAL This study mentions a base value of 0.10 for unmodified TPP (likely H2TPP) in a common solvent. https://gemini.google.com/u/1/hal-02945971

It's important to remember that these are reported values, and the actual quantum yield of your specific H2TPP sample might vary slightly depending on the exact solvent, measurement conditions, and potential presence of impurities.

### What is the fluorescence quantum yield of indocyanine green?

#### Gemini

My previous response about the fluorescence quantum yield of indocyanine green (ICG) contained a minor inaccuracy. There seems to be some variation in the reported values depending on the source and potentially the measurement conditions. Here's a more comprehensive explanation:

Range of Reported Values: The fluorescence quantum yield of ICG is generally reported to be in the range of 0.09 - 0.14 [1, 2, 3]. This means that roughly 9-14% of absorbed photons are reemitted as fluorescence.

Factors Influencing Quantum Yield: Several factors can influence the measured quantum yield of ICG:

Solvent: While not a major factor, the specific solvent used can cause slight variations. Studies using DMSO often report slightly higher values compared to water [1].

Aggregation: ICG can form aggregates in solution, which can decrease its fluorescence efficiency [2].

Measurement Conditions: The specific methodology and instrumentation used for the measurement can lead to slight variations in the reported value.

Here are some reliable references for further information:

Hot-band absorption of indocyanine green for advanced anti-stokes fluorescence bioimaging [Light: Science & Applications]([Nature Research]) This research explores advanced applications of ICG and mentions a full-spectrum quantum efficiency of 13% for ICG dissolved in DMSO, which translates to an estimated quantum efficiency of around 8% in the 800-900 nm range relevant for fluorescence [1].

Indocyanine Green (ICG) | CAS#: 3599-32-4 [Lumiprobe]

https://www.lumiprobe.com/p/icg-3599-32-4

This supplier website lists a fluorescence quantum yield value of 0.09 for ICG [2].

Indocyanine green | Fluorescent Dyes | Bio-Techne

https://www.bio-techne.com/p/fluorescent-probes-dyes/indocyanine-green\_7510

This supplier website lists a quantum yield of 0.14; extinction coefficient of 223,000 M-1 [3].

Key Takeaway: It's important to consider the context when referencing the fluorescence quantum yield of ICG.

A value around 0.09 - 0.10 is a common estimate for biological environments where water is the primary solvent.

Higher values (around 0.13 - 0.14) might be encountered in studies using DMSO or under specific measurement conditions.

## What is the fluorescence quantum yield of Alexa Fluor 488?

#### Gemini

The fluorescence quantum yield of Alexa Fluor 488 is well-established and reported to be around 0.92 in water (H2O) [1, 2, 3].

https://www.thermofisher.com/jp/en/home/references/molecular-probes-the-

handbook/fluorophores-and-their-amine-reactive-derivatives/alexa-fluor-dyes-spanning-thevisible-and-infrared-spectrum.html

This indicates a very efficient fluorescence process, where roughly 92% of the absorbed photons are re-emitted as fluorescence.

https://www.thermofisher.com/us/en/home/references/molecular-probes-the-

handbook/fluorophores-and-their-amine-reactive-derivatives/alexa-fluor-dyes-spanning-thevisible-and-infrared-spectrum.html

Here are some reliable references for this information:

Alexa Fluor Dyes Spanning the Visible and Infrared Spectrum [Thermo Fisher Scientific]([Thermofisher website]) This webpage from the Alexa Fluor dye provider highlights various features of Alexa Fluor 488, including a quantum yield of 0.92 in H2O [1].

Quantum Yield [Alexa Fluor 488] [AAT Bioquest]([AAT Bioquest website]) This supplier website provides a searchable database of quantum yield values for various fluorescent probes, including Alexa Fluor 488 with a value of 0.92 in H2O [2].

https://www.aatbio.com/resources/quantum-yield/alexa\_fluor\_488

Alexa Fluor conjugated secondary antibodies [Abcam]([Abcam website]) This product information page mentions a quantum yield of 0.92 for Alexa Fluor 488, typically used for antibody conjugation [3].

https://www.abcam.com/secondary-antibodies/alexa-fluor-conjugated-secondary-antibodies

It's important to note that the fluorescence quantum yield can be slightly influenced by factors such as:

Solvent: While water (H2O) is the most common reference, the quantum yield might vary slightly in other solvents.

pH: For certain fluorophores, pH can affect the fluorescence properties. However, Alexa Fluor 488 is known for its pH-insensitive fluorescence between pH 4 and 10 [1].

https://www.thermofisher.com/us/en/home/references/molecular-probes-the-

handbook/fluorophores-and-their-amine-reactive-derivatives/alexa-fluor-dyes-spanning-the-

visible-and-infrared-spectrum.html

Measurement Conditions: The specific methodology and instrumentation used for the measurement can lead to slight variations in the reported value.

However, the value of 0.92 in H2O is a widely accepted and reliable estimate for the fluorescence quantum yield of Alexa Fluor 488 in most biological environments.

### What is the fluorescence quantum yield of naphthalene?

#### Gemini Advanced

The fluorescence quantum yield of naphthalene dissolved in cyclohexane is reported to be 0.23, according to Berlman (1971).

https://omlc.org/spectra/PhotochemCAD/html/001.html

This means that for every 100 photons absorbed by naphthalene, approximately 23 photons are emitted as fluorescence.

You can find more information about the fluorescence of naphthalene at:

https://omlc.org/spectra/PhotochemCAD/html/001.html

It's important to note that the quantum yield can vary depending on the solvent and other environmental factors.

#### What is the fluorescence quantum yield of 8-anilino-1-naphthalenesulfonic acid?

#### Gemini Advanced

The fluorescence quantum yield of 8-anilino-1-naphthalenesulfonic acid (ANS) is highly dependent on its environment.

https://pubs.acs.org/doi/10.1021/acsomega.9b03002

In aqueous solution, the quantum yield is very low (<0.004). However, when ANS binds to hydrophobic regions of proteins or membranes, its quantum yield increases significantly, reaching values up to 0.95.

This environment-sensitive fluorescence is the basis for ANS's use as a probe to study protein folding, membrane interactions, and other biological phenomena.

Here are some resources that provide more information about ANS:

\* \*\*Sigma-Aldrich product information:\*\*

https://www.sigmaaldrich.com/deepweb/assets/sigmaaldrich/product/documents/362/696/a3125p is.pdf

\* \*\*ResearchGate article on ANS dimerization:\*\*

https://www.researchgate.net/publication/244385586\_Thermodynamic\_study\_of\_the\_dimerizati on of 8-anilino-1-naphtalene-sulfonic acid by isothermal titration calorimetry

I hope this helps! Let me know if you have any other questions.

QUESTIONABLE: In aqueous solution, the quantum yield is very low (<0.004). However, when ANS binds to hydrophobic regions of proteins or membranes, its quantum yield increases significantly, reaching values up to 0.95.

#### What is the fluorescence quantum yield of anthracene?

#### Gemini Advanced

The fluorescence quantum yield of anthracene can vary depending on the solvent and other conditions, but generally accepted values are:

\* \*\*In cyclohexane:\*\* 0.36 (Berlman, 1971)

https://omlc.org/spectra/PhotochemCAD/html/022.html

\* \*\*In ethanol:\*\* 0.27 (Dawson, 1968; Eaton, 1988)

https://omlc.org/spectra/PhotochemCAD/html/022.html

There is also research suggesting higher quantum yields can be achieved in highly purified single crystals, with a lower limit of 0.64.

https://pubs.acs.org/doi/10.1021/acs.jpcc.2c06761

For further information, you can refer to these resources:

\* \*\*OMLC Spectral Data for Anthracene:\*\*

https://omlc.org/spectra/PhotochemCAD/html/022.html

\* \*\*Fluorescence Quantum Yield of Aromatic Hydrocarbon Crystals:\*\*

https://pubs.acs.org/doi/abs/10.1021/jp807684m

I hope this helps! Let me know if you have any other questions.

#### What is the fluorescence quantum yield of 9,10-diphenylanthracene?

#### Gemini Advanced

The fluorescence quantum yield of 9,10-diphenylanthracene (DPA) is often cited as close to 1 (or 100%) in many solvents.

https://omlc.org/spectra/PhotochemCAD/html/021.html

However, some studies have reported slightly lower values depending on the solvent used.

Here are some reported values:

\* \*\*In cyclohexane:\*\* 1.00 (Berlman, 1965)

\* \*\*In ethanol:\*\* 0.95 (Morris et al., 1978)

https://pubs.acs.org/doi/pdf/10.1021/j100550a010

\* \*\*In 3-methylpentane:\*\* 0.93 (Morris et al., 1978)

https://pubs.acs.org/doi/pdf/10.1021/j100550a010

\* \*\*In benzene:\*\* 0.82 (Morris et al., 1978)

These values highlight that the fluorescence quantum yield of DPA can be slightly influenced by solvent effects, but it remains a highly fluorescent compound with a quantum yield close to unity in most common solvents.

You can find further information in the following resources:

\* \*\*OMLC Spectral Data for 9,10-Diphenylanthracene:\*\*

https://omlc.org/spectra/PhotochemCAD/html/021.html

\* \*\*Fluorescence Quantum Yield Determinations. 9,10-Diphenylanthracene as a Reference Standard in Different Solvents:\*\*

https://pubs.acs.org/doi/10.1021/j100550a010

I hope this helps! Let me know if you have any other questions.

#### What is the fluorescence quantum yield of quinine?

#### Gemini Advanced

The fluorescence quantum yield of quinine is dependent on the solvent used and the temperature. <u>https://chem.libretexts.org/Courses/British\_Columbia\_Institute\_of\_Technology/Chem\_2305%3</u> A Biochemistry%2F%2FInstrumental Analysis/01%3A Spectroscopy/1.02%3A Photolumines

cent Spectroscopy

\* \*\* $In 0.05M H_2SO_4$ :\*\* 0.546 (Eaton, 1988)

https://omlc.org/spectra/PhotochemCAD/html/080.html

\* \*\*In 0.1M HClO<sub>4</sub>:\*\* 0.60 (Melhuish, 1961)

It's important to note that recent research has shown that quinine in  $0.05M H_2SO_4$  exhibits a temperature-dependent fluorescence quantum yield, particularly around room temperature, whereas quinine in  $0.1M HClO_4$  shows a consistent quantum yield up to  $45^{\circ}C$ . Therefore, quinine in  $0.1M HClO_4$  is recommended as a more reliable standard for determining fluorescence quantum yields.

https://pubs.acs.org/doi/abs/10.1021/acs.analchem.9b00583

You can find more information in the following resource:

\* \*\*Goodbye to Quinine in Sulfuric Acid Solutions as a Fluorescence Quantum Yield Standard:\*\* https://pubs.acs.org/doi/10.1021/acs.analchem.9b00583

I hope this helps! Let me know if you have any other questions.

#### What is the fluorescence quantum yield of acridine orange?

#### Gemini Advanced

The fluorescence quantum yield of acridine orange is 0.2 in basic ethanol (Soep, 1972). <u>https://omlc.org/spectra/PhotochemCAD/html/032.html</u>

This value was obtained when acridine orange was dissolved in basic ethanol and excited at a wavelength of 400 nm.

It's important to note that the fluorescence quantum yield can vary depending on several factors, including:

\* \*\*Solvent:\*\* The quantum yield may differ in solvents other than basic ethanol.

\* \*\*pH:\*\* Acridine orange exhibits pH-dependent properties, which could affect its fluorescence quantum yield.

\* \*\*Concentration:\*\* High concentrations may lead to self-quenching, reducing the quantum yield.

You can find more information about the fluorescence of acridine orange on the OMLC website: <u>https://omlc.org/spectra/PhotochemCAD/html/032.html</u>

Additionally, several research papers explore the fluorescence properties of acridine orange under different conditions, such as when bound to DNA:

\* Fluorescence decay and quantum yield characteristics of acridine orange and proflavine bound to DNA: <u>https://pubmed.ncbi.nlm.nih.gov/880342/</u>

I hope this information is helpful!

## What is the fluorescence quantum yield of coumarin 1?

#### Gemini Advanced

The fluorescence quantum yield of coumarin 1 is reported to be 0.73 (Jones, 1985). https://omlc.org/spectra/PhotochemCAD/html/045.html

<u>https://omlc.org/spectra/PhotochemCAD/html/045.html</u> This value was obtained in othered when evolted at 260 pm. You a

This value was obtained in ethanol when excited at 360 nm. You can find more information on the OMLC website:

https://omlc.org/spectra/PhotochemCAD/html/045.html

#### What is the fluorescence quantum yield of fluorescein?

#### Gemini Advanced

The fluorescence quantum yield of fluorescein is highly dependent on the solvent and pH conditions.

https://www.mdpi.com/2227-9040/6/3/26

\*\*In 0.1 N NaOH (pH > 11):\*\*

\* Widely accepted as a standard reference value:  $0.925 \pm 0.015$ 

\*\*In ethanol:\*\*

\* Varying values have been reported:

\* 0.79 (Kellogg, 1964)

https://omlc.org/spectra/PhotochemCAD/html/010.html

<sup>\*</sup> Up to 1.0 in neutral ethanol (Martin, 1975)

\* The maximum yield declines with solvent polarity, decreasing to 0.60 in dimethylsulfoxide (Martin, 1975).

\*\*In other solvents:\*\*

\* Quantum yield can vary significantly depending on the specific solvent and pH conditions.

\* Studies have shown fluctuations in quantum yields due to buffer compositions and the presence of salts and proteins.

https://www.researchgate.net/figure/Quantum-yields-of-fluorescein-under-different-bufferconditions\_tbl3\_297766047

For further information and detailed research, you can refer to the following resources:

\* \*\*OMLC Spectral Data for Fluorescein:\*\*

https://omlc.org/spectra/PhotochemCAD/html/037.html

\* \*\*Fluorescence quantum yields and their relation to lifetimes of rhodamine 6G and fluorescein in nine solvents:\*\*

https://pubmed.ncbi.nlm.nih.gov/12003120/

\* \*\*Fluorescence properties of twenty fluorescein derivatives:\*\*

https://pubmed.ncbi.nlm.nih.gov/24510430/

It is crucial to consider the specific conditions of your experiment when working with fluorescein, as the quantum yield can significantly impact your results.

## What is the fluorescence quantum yield of rhodamine 6G?

#### Gemini Advanced

The fluorescence quantum yield of rhodamine 6G is generally accepted to be 0.95 in ethanol. <u>https://pubmed.ncbi.nlm.nih.gov/12003120/</u>

This value has been widely used as a reference standard for determining the quantum yields of other fluorophores.

However, research has shown that the quantum yield can be influenced by several factors, including:

\* \*\*Solvent:\*\* While the quantum yield in ethanol is close to 0.95, it can vary slightly in other solvents. For example, in water, the quantum yield is slightly lower.

\* \*\*Concentration:\*\* At high concentrations, the quantum yield may decrease due to selfquenching effects.

\* \*\*Temperature:\*\* Temperature can also affect the quantum yield, although the impact is usually small.

For most applications, the value of 0.95 in ethanol is a good approximation for the fluorescence quantum yield of rhodamine 6G. However, it is crucial to consider the specific conditions of your experiment and consult relevant literature if high accuracy is required.

You can find more information in the following resources:

\* \*\*OMLC Spectral Data for Rhodamine 6G:\*\*

https://omlc.org/spectra/PhotochemCAD/html/083.html

\* \*\*Fluorescence quantum yields and their relation to lifetimes of rhodamine 6G and fluorescein in nine solvents: improved absolute standards for quantum yields:\*\*

https://pubmed.ncbi.nlm.nih.gov/12003120/

I hope this helps! Let me know if you have any other questions.

What is the fluorescence quantum yield of chlorophyll a?

#### Gemini Advanced

The fluorescence quantum yield of chlorophyll a is generally considered to be around 0.32 in solution.

https://omlc.org/spectra/PhotochemCAD/html/123.html

This means that for every 100 photons absorbed by chlorophyll a, approximately 32 are re-emitted as fluorescence.

However, it's important to note that the quantum yield can be influenced by several factors:

\* \*\*Solvent:\*\* The type of solvent can affect the quantum yield, with values typically ranging between 0.24 and 0.35.

https://omlc.org/spectra/PhotochemCAD/html/123.html

\* \*\*Aggregation:\*\* Chlorophyll a molecules tend to aggregate in solution, and the degree of aggregation can influence the quantum yield.

\*\*\*Temperature:\*\* Temperature can also affect the quantum yield, with lower temperatures generally leading to higher quantum yields.

https://www.edinst.com/chlorophyll-fluorescence-quantum-yield/

In the context of photosynthesis, the fluorescence quantum yield is lower due to the efficient transfer of excitation energy to other chlorophyll molecules and ultimately to the reaction centers. You can find more information about the fluorescence of chlorophyll a in these resources:

\* \*\*The Absolute Quantum Yields of the Fluorescence of Chlorophyll Solutions:\*\*

https://pubs.aip.org/aip/jcp/article/20/8/1315/202670/The-Absolute-Quantum-Yields-of-the-Fluorescence-of

\* \*\*Chlorophyll fluorescence—a practical guide:\*\*

https://academic.oup.com/jxb/article/51/345/659/652534

I hope this helps! Let me know if you have any other questions.

#### What is the fluorescence quantum yield of chlorophyll b?

#### Gemini Advanced

The fluorescence quantum yield of chlorophyll b is generally lower than that of chlorophyll a. The reported values vary depending on the solvent used:

\* \*\*In diethyl ether:\*\* 0.117 (Weber, 1957)

https://omlc.org/spectra/PhotochemCAD/html/125.html

\* \*\*In ether:\*\* 0.11 (Forster & Livingston, 1952)

https://pubs.aip.org/aip/jcp/article/20/8/1315/202670/The-Absolute-Quantum-Yields-of-the-Fluorescence-of

\* \*\*In methanol:\*\* 0.06 (Forster & Livingston, 1952)

https://pubs.aip.org/aip/jcp/article/20/8/1315/202670/The-Absolute-Quantum-Yields-of-the-Fluorescence-of

You can find more information on the OMLC website:

\* \*\*Chlorophyll b:\*\*

https://omlc.org/spectra/PhotochemCAD/html/125.html

It is important to note that these values are for isolated chlorophyll b in solution. In the context of photosynthesis, the actual fluorescence quantum yield can be significantly lower due to the efficient transfer of energy to other chlorophyll molecules.

I hope this helps! Let me know if you have any other questions.

#### What is the fluorescence quantum yield of chlorophyll d?

#### **Gemini Advanced**

The fluorescence quantum yield of chlorophyll d has not been definitively determined. While chlorophyll d is known to fluoresce, its quantum yield is likely lower than that of chlorophyll a due to its different structure and function in photosynthesis.

The majority of research on chlorophyll d focuses on its absorption and energy transfer properties rather than its fluorescence quantum yield. Therefore, a precise value for the fluorescence quantum yield of chlorophyll d in isolation or in vivo remains elusive.

However, you can find some information on the absorption and fluorescence spectra of chlorophyll d in the following resources:

\* \*\*An overview of chlorophyll d: structure, biosynthesis, occurrence and function in oxygenic photosynthesis:\*\* [invalid URL removed]

\* \*\*The Absolute Quantum Yields of the Fluorescence of Chlorophyll Solutions:\*\*

https://pubs.aip.org/aip/jcp/article/20/8/1315/202670/The-Absolute-Quantum-Yields-of-the-

<u>Fluorescence-of</u> (This reference doesn't specifically address chlorophyll d but provides a broader context for chlorophyll fluorescence quantum yields).

I hope this helps!

# What is the fluorescence quantum yield of chlorophyll f?

#### Gemini Advanced

There is currently no widely accepted or definitive value for the fluorescence quantum yield of chlorophyll f. This is due to a few reasons:

1. \*\*Recent Discovery:\*\* Chlorophyll f was only discovered in 2010 and research on its properties is still ongoing.

https://en.wikipedia.org/wiki/Chlorophyll\_f

2. \*\*Limited Studies:\*\* There have been limited studies specifically focusing on the fluorescence properties of chlorophyll f.

3. \*\*Complex Environments:\*\* Chlorophyll f is primarily found in cyanobacteria inhabiting environments with far-red light, and its fluorescence properties can be influenced by various factors within these complex systems.

However, preliminary research suggests that the fluorescence quantum yield of chlorophyll f is relatively low compared to other chlorophylls. It is likely that the quantum yield varies depending on the specific environmental conditions and the interactions of chlorophyll f with other pigments and proteins in the photosynthetic apparatus.

Further research is needed to determine a more accurate and comprehensive understanding of the fluorescence quantum yield of chlorophyll f.

I hope this explanation is helpful! Let me know if you have any other questions.

### What is the fluorescence quantum yield of tetraphenylporphyrin?

#### Gemini Advanced

The fluorescence quantum yield of tetraphenylporphyrin (TPP) in toluene is reported to be 0.11 (Seybold, 1969a).

https://omlc.org/spectra/PhotochemCAD/html/099.html

However, it's important to note that the quantum yield can vary depending on the solvent, concentration, and other factors. Some studies have reported slightly different values in other solvents.

You can find additional information on the OMLC website:

\* \*\*Tetraphenylporphyrin (TPP):\*\*

https://omlc.org/spectra/PhotochemCAD/html/099.html

I hope this helps! Let me know if you have any other questions.

### What is the fluorescence quantum yield of indocyanine green?

#### Gemini Advanced

The fluorescence quantum yield of indocyanine green (ICG) varies depending on the solvent and other experimental conditions.

https://www.researchgate.net/publication/50348638\_Measuring\_the\_fluorescent\_quantum\_effici ency\_of\_indocyanine\_green\_encapsulated\_in\_nanocomposite\_particulates

However, commonly reported values range from 0.09 to 0.14.

Here are some resources providing information on ICG's fluorescence quantum yield:

\* \*\*Lumiprobe:\*\* Reports a quantum yield of 0.09.

https://www.lumiprobe.com/p/icg-3599-32-4

\* \*\*Bio-Techne:\*\* Reports a quantum yield of 0.14.

https://www.bio-techne.com/p/fluorescent-probes-dyes/indocyanine-green\_7510

\* \*\*Nature - Light: Science & Applications:\*\* Discusses the anti-Stokes fluorescence quantum efficiency of ICG in DMSO, estimated to be around 8%.

The variation in reported values highlights the importance of considering the specific experimental conditions when working with ICG.

I hope this helps! Let me know if you have any other questions.

### What is the fluorescence quantum yield of Alexa Fluor 488?

#### Gemini Advanced

The fluorescence quantum yield of Alexa Fluor 488 is 0.92 in aqueous solutions.

https://www.thermofisher.com/us/en/home/life-science/cell-analysis/fluorophores/alexa-fluor-488.html

This makes it a highly fluorescent dye, ideal for various applications in fluorescence microscopy and flow cytometry.

You can find further information on the fluorescence quantum yield and other properties of Alexa Fluor 488 here:

https://www.thermofisher.com/us/en/home/references/molecular-probes-thehandbook/tables/fluorescence-quantum-yields-and-lifetimes-for-alexa-fluor-dyes.html

# What is the fluorescence quantum yield of naphthalene?

The fluorescence quantum yield of naphthalene is 0.23<sup>1</sup>. Fluorescence quantum yield is the ratio of the number of photons emitted to the number of photons absorbed by a molecule during fluorescence <sup>2</sup>. Here are some other polycyclic aromatic hydrocarbons (PAH) and their fluorescence quantum yields <sup>2</sup>:

- \* Benzene: 5.3 x 10^-3
- \* Anthracene:  $0.25 \pm 0.02$
- \* Pyrene:  $0.69 \pm 0.06$
- \* Fluoranthene:  $0.20 \pm 0.01$
- \* Benzo(e)pyrene: approximately  $0.3 \pm 0.1$

Please note that the values may vary depending on the source and conditions. https://omlc.org/spectra/PhotochemCAD/html/001.html

https://ntrl.ntis.gov/NTRL/dashboard/searchResults/titleDetail/PB252797.xhtml

### What is the fluorescence quantum yield of 8-anilino-1-naphthalenesulfonic acid?

#### 💛 Meta AI

The fluorescence quantum yield of 8-anilino-1-naphthalenesulfonic acid (ANS) in **water is 0.003**, **and in ethylene glycol, it is 0.154**<sup>1</sup>. The fluorescence yield is influenced by the electronic nature of the aryl substituent and the local solvated environment. ANS and its derivatives are useful tools for studying biological systems.

ANS is a fluorescent dye that has been used for decades to study biological systems due to its environmentally sensitive fluorescent nature and its propensity to bind to hydrophobic pockets of proteins. However, the syntheses of ANS and its derivatives have been low yielding, requiring harsh reaction conditions and long reaction times. Recently, researchers have developed efficient, mild microwave-assisted copper(0)-catalyzed Ullmann coupling conditions to synthesize ANS derivatives with yields of up to 74%<sup>1</sup>.

Many of these derivatives have spectral properties distinct from ANS, including improved and diminished quantum yields, different absorption and emission maxima, and complete loss of fluorescence. The ability of ANS to bind hydrophobic pockets of proteins in a nonspecific manner has made it useful to study the properties of many biological systems, including proteins, enzymatic binding sites, and action potentials in neuronal systems <sup>1</sup>.

In summary, the fluorescence quantum yield of ANS is dependent on the solvent, with a yield of 0.003 in water and 0.154 in ethylene glycol. The synthesis of ANS derivatives has been improved using microwave-assisted copper(0)-catalyzed Ullmann coupling conditions, and these derivatives have spectral properties distinct from ANS. The usefulness of ANS and its derivatives in studying biological systems makes them valuable tools in the field of biochemistry.

https://pubs.acs.org/doi/10.1021/acsomega.9b03002

#### QUESTIONABLE: water is 0.003, and in ethylene glycol, it is 0.154

## What is the fluorescence quantum yield of anthracene?

#### Meta AI

The fluorescence quantum yield of anthracene is 0.36<sup>1</sup>. Here are some other facts about anthracene

Substituting anthracene at the 9- and 10-positions can drastically alter the probability of transitions. 9.10-dimethylanthracene has a fluorescence quantum yield of about 70% and has been successfully used in triplet-triplet annihilation systems.

Bulky substituents, such as phenyl groups, are also known to hamper the 4+4] photocycloaddition that anthracene and 9,10-dimethylanthracene undergo at high concentrations when irradiated.

The fluorescence quantum yield is the ratio of the number of photons emitted to the number of photons absorbed by a molecule during fluorescence.

https://omlc.org/spectra/PhotochemCAD/html/022.html

https://pubs.rsc.org/en/content/articlehtml/2015/tc/c5tc02626a

#### What is the fluorescence quantum yield of 9,10-diphenylanthracene?

#### Meta AI

The fluorescence quantum yield of 9,10-diphenylanthracene is 1<sup>-1</sup>. Here are some other facts about 9,10-diphenylanthracene<sup>2</sup>:

\* The fluorescence lifetime of 9,10-diphenylanthracene was measured using the single photon counting technique in various frozen gas matrices at 12 K.

\* The fluorescence quantum yields of C6H6 and C6D6 in CH4 at 12 K were determined as 0.35 and 0.45, respectively.

\* 9,10-diphenylanthracene is used as a reference standard in different solvents for fluorescence quantum yield determinations.

Please note that the values may vary depending on the source and conditions.

https://omlc.org/spectra/PhotochemCAD/html/021.html

https://pubs.rsc.org/en/content/articlelanding/1979/c3/c39790000925



#### Meta AI

The fluorescence quantum yield of quinine is 0.546<sup>1</sup>. Here are some other facts about quinine<sup>1</sup>:

\* The fluorescence emission spectrum of quinine sulfate dissolved in 0.05 M H2SO4.

\* The excitation wavelength was 310nm.

\* The spectrum was collected by in the summer of 1995 using a Spex FluoroMax.

\* The excitation and emission monochromators were set at 1 mm, giving a spectral bandwidth of 4 25 nm

\* The data interval was 0.5 nm and the integration time was 2.0 sec.

\* Samples were prepared in 1cm path length quartz cells with absorbance less than 0.1 at the excitation and all emission wavelengths to uniformly illuminate across the sample, and to avoid the inner-filter effect

\* The dark counts were subtracted and the spectra were corrected for wavelength-dependent instrument sensitivity.

Please note that the values may vary depending on the source and conditions. Quinine is a fluorescent dye that has been used for decades to study biological systems due to its environmentally sensitive fluorescent nature and its propensity to bind to hydrophobic pockets of proteins <sup>1</sup>.

https://omlc.org/spectra/PhotochemCAD/html/080.html

## What is the fluorescence quantum yield of acridine orange?

#### 🜙 Meta AI

Here are some details about the fluorescence quantum yield of Acridine Orange:

\* Quantum Yield: The fluorescence quantum yield of Acridine Orange is 0.2<sup>1</sup>.

\* Fluorescence Emission Spectrum: The fluorescence emission spectrum of Acridine orange was dissolved in basic ethanol<sup>1</sup>.

\* Excitation Wavelength: The excitation wavelength was 400nm<sup>1</sup>.

\* Spectral Bandwidth: The excitation and emission monochromators were set at 1 mm, giving a spectral bandwidth of 4.25 nm<sup>-1</sup>.

\* Data Interval: The data interval was 0.5 nm and the integration time was 2.0 sec<sup>1</sup>.

The fluorescence quantum yield of a molecule depends on the solvent it is in and other conditions. <u>https://omlc.org/spectra/PhotochemCAD/html/032.html</u>

### What is the fluorescence quantum yield of coumarin 1?

#### 🌙 Meta AI

I tried searching for the fluorescence quantum yield of coumarin 1, but couldn't find the information. You might have better luck searching online for more details. There are many resources available that provide information on the optical properties of various compounds, including coumarin 1.

What is the fluorescence quantum yield of fluorescein?

The fluorescence quantum yield of fluorescein is:

\* 0.97 in basic ethanol<sup>1</sup>

\* 0.79 in EtOH (neutral)<sup>2</sup>

\*  $0.925 \pm 0.015$  in 0.1 N NaOH(aq) <sup>3</sup>

Fluorescence quantum yield is the ratio of the number of photons emitted to the number of photons absorbed by a molecule during fluorescence. The fluorescence quantum yield of a molecule depends on the solvent it is in and other conditions <sup>4</sup>.

https://omlc.org/spectra/PhotochemCAD/html/037.html

https://www.aatbio.com/resources/faq-frequently-asked-questions/What-is-the-quantum-yieldof-fluorescein https://pubmed.ncbi.nlm.nih.gov/12003120/ https://link.springer.com/article/10.1007/s10895-014-1356-5

## What is the fluorescence quantum yield of rhodamine 6G?

#### 🌙 Meta AI

Here are some details about the fluorescence quantum yield of Rhodamine 6G:

\* The fluorescence quantum yield of Rhodamine 6G is 0.95<sup>1</sup>.

\* This molecule's spectrum was collected in the summer of 1995 using a Spex FluoroMax<sup>1</sup>.

\* The excitation and emission monochromators were set at 1 mm, giving a spectral bandwidth of 4.25 nm<sup>-1</sup>.

\* The data interval was 0.5 nm and the integration time was 2.0 sec  $^{1}$ .

\* Rhodamine 6G has been used as a reference standard in different solvents for fluorescence quantum yield determinations <sup>1</sup>.

Please note that the values may vary depending on the source and conditions. <u>https://omlc.org/spectra/PhotochemCAD/html/083.html</u>

### What is the fluorescence quantum yield of chlorophyll a?

#### 🜙 Meta AI

\* The fluorescence quantum yield of chlorophyll a is between 1% and 6% depending on the depth of the water.

\* Maximal values are found at depth, whereas minimal values are found in near-surface waters.

\* The fluorescence quantum yield of chlorophyll a is a useful parameter for interpreting remotely sensed fluorescence signals.

\* The fluorescence quantum yield of chlorophyll a can be accurately derived in a nonintrusive way with available instrumentation and adequate protocols.

\* The fluorescence quantum yield of chlorophyll a can be measured in situ within the upward and downward light fields in oceanic waters.

\* The fluorescence quantum yield of chlorophyll a can be combined with phytoplankton absorption spectra to derive the fluorescence quantum yield.

https://opg.optica.org/abstract.cfm?uri=ao-39-36-6725

# What is the fluorescence quantum yield of chlorophyll a molecule? [Extra query]

Here are some details about the fluorescence quantum yield of chlorophyll a molecule <sup>1 2</sup>:

\* The fluorescence quantum yield of Chlorophyll a is 0.32.

\* The fluorescence quantum yield of Chlorophyll a is 0.25 and is generally independent of solvent and excitation wavelength.

\* The fluorescence emission spectrum of Chlorophyll a was dissolved in diethyl ether.

\* The excitation wavelength was 614nm.

\* The fluorescence quantum yield of Chlorophyll b is 0.11 for ether solutions and 0.06 for methanol solutions.

\* The yield for chlorophyll a is 0.25 and is in general independent of solvent and excitation wavelength.

\* The yield for chlorophyll b is 0.11 for ether solutions and 0.06 for methanol solutions.

\* These results are in reasonable agreement with the published values of the yields for the same compounds.

Please note that the values may vary depending on the source and conditions.

https://omlc.org/spectra/PhotochemCAD/html/123.html

https://pubs.aip.org/aip/jcp/article/20/8/1315/202670/The-Absolute-Quantum-Yields-of-the-Fluorescence-of

What is the fluorescence quantum yield of chlorophyll b?

#### 🬙 Meta AI

Here are some details about the fluorescence quantum yield of chlorophyll b<sup>12</sup>:

\* The fluorescence quantum yield of Chlorophyll b is 0.117.

\* The fluorescence quantum yield of Chlorophyll b is 0.11 for ether solutions and 0.06 for methanol solutions.

\* The fluorescence emission spectrum of Chlorophyll b dissolved in diethyl ether.

\* The excitation wavelength was 435nm.

\* The fluorescence quantum yield of Chlorophyll b molecule is 0.11 for ether solutions and 0.06 for methanol solutions.

Please note that the values may vary depending on the source and conditions.

The fluorescence quantum yield of chlorophyll b varies depending on the solvent and other conditions. The values range from 0.06 to 0.117. The values may vary depending on the source and conditions.

https://omlc.org/spectra/PhotochemCAD/html/125.html

https://pubs.aip.org/aip/jcp/article/20/8/1315/202670/The-Absolute-Quantum-Yields-of-the-Fluorescence-of

What is the fluorescence quantum yield of chlorophyll d?

#### 💛 Meta AI

I couldn't find any information about the fluorescence quantum yield of chlorophyll f. However, I was able to find information about the fluorescence quantum yield of chlorophyll a and b. If you have any further questions or concerns, please do not hesitate to ask!

https://opg.optica.org/abstract.cfm?uri=ao-39-36-6725

https://academic.oup.com/jxb/article/51/345/659/652534

## What is the fluorescence quantum yield of chlorophyll f?

#### 💛 Meta AI

I couldn't find any information on the fluorescence quantum yield of chlorophyll f. However, I did find that the fluorescence quantum yield of chlorophyll a is 0.25 and is generally independent of solvent and excitation wavelength <sup>1</sup>. The fluorescence quantum yield of chlorophyll b is 0.11 for ether solutions and 0.06 for methanol solutions <sup>1</sup>. The fluorescence quantum yield of chlorophyll fluorescence analysis is 1 or 2% of total light absorbed <sup>2</sup>.

Notes:

I couldn't find any information about the fluorescence quantum yield of chlorophyll f. However, I was able to find information about the fluorescence quantum yield of chlorophyll a and b. If you have any further questions or concerns, please do not hesitate to ask!

https://pubs.aip.org/aip/jcp/article/20/8/1315/202670/The-Absolute-Quantum-Yields-of-the-Fluorescence-of

https://academic.oup.com/jxb/article/51/345/659/652534

# What is the fluorescence quantum yield of tetraphenylporphyrin?

#### 🜙 Meta AI

The fluorescence quantum yield of tetraphenylporphyrin is 0.11<sup>-1</sup>. Here are some other facts about tetraphenylporphyrin <sup>1</sup>:

- \* Excitation wavelength: 514 nm
- \* Emission spectrum: collected in 1994 using a Spex FluoroMax
- \* Spectral bandwidth: 4.25 nm
- \* Data interval: 0.5 nm
- \* Integration time: 2.0 sec

\* Samples were prepared in 1cm path length quartz cells with absorbance less than 0.1 at the excitation and all emission wavelengths to uniformly illuminate across the sample, and to avoid the inner-filter effect.

The fluorescence quantum yield of a molecule depends on the solvent it is in and other conditions. <u>https://omlc.org/spectra/PhotochemCAD/html/099.html</u>

#### What is the fluorescence quantum yield of indocyanine green?

#### ) Meta AI

Here are some details about the fluorescence quantum yield of indocyanine green:

- \* Fluorescence Quantum Yield: The fluorescence quantum yield of indocyanine green is 0.04<sup>1</sup>.
- \* Alternative Names: Indocyanine green is also known as ICG<sup>2</sup>.

\* Fluorescence Quantum Efficiency: The fluorescence quantum efficiency of indocyanine green is  $0.027 \pm 0.001$ <sup>3</sup>.

- \* Emission Maximum: The emission maximum of indocyanine green is 819 nm <sup>4</sup>.
- \* Fluorescence Quantum Yield: The fluorescence quantum yield of indocyanine green is 0.09<sup>4</sup>.
- \* Function: Indocyanine green is a negatively charged, tricarbocyanine dye that is widely used for its low toxicity and infrared fluorescence emission <sup>1</sup>.
\* Applications: Indocyanine green is used in medical diagnostics for determining cardiac output, hepatic function, and liver blood flow and for ophthalmic angiography <sup>1</sup>.

Please note that the values may vary depending on the source and conditions.

Indocyanine green is a negatively charged, tricarbocyanine dye that is widely used for its low toxicity and infrared fluorescence emission. The fluorescence quantum yield of indocyanine green is 0.04, and it is used in medical diagnostics for determining cardiac output, hepatic function, and liver blood flow and for ophthalmic angiography. The values may vary depending on the source and conditions.

https://www.aatbio.com/catalog/indocyanine-green

https://www.bio-techne.com/p/fluorescent-probes-dyes/indocyanine-green\_7510

https://www.researchgate.net/publication/50348638\_Measuring\_the\_fluorescent\_quantum\_effici ency\_of\_indocyanine\_green\_encapsulated\_in\_nanocomposite\_particulates

https://www.lumiprobe.com/p/icg-3599-32-4

## What is the fluorescence quantum yield of Alexa Fluor 488?

### 🌙 Meta AI

The fluorescence quantum yield of Alexa Fluor 488 is  $0.92^{-1}$ . The fluorescence quantum yield of Alexa Fluor 488 was measured in PBS (50 mM potassium phosphate, 150 mM NaCl, pH 7.2) at 22°C relative to fluorescein in 0.01 M NaOH (QY = 0.92). The fluorescence lifetime of Alexa Fluor 488 is 4.1 ns.

Here are some other details about Alexa Fluor 488 <sup>1</sup>:

Measurements were made on free succinimidyl ester derivatives in aqueous solutions.

Except for the footnoted values, lifetime measurements were made in water at 22°C, data provided by ISS Inc. (Champaign, IL).

The fluorescence quantum yield of Alexa Fluor 488 is 0.92, and the fluorescence lifetime of Alexa Fluor 488 is 4.1 ns. The measurements were made in PBS (50 mM potassium phosphate, 150 mM NaCl, pH 7.2) at 22°C relative to fluorescein in 0.01 M NaOH (QY = 0.92). If you have any further questions or concerns, please do not hesitate to ask!

https://www.thermofisher.com/us/en/home/references/molecular-probes-thehandbook/tables/fluorescence-quantum-yields-and-lifetimes-for-alexa-fluor-dyes.html

### 3. Fictive or misplaced dyes and fluorophores

# Q1: What is the molar absorption coefficient of 10,10-Diphenylanthracene?

The molar absorption coefficient (extinction coefficient) of **10,10-Diphenylanthracene (DPA)** can vary slightly depending on the solvent and conditions. However, in general, the molar absorption coefficient of DPA in ethanol (a commonly used solvent) at its absorption maximum **around 360 nm is approximately \*\*40,000 M^-1 cm^-1\*\*.** 

This value indicates the strength of absorption of light by DPA molecules per unit concentration and path length.

#### QUESTIONABLE: 10,10-Diphenylanthracene (DPA) QUESTIONABLE: around 360 nm is approximately \*\*40,000 M^-1 cm^-1\*\*.

## Q1: What is the molar absorption coefficient of 10,10-Diphenylanthracene?

The molar absorption coefficient (extinction coefficient) of 10,10-Diphenylanthracene (DPA) at its absorption maximum around 354 nm is approximately  $*22,000 \text{ M}^{-1} \text{ cm}^{-1}**$  in cyclohexane. This value may vary slightly depending on the solvent and exact experimental conditions.

#### QUESTIONABLE: 10,10-Diphenylanthracene (DPA) QUESTIONABLE: 22,000 M^-1 cm^-1

## Q1: What is the molar absorption coefficient of 10,10-Diphenylanthracene?

### Copilot

The molar absorption coefficient, also known as the molar absorptivity or molar extinction coefficient, is a measure of how strongly a chemical species absorbs light at a given wavelength. It is an intrinsic property of the species; the actual absorbance, or optical density, of a solution will also depend on the path length and the concentration of the species.

For 9,10-Diphenylanthracene, the molar extinction coefficient matches the value of 14,000 cm<sup>-</sup>-1/M at 372.5 nm<sup>1</sup>. Please note that this data is for 9,10-Diphenylanthracene, which is slightly different from 10,10-Diphenylanthracene. The molar absorption coefficient for 10,10-Diphenylanthracene might be different and could not be found in the available resources. You may need to refer to specific scientific literature or databases for the exact value.

It's also important to note that the molar absorption coefficient can vary depending on the solvent and temperature, so these conditions should be specified when comparing values.

9,10-Diphenylanthracene

9,10-Diphenylanthracene - Wikipedia

<u>e: Molar Absorption Coefficients (UV-VIS) - GEORGENET.NET</u> Photophysical characterization of the 9,10 ... - RSC Publishing

### Q1: What is the molar absorption coefficient of 10,10-Diphenylanthracene?

### Gemini

The molar absorption coefficient of **10,10-Diphenylanthracene** (also known as **9,10-Diphenylanthracene**) is around 14,000 cm<sup>-1</sup>M<sup>-1</sup> at a wavelength of 372.5 nm. https://omlc.org/spectra/PhotochemCAD/html/021.html

Here are some sources where you can find this information:

\* OMLC

\* PhotochemCAD

### QUESTIONABLE: 10,10-Diphenylanthracene (also known as 9,10-Diphenylanthracene

### Q1: What is the molar absorption coefficient of 10,10-Diphenylanthracene?

### Gemini Advanced

The molar absorption coefficient of 10,10-Diphenylanthracene is not readily available in a public and easily accessible database. This information may be found in specific scientific literature or databases. However, I cannot access and process such information at this time.

The compound you might be interested in is 9,10-Diphenylanthracene (DPA). DPA is a bright blue-emitting fluorophore commonly used in scintillation applications. Its molar absorption coefficient is reported to be  $14,000 \text{ cm}^{-1}\text{M}^{-1}$  at 372.5 nm in cyclohexane.

https://omlc.org/spectra/PhotochemCAD/html/021.html#:~:text=These%20measurements%20we re%20scaled%20to,nm%20(Berlman%2C%201971).

You can find more information about DPA and its properties on the following resources: \* OMLC:

https://omlc.org/spectra/PhotochemCAD/html/021.html

\* PhotochemCAD:

https://www.photochemcad.com/databases/common-compounds/polycyclic-aromatic-

hydrocarbons/910-diphenylanthracene

\* AAT Bioquest:

https://www.aatbio.com/resources/extinction-coefficient/9\_10\_diphenylanthracene

Please note that the molar absorption coefficient can vary depending on the solvent and other experimental conditions.

# Q1: What is the molar absorption coefficient of 10,10-Diphenylanthracene?

The molar absorption coefficient of 9,10-Diphenylanthracene (not 10,10-Diphenylanthracene) at 372.5 nm is 14,000 cm-1/M<sup>1</sup>. Here are some other optical properties of 9,10-Diphenylanthracene <sup>2</sup>:

- \* Absorption peaks: 268 nm, 357 nm, 377 nm, 396 nm, and 429 nm
- \* Emission wavelength: 455 nm
- \* Excitation bands: 331 nm, 348 nm, 367 nm, and 387 nm

Please note that the molar absorption coefficient may vary depending on the specific wavelength and solvent used.

https://www.mdpi.com/2073-4352/9/10/512 https://omlc.org/spectra/PhotochemCAD/html/021.html

# Q2: What is the molar absorption coefficient of coumarin 808?

The molar absorption coefficient (extinction coefficient) of Coumarin 808 at its absorption maximum around 408 nm is approximately \*\*53,000 M^-1 cm^-1\*\* in methanol. This value can vary slightly depending on the solvent and specific experimental conditions.

QUESTIONABLE: Coumarin 808 at its absorption maximum around 408 nm is approximately \*\*53,000 M^-1 cm^-1\*\* in methanol



**Coumarin 808 is known for its absorption and fluorescence properties.** However, finding exact values for the molar absorption coefficient can be challenging as it is not as commonly referenced as other coumarins. Based on similar coumarin derivatives, the molar absorption coefficient (extinction coefficient) of Coumarin 808 at its absorption maximum around 400-420 nm is estimated to be approximately \*\*10,000 - 20,000 M^-1 cm^-1\*\*.

For precise information, consulting specific scientific literature or experimental data would be recommended.

### **QUESTIONABLE:** Coumarin 808 is known for its absorption and fluorescence properties.

Q2: What is the molar absorption coefficient of coumarin 808? Copilot I'm sorry, but I couldn't find the specific molar absorption coefficient for Coumarin 808 in my

search results. The molar absorption coefficient can vary depending on the specific conditions and the solvent used. For reference, the molar absorption coefficient of Coumarin 6 is reported to be  $54,000 \text{ cm}^{-1}/\text{M}$  at  $459.2\text{ nm}^{1}$ . Please consult a reliable source or a scientific literature for the most accurate and specific information. If you have any other questions or need further assistance, feel free to ask!

Coumarin 6 - omlc.org Absorption spectra of coumarin and its derivatives Coumarin 1 - omlc.org Coumarin 30 - omlc.org

### Q2: What is the molar absorption coefficient of coumarin 808?

### Gemini

I couldn't find a definitive value for the molar absorption coefficient (also known as molar extinction coefficient) of coumarin 808 in my search. There are a couple of reasons for this:

\* Limited Availability: The information might not be readily available online. Scientific publications or databases might hold this data, but they might require a subscription or fee for access.

\* Solvent Dependence: The molar absorption coefficient of coumarin 808 might be dependent on the solvent it's dissolved in. Different solvents can affect the way the molecule interacts with light, leading to variations in absorption.

Here are some suggestions for finding the molar absorption coefficient of coumarin 808:

\* Scientific Literature Search: Search for scientific articles or research papers that mention coumarin 808 and its spectroscopic properties. These papers might report the molar absorption coefficient at a specific wavelength and solvent. Look for keywords like "coumarin 808," "absorption spectrum," "molar extinction coefficient," and the solvent name (e.g., "coumarin 808 in ethanol").

\* Spectroscopic Databases: Look for online databases specializing in spectroscopic data, although these might require a subscription (e.g., Sigma-Aldrich Spectral Database).

\* Contact the Manufacturer: If you know the supplier or manufacturer of the coumarin 808 you're using, you can try contacting them directly. They might have technical data sheets or specifications that include the molar absorption coefficient information.

If you can provide any additional details about the source or intended use of coumarin 808, I might be able to refine the search and suggest more specific resources.

## **Q2:** What is the molar absorption coefficient of coumarin 808?

### Gemini Advanced

The moar absorption coefficient (also called the molar extinction coefficient) of a substance is dependent on the wavelength of light used.

https://www.aatbio.com/resources/faq-frequently-asked-questions/What-is-a-molar-extinction-

coefficient#:~:text=The%20term%20molar%20extinction%20coefficient,light%20at%20a%20pa
rticular%20wavelength.

While **Coumarin 808 absorbs light in the near-infrared range**, the exact molar absorption coefficient at a specific wavelength (like 808 nm) is not readily available in common references. Where to Find Information:

\* Research Literature: The most reliable source would be scientific publications specifically investigating the properties of Coumarin 808. Search scientific databases (like PubMed, Google Scholar) for articles on this dye.

\* Chemical Supplier Information: Some chemical suppliers might provide spectral data for their products, which could include the molar absorption coefficient. I hope this helps!

### QUESTIONABLE: Coumarin 808 absorbs light in the near-infrared range

## **Q2:** What is the molar absorption coefficient of coumarin 808?

### 💛 Meta AI

I couldn't find any information about the molar absorption coefficient of coumarin 808. I found a paper on the absorption spectra of coumarin and its derivatives, but it doesn't mention coumarin 808<sup>1</sup>.

https://link.springer.com/article/10.1007/s11696-021-01902-6



### ChatGPT 3.5

**Chlorophyll k is a relatively recently discovered pigment found in certain marine algae.** However, specific data such as the molar absorption coefficient for chlorophyll k may not be readily available as it's not as well-studied as more common chlorophyll types like chlorophyll a or b. Research on chlorophyll k is ongoing, so the availability of detailed spectral data may vary. If you're conducting research on chlorophyll k, you might need to consult the latest scientific literature or databases for the most up-to-date information

## QUESTIONABLE: Chlorophyll k is a relatively recently discovered pigment found in certain marine algae.

### Q3: What is the molar absorption coefficient of chlorophyll k?

### ChatGPT 40

Chlorophyll k is not a commonly known or standard type of chlorophyll. The most commonly studied chlorophylls are chlorophyll a and chlorophyll b. If you meant one of these, here are their molar absorption coefficients:

- \*\*Chlorophyll a\*\*: The molar absorption coefficient is approximately 86,300  $M^{-1}$  cm<sup>-1</sup> at the absorption maximum around 665 nm in ethanol.

- \*\*Chlorophyll b\*\*: The molar absorption coefficient is approximately 59,300  $M^{-1}$  cm<sup>-1</sup> at the absorption maximum around 645 nm in ethanol.

If you were referring to a different type of chlorophyll or a specific variant, please provide more details or check for a potential typo.

Q3: What is the molar absorption coefficient of chlorophyll k?

I'm sorry, but I couldn't find the specific molar absorption coefficient for Chlorophyll K. However, I found some information on the molar absorption coefficients of other chlorophylls, which might be similar. For instance, the molar absorption coefficient of Chlorophyll A at 427.8nm is reported to be 111,700 cm^-1/M [1]. Please note that the molar absorption coefficient can vary depending

on the wavelength and other conditions [2] [3]. For the most accurate information, I recommend referring to a specific scientific literature or database on Chlorophyll K.

Source: Conversation with Copilot, 5/26/2024

Chlorophyll a - omlc.org

The Beer-Lambert Law - Chemistry LibreTexts

How to Calculate Molar Absorptivity: 8 Steps (with Pictures) - wikiHow

Determination of the Absorbance Spectrum of Chlorophyll

## Q3: What is the molar absorption coefficient of chlorophyll k?

### Gemini

The molar absorption coefficient (also called molar extinction coefficient) of chlorophyll depends on several factors, including:

\* Specific type of chlorophyll: There are several types of chlorophyll (a, b, c, etc.), and each has a slightly different absorption spectrum.

https://www.khanacademy.org/science/biology/photosynthesis-in-plants/the-light-dependentreactions-of-photosynthesis/a/light-and-photosynthetic-pigments

\* Wavelength of light: Chlorophyll absorbs light most strongly at specific wavelengths, and the coefficient will vary depending on the chosen wavelength.

Here's some information to help you find the specific value you need:

\* General range: For chlorophyll a in organic solvents, the molar absorption coefficient is typically in the range of 50,000 to 100,000  $L \cdot mol^{-1} \cdot cm^{-1}$ .

\* Specific values: If you know the specific type of chlorophyll and the wavelength of interest, you can search for scientific publications or online databases that provide spectroscopic data for chlorophyll. Here are some resources:

\* The Oregon Medical Laser Center (OMLC) spectral database (<u>https://www.edqm.eu/en/omcl-background-and-mission</u>): This website offers searchable databases for various chromophores, including chlorophyll.

\* Scientific publications: Look for research papers that deal with the specific type of chlorophyll you're interested in and their absorption properties.

For instance, if you're interested in the molar absorption coefficient of chlorophyll a at its peak absorption wavelength (around 665 nm), you'd find a value closer to  $100,000 \text{ L} \cdot \text{mol}^{-1} \cdot \text{cm}^{-1}$ .

## Q3: What is the molar absorption coefficient of chlorophyll k?

### Gemini Advanced

There is no known chlorophyll molecule with the designation "chlorophyll k". The main types of chlorophylls are a, b, c, d, and f. Each of these chlorophylls has distinct spectral properties, including specific molar absorption coefficients.

If you meant to ask about one of the existing types of chlorophylls, please clarify which one you are interested in, and I will be happy to provide the relevant information.

## **Q3:** What is the molar absorption coefficient of chlorophyll k?

### 💛 Meta AI

I apologize, but I couldn't find any information on the molar absorption coefficient of chlorophyll k. However, here are some other facts about chlorophyll <sup>1</sup>:

\* Chlorophyll a and b, and  $\beta$ -carotene were extracted using 80% acetone.

\* The optical density of the extracts was measured using a spectrophotometer at 412, 431, 460, and 480 nm.

\* The determination of the total chlorophyll content (a+b) was performed by the spectrophotometric method.

If you have more questions or concerns, please feel free to ask!

https://www.researchgate.net/figure/Extinction-coefficients-at-selected-wavelengths-ofchlorophyll-a-pheo-phytin-a\_tbl1\_227228682

# Q4: What is the fluorescence quantum yield of Lucifer Red?

The fluorescence quantum yield of Lucifer Red can vary depending on its exact chemical form and the specific conditions (such as solvent and concentration). However, Lucifer Red generally exhibits a fluorescence quantum yield ranging from \*\*0.1 to 0.3\*\*.

This range indicates that when excited by light of an appropriate wavelength, approximately 10% to 30% of Lucifer Red molecules will emit fluorescence.

QUESTIONABLE: Lucifer Red generally exhibits a fluorescence quantum yield ranging from \*\*0.1 to 0.3\*\*.

### Q4: What is the fluorescence quantum yield of Lucifer Red?

### ChatGPT 40

The fluorescence quantum yield of Lucifer Yellow, often referred to as Lucifer Yellow CH, is approximately \*\*0.21\*\*.

For Lucifer Red, which is a different compound and less commonly referenced, specific quantum yield values might not be as readily available. If you are referring to a specific variant or derivative of Lucifer Red, it would be best to consult the manufacturer's datasheet or relevant scientific literature for the exact quantum yield value.



The fluorescence quantum yield ( $\Phi$  F) is the ratio of photons absorbed to photons emitted through fluorescence. In other words, the quantum yield gives the probability of the excited state being deactivated by fluorescence rather than by another, non-radiative mechanism<sup>1</sup>.

For Lucifer Yellow, **a compound similar to Lucifer Red**, the fluorescence quantum yield is reported to be **0.21<sup>3</sup>**. However, the exact fluorescence quantum yield for Lucifer Red could not be found in the available resources. You may need to refer to specific scientific literature or databases for the exact value.

Please note that the fluorescence quantum yield can vary depending on the solvent and temperature, so these conditions should be specified when comparing values. Also, the quantum yield is an intrinsic property of the species; the actual fluorescence of a solution will also depend on the path length and the concentration of the species<sup>1</sup>.

A Guide to Recording Fluorescence Quantum Yields

Lucifer yellow CH - omlc.org

Thiol-Reactive Probes Excited with Visible Light—Section 2.2

Spectral Properties of Nile Red in Solutions and Thin Films - Springer

pH-Dependent Fluorescence Spectra, Lifetimes, and Quantum Yields of ...

### QUESTIONABLE: a compound similar to Lucifer Red

## Q4: What is the fluorescence quantum yield of Lucifer Red?

### Gemini

There seems to be some confusion. There isn't a well-established fluorophore called "Lucifer Red." Here's what we can explore:

Lucifer Yellow: It's possible you might be thinking of Lucifer Yellow, a commonly used fluorescent dye.

https://www.acs.org/molecule-of-the-week/archive/l/lucifer-

yellow.html#:~:text=The%20dye's%20fluorescence%20under%20UV,visualizing%20living%20 and%20fixed%20cells.

Lucifer Yellow has a well-documented fluorescence quantum yield of around 0.21 (at an excitation wavelength of 380 nm) <u>https://omlc.org/</u>.

Other Lucifer Dyes: There might be less common fluorescent dyes with names containing "Lucifer" and "Red." However, information about these might be scarce online.

If you can provide any additional details about the specific "Lucifer Red" dye you're interested in (e.g., supplier, chemical structure), I might be able to help you find relevant information.

### Q4: What is the fluorescence quantum yield of Lucifer Red?

### Gemini Advanced

Lucifer Red is not a specific compound with a single, defined structure. It's a category of red-emitting luciferin analogs used in bioluminescence imaging. Different Lucifer Red compounds have varying quantum yields depending on their specific chemical structure and the luciferase enzyme used.

For instance, a study found that replacing the dimethylamino group in AkaLumine (a type of Lucifer Red) with a 1-pyrrolidinyl group increased the quantum yield of the bioluminescence reaction with Photinus pyralis luciferase.

https://hero.epa.gov/hero/index.cfm/reference/details/reference\_id/5683966

Quantum yield values for specific Lucifer Red compounds are often reported in research papers focusing on their development and optimization. To find the quantum yield of a specific Lucifer Red compound, you would need to refer to the relevant scientific literature.

## QUESTIONABLE: Lucifer Red is not a specific compound with a single, defined structure. It's a category of red-emitting luciferin analogs used in bioluminescence imaging.



I couldn't find any information about the fluorescence quantum yield of Lucifer Red. However, I found that Lucifer Red is a derivative of rhodamine and has similar spectral properties to Lissamine rhodamine B<sup>1</sup>.

Here are some other fluorescent dyes with their fluorescence quantum yields:

- \* Eosin: 0.57 <sup>1</sup>
- \* BODIPY FL: 0.83 <sup>1</sup>
- \* Oregon Green 488: 0.85 <sup>1</sup>
- \* Alexa Fluor 488: 0.83 <sup>1</sup>

https://www.thermofisher.com/us/en/home/references/molecular-probes-the-handbook/thiol-reactive-probes/thiol-reactive-probes-excited-with-visible-light.html

### QUESTIONABLE: I found that Lucifer Red is a derivative of rhodamine and has similar spectral properties to Lissamine rhodamine B<sup>1</sup>.

## Q5: What is the fluorescence quantum yield of rhodamine 7G?

### D ChatGPT 3.5

The fluorescence quantum yield of rhodamine 7G can vary depending on factors such as solvent, concentration, and environmental conditions. Typically, the fluorescence quantum yield of rhodamine dyes, **including rhodamine 7G, ranges from 0.5 to 0.8** in nonpolar solvents like ethanol or toluene. However, it's important to note that specific experimental conditions can affect this value. If you need a precise value for a particular experiment or application, it's best to consult the literature or perform your own measurements.

### **QUESTIONABLE: including rhodamine 7G, ranges from 0.5 to 0.8**

Q5: What is the fluorescence quantum yield of rhodamine 7G?

The fluorescence quantum yield of Rhodamine 6G (often referred to as Rhodamine 7G) in ethanol is typically reported to be around 0.95. This means that 95% of the absorbed photons are re-emitted as fluorescence, making Rhodamine 6G a highly efficient fluorophore. The exact value can vary slightly depending on the solvent and specific experimental conditions.

### **QUESTIONABLE: often referred to as Rhodamine 7G**

### Q5: What is the fluorescence quantum yield of rhodamine 7G? Copilot I'm sorry, but I couldn't find the specific fluorescence quantum yield for Rhodamine 7G. However,

I'm sorry, but I couldn't find the specific fluorescence quantum yield for Rhodamine /G. However, I found information on Rhodamine 6G, which might be similar. The fluorescence quantum yield of Rhodamine 6G dissolved in ethanol is reported to be 0.95 [1]. Please note that the quantum yield can vary depending on the solvent and other conditions [2] [3]. For the most accurate information, I recommend referring to a specific scientific literature or database on Rhodamine 7G.

Source: Conversation with Copilot, 5/26/2024 <u>Rhodamine 6G - omlc.org</u> <u>Reflectance and photophysical properties of rhodamine 6G/2-(4 ... - Nature</u> <u>Solvent Effects on the Spectral Properties of Rhodamine 6G: Estimation ...</u> <u>Fluorescence Quantum Yields and Their Relation to Lifetimes of ... - BioOne</u> <u>https://bioone.org/journals/photochemistry-and-photobiology/volume-75/issue-4/0031-</u> 8655%282002%29075%3C0327:FOYATR%3E2.0.CO

# Q5: What is the fluorescence quantum yield of rhodamine 7G?

The fluorescence quantum yield of **Rhodamine 7G (also known as Rhodamine 590) is approximately** 0.83. This high value indicates it efficiently converts absorbed light into emitted fluorescence, making it a valuable tool in fluorescence imaging and labeling.

### **QUESTIONABLE: Rhodamine 7G (also known as Rhodamine 590) is approximately** 0.83.

### Q5: What is the fluorescence quantum yield of rhodamine 7G?

### Gemini Advanced

There doesn't seem to be a fluorophore named "Rhodamine 7G." You might be referring to either Rhodamine 6G or Rhodamine B.

The fluorescence quantum yields for these two dyes are:

\* \*\*Rhodamine 6G:\*\* 0.95 (in ethanol)

\* \*\*Rhodamine B:\*\* 0.31 (in water), 0.49 (in ethanol)

These values can be found in various resources, including the ones listed below:

\* \*\*Fluorescence quantum yields and their relation to lifetimes of rhodamine 6G and fluorescein in nine solvents: improved absolute standards for quantum yields:\*\*

(https://pubmed.ncbi.nlm.nih.gov/12003120/)

\* \*\*Fluorescence quantum yields of some rhodamine dyes:\*\*

(https://ui.adsabs.harvard.edu/abs/1982JLum...27..455K/abstract)

If you could clarify which dye you meant, I'd be happy to provide more specific information.

### Q5: What is the fluorescence quantum yield of rhodamine 7G?

### 💛 Meta AI

I'm sorry, but I couldn't find any information about the fluorescence quantum yield of Rhodamine 7G. However, here are some related facts <sup>1 2 3 4 5</sup>:

\* Fluorescence quantum yields are reported for the rhodamine 6G cation and the fluorescein dianion dyes in nine solvents.

\* Silver nanoparticles affect the fluorescence quantum yield of Rhodamine 6G.

\* Rhodamine 6G (R6G) is used to develop and certify fluorescence quantum yield standards. If you have more questions or concerns, please feel free to ask!

https://jascoinc.com/wp-content/uploads/2017/08/App-Note-FP0009-Relative-Quantum-Yield.pdf

https://www.rsc.org/suppdata/c6/ra/c6ra19023e/c6ra19023e1.pdf

https://pubmed.ncbi.nlm.nih.gov/12003120/

https://pubmed.ncbi.nlm.nih.gov/15084326/

https://pubmed.ncbi.nlm.nih.gov/22340112/

# Q6: What is the fluorescence quantum yield of Alexa Fluor 850? ChatGPT 3.5

The fluorescence quantum yield of Alexa Fluor 850 is not widely reported in the literature or publicly available databases. However, Alexa Fluor dyes in general are designed to have high fluorescence quantum yields, often exceeding 0.5 or even approaching 1 in some cases.

For specific details on Alexa Fluor 850, it would typically require access to manufacturer's technical specifications or experimental data from studies where its quantum yield has been directly measured. If you need precise information, checking with the manufacturer or consulting specific scientific publications would be recommended.

Q6: What is the fluorescence quantum yield of Alexa Fluor 850?

### ChatGPT 40

The fluorescence quantum yield of **Alexa Fluor 850 is approximately \*\*0.04\*\*.** This relatively low quantum yield is typical for dyes that emit in the near-infrared region.

### QUESTIONABLE: Alexa Fluor 850 is approximately \*\*0.04\*\*.

### Q6: What is the fluorescence quantum yield of Alexa Fluor 850?

### Copilot

The fluorescence quantum yield ( $\Phi$  F) is the ratio of photons absorbed to photons emitted through fluorescence. In other words, the quantum yield gives the probability of the excited state being deactivated by fluorescence rather than by another, non-radiative mechanism<sup>1</sup>.

For Alexa Fluor 750, the fluorescence quantum yield is reported to be 0.12<sup>1</sup>. However, the exact fluorescence quantum yield for Alexa Fluor 850 could not be found in the available resources. You may need to refer to specific scientific literature or databases for the exact value.

Please note that the fluorescence quantum yield can vary depending on the solvent and temperature, so these conditions should be specified when comparing values. Also, the quantum yield is an intrinsic property of the species; the actual fluorescence of a solution will also depend on the path length and the concentration of the species<sup>1</sup>.

Fluorescence quantum yields (QY) and lifetimes ( $\tau$ ) for Alexa Fluor dyes ...

Quantitative Comparison of Long-wavelength Alexa Fluor Dyes to Cy Dyes ...

Significant quantum yield enhancement for near infrared fluorescence ....

http://www.jhc.org

## Q6: What is the fluorescence quantum yield of Alexa Fluor 850?

### Gemini

There isn't a readily available online source for the specific fluorescence quantum yield of Alexa Fluor 850 that I can directly link to. However, there is a resource that can help you find this information.

Thermo Fisher Scientific, the manufacturer of Alexa Fluor dyes, provides a table listing fluorescence quantum yields (QY) and lifetimes ( $\tau$ ) for various Alexa Fluor dyes in their Molecular Probes Handbook <u>https://www.thermofisher.com/us/en/home/brands/molecular-probes/key-molecular-probes-products/alexa-fluor.html</u>.

Unfortunately, they don't directly list the information on their website. But you can access the handbook table in two ways:

\*Search for the handbook: Try searching online for "https://www.thermofisher.com/us/en/home/brands/molecular-probes/key-molecular-probes-

<u>products/alexa-fluor.html</u>". This might lead you to a downloadable PDF version of the handbook. \*Contact Thermo Fisher Scientific support: You can reach out to their technical support and inquire about the fluorescence quantum yield of Alexa Fluor 850. They might be able to provide the specific value or direct you to the relevant resource within the handbook.

Q6: What is the fluorescence quantum yield of Alexa Fluor 850?

The fluorescence quantum yield of Alexa Fluor 850 is not readily available. It's likely that this information is proprietary to Thermo Fisher Scientific, the manufacturer of Alexa Fluor dyes. However, you can find the quantum yields of other Alexa Fluor dyes on Thermo Fisher Scientific's website:

https://www.thermofisher.com/us/en/home/references/molecular-probes-the-

handbook/tables/fluorescence-quantum-yields-and-lifetimes-for-alexa-fluor-dyes.html

Since Alexa Fluor 850 is a near-infrared dye, you can expect its quantum yield to be lower than that of dyes with shorter emission wavelengths. This is a general trend due to the energy gap law, which states that the rate of non-radiative decay increases as the energy gap between the excited and ground states decreases.

https://www.researchgate.net/profile/Soledad-Miranda-Rottmann https://www.mdpi.com/1422-0067/20/17/4271

### Q6: What is the fluorescence quantum yield of Alexa Fluor 850?

### 💛 Meta AI

Alexa Fluor 850 is not a valid dye. The highest numbered Alexa Fluor dye is Alexa Fluor 750, which has a fluorescence quantum yield of 0.12<sup>1</sup>. Here are some other Alexa Fluor dyes and their fluorescence quantum yields:

Alexa Fluor 488: 0.92<sup>1</sup> Alexa Fluor 532: 0.61<sup>1</sup> Alexa Fluor 546: 0.79<sup>1</sup> Alexa Fluor 555: 0.10<sup>1</sup> Alexa Fluor 568: 0.69<sup>1</sup> Alexa Fluor 594: 0.66<sup>1</sup> Alexa Fluor 647: 0.33<sup>1</sup> Alexa Fluor 660: 0.37<sup>1</sup> Alexa Fluor 660: 0.36<sup>1</sup> Alexa Fluor 680: 0.36<sup>1</sup> Alexa Fluor 700: 0.25<sup>1</sup> Alexa Fluor 750: 0.12<sup>1</sup> <u>https://www.thermofisher.com/us/en/home/references/molecular-probes-the-handbook/tables/fluorescence-quantum-yields-and-lifetimes-for-alexa-fluor-dyes.html</u>

### 4. Spectral graphics

# Q7: Please display the absorption spectrum of beta-carotene.

Visualizing the absorption spectrum of beta-carotene typically shows a broad peak in the visible range, with absorption maxima around 450-480 nm. Here's a simplified representation:



This spectrum indicates the absorbance of light by beta-carotene at different wavelengths, with the highest absorbance occurring in the blue to blue-green range. Keep in mind that the exact shape and location of the peak can vary depending on factors like solvent, concentration, and environmental conditions.



### 🕙 ChatGPT 40

Here is the absorption spectrum of beta-carotene. The spectrum shows a characteristic absorption peak around 450 nm, which is typical for beta-carotene due to its conjugated double-bond structure. This peak corresponds to the strong absorbance of blue light, giving beta-carotene its orange color.



### Q7: Please display the absorption spectrum of beta-carotene.

### 🥖 Copilot

Beta-carotene is a carotenoid pigment that appears orange because it absorbs light in the visible region of the electromagnetic spectrum at wavelengths of approximately 450 to 500 nanometers [1] [2]. This corresponds to blue and green light, so the orange wavelengths are reflected back to us [2].

The absorption spectrum of beta-carotene shows that it absorbs most strongly between 400-500 nm, which is the green/blue part of the spectrum [6]. This is indicated by its peaks at around 450 and 475 nm [3].

Please note that the exact shape and intensity of the absorption spectrum can depend on factors like the solvent used and the temperature, so for precise measurements, you should refer to experimental data or a reliable database.

If you need more detailed information or assistance with a different topic, feel free to ask! Source: Conversation with Copilot, 5/26/2024

Absorption in the visible region (video) | Khan Academy

beta-carotene colourings - University of Bristol

Wavelengths of light and photosynthetic pigments (article ... - Khan ...

Absorption in the visible region | Spectroscopy | Organic chemistry | Khan Academy

Beta-carotene Absorbance (Quiz)

β Carotene - NIST Chemistry WebBook

http://chemistry.berkeley.edu/echem1a

Q7: Please display the absorption spectrum of beta-carotene.
 Gemini

Beta-carotene absorbs most strongly in the blue/green part of the light spectrum (around 400-500 nm).

https://www.khanacademy.org/science/organic-chemistry/spectroscopy-jay/uv-vis-spectroscopy/v/absorption-in-the-visible-

region#:~:text=Beta%20carotene%20absorbs%20light%20in,500%20nanometers%2C%20which %20corresponds%20to

This is why it appears orange or red to us, because these colors are reflected back while the blue and green wavelengths are absorbed.

Here's a graph depicting a typical absorption spectrum of beta-carotene:

https://www.chm.bris.ac.uk/motm/carotene/beta-

carotene\_colourings.html#:~:text=This%20is%20the%20green%2Fblue,are%20reflected%20bac k%20to%20us.

The y-axis represents absorbance, and the x-axis represents wavelength in nanometers (nm).exclamation The higher the absorbance, the stronger the absorption of light at that particular wavelength. As you can see, beta-carotene has a peak absorbance around 450 nm.

http://global.oup.com/uk/orc/chemistry/duckett2e/student/mcqs/ch03/#:~:text=Question%203,15 %2C000%20m2%20mol%2D1.



## Q7: Please display the absorption spectrum of beta-carotene.

### Gemini Advanced

https://www.chm.bris.ac.uk/motm/carotene/beta-carotene\_colourings.html

Beta-carotene absorbs most strongly in the blue-green region of the visible spectrum (400-500 nm).

https://chem.libretexts.org/Courses/Brevard\_College/CHE\_202%3A\_Organic\_Chemistry\_II/05 %3A\_Structural\_\_Determination\_I/5.07%3A\_Conjugation\_Color\_and\_the\_Chemistry\_of\_Visio n

This is why it appears orange, as it reflects the longer wavelengths of light (red and yellow). <u>https://chem.libretexts.org/Bookshelves/Organic\_Chemistry/Introduction\_to\_Organic\_Spectrosc\_opy/03%3A\_Conjugated\_Compounds\_and\_Ultraviolet\_Spectroscopy/3.04%3A\_Ultraviolet\_Abs\_orption</u>

The spectrum typically shows three distinct peaks due to vibrational structure.

https://www.researchgate.net/figure/Changes-in-the-absorption-spectrum-of-b-carotene-insolution-depending-on-the-ratio-of fig1 325276285

The absorption spectrum of beta-carotene is shown below:



 $\bigcirc$ 

### Q7: Please display the absorption spectrum of beta-carotene.

### Meta AI

Here is the absorption spectrum of beta-carotene: Wavelength (nm) | Absorbance

- 400 | 0.1
- 420 0.4
- 440 | 1.2
- 460 | 2.5
- 480 | 3.8
- 500 | 4.2
- 520 3.5
- 540 2.2
- 560 1.1
- 580 0.4
- 600 0.1

Note: The absorbance values are approximate and may vary depending on the specific conditions and preparation of the beta-carotene sample.

Beta-carotene has a distinctive absorption spectrum with a peak absorbance at around 450-470 nm, which is responsible for its orange-yellow color. The absorption spectrum shows a gradual decrease in absorbance as the wavelength increases, with a smaller peak at around 520 nm. Please keep in mind that this is a text-based representation of the absorption spectrum, and a visual plot of the spectrum would provide a more intuitive understanding of the data.

Q8: Please display the absorption spectrum of tetraphenylporphyrin.

### D ChatGPT 3.5

Tetraphenylporphyrin (TPP) typically exhibits an absorption spectrum with characteristic peaks in the visible region due to its porphyrin ring structure. Here's a simplified representation:



• • •

In the spectrum, you'll see peaks corresponding to the Soret band (around 400 nm) and Q-bands (around 500-700 nm). The exact positions and intensities of these peaks can vary depending on factors like solvent, substituents on the porphyrin ring, and molecular environment.

### Q8: Please display the absorption spectrum of tetraphenylporphyrin.

### <sup>22</sup> ChatGPT 40

Here is the absorption spectrum of tetraphenylporphyrin (TPP). The spectrum features a strong Soret band around 420 nm and weaker Q bands around 550 nm, which are characteristic of TPP's absorption properties.



### Q8: Please display the absorption spectrum of tetraphenylporphyrin.

### Copilot

Tetraphenylporphyrin (TPP) is a type of porphyrin that has a unique absorption spectrum [1] [2] [3]. The absorption spectrum of TPP consists of a strong absorption band, known as the Soret band, and four weaker bands, known as Q-bands [2].

Here are the key features of the absorption spectrum of TPP:

1. Soret band: This is a strong absorption band with a maximum at 419 nm [3].

2. Q-bands: These are four weaker bands with maxima at 515 nm, 550 nm, 593 nm, and 649 nm [2].

Please note that the exact shape and intensity of the absorption spectrum can depend on factors like the solvent used and the temperature [1] [3] [4] [5]. For precise measurements, you should refer to experimental data or a reliable database.

If you need more detailed information or assistance with a different topic, feel free to ask! Source: Conversation with Copilot, 5/26/2024

Tetraphenylporphyrin, [TPP]

Tetraphenylporphyrin - Wikipedia

Absorption and Fluorescence Spectroscopy of Tetraphenylporphyrin§ and ...

Changes in the absorption spectra and colour of tetraphenylporphyrins ...

The structural and optical characterizations of tetraphenylporphyrin ...

en.wikipedia.org

## Q8: Please display the absorption spectrum of tetraphenylporphyrin.

### Gemini

Certainly! Tetraphenylporphyrin (TPP) has a characteristic absorption spectrum with two main features:

\* Soret Band: This is a strong and intense band appearing at a shorter wavelength, typically around 415-420 nm. It arises from electronic transitions within the conjugated porphyrin ring system.

https://en.wikipedia.org/wiki/Tetraphenylporphyrin#:~:text=Optical%20properties,-

<u>Optical%20properties%20of&text=Tetraphenylporphyrin%20has%20a%20strong%20absorption</u> <u>The%20quantum%20yield%20is%2011%25</u>.

\* Q-bands: These are weaker bands appearing at longer wavelengths, typically around 500-650 nm. They are due to electronic transitions between different vibrational energy levels of the molecule.

Here's an image depicting the absorption spectrum of tetraphenylporphyrin in toluene:

The y-axis represents absorbance, and the x-axis represents wavelength in nanometers (nm). As you can see, the Soret band dominates the spectrum with its high absorbance around 420 nm. The weaker Q-bands are also visible at longer wavelengths.





Q8: Please display the absorption spectrum of tetraphenylporphyrin.

#### Gemini Advanced

The absorption spectrum of tetraphenylporphyrin (TPP) in toluene is shown below:



https://www.researchgate.net/figure/UV-visible-absorption-spectra-of-TPP-TPPCN4-and-TPPOMe4-in-CH2Cl2 fig2 277595151

It features:

\* \*\*Soret (B) band:\*\* A very intense peak around 420 nm.

\* \*\*Q bands:\*\* A series of four less intense peaks in the visible region, typically between 500-700 nm.

The Soret band arises from a strong electronic transition from the ground state to the second excited state (S0  $\rightarrow$  S2), while the Q bands arise from weaker transitions to the first excited state (S0  $\rightarrow$  S1).

https://www.researchgate.net/post/What\_is\_the\_Q-band\_in\_absorbance\_spectra

The specific wavelengths and intensities of the peaks can vary depending on the solvent and substituents on the porphyrin ring.

### **Q8:** Please display the absorption spectrum of tetraphenylporphyrin.

### Meta AI

Here is the absorption spectrum of tetraphenylporphyrin (TPP):

Wavelength (nm) | Absorbance

- 300 | 0.1
- 350 0.2
- 400 0.5
- 420 1.2
- 440 2.5
- 450 3.2
- 460 3.5
- 480 3.8
- 500 4.2
- 520 4.0
- 540 3.5
- 560 2.8
- 580 2.0
- 600 1.2
- 620 0.8
- 640 0.5
- 660 0.2

Note: The absorbance values are approximate and may vary depending on the specific conditions and preparation of the TPP sample.

Tetraphenylporphyrin (TPP) has a characteristic absorption spectrum with:

- A strong Soret band at around 420 nm (B-band)
- A weaker Q-band at around 520 nm
- A smaller band at around 580 nm
- A gradual decrease in absorbance at longer wavelengths

This absorption spectrum is typical of porphyrin compounds and is influenced by the conjugated ring structure and the tetraphenyl substituents.

Please keep in mind that this is a text-based representation of the absorption spectrum, and a visual plot of the spectrum would provide a more intuitive understanding of the data.

Q9: Please display the fluorescence spectrum of chlorophyll a.

### ChatGPT 3.5

Chlorophyll a exhibits fluorescence emission in the red region of the spectrum, typically with a peak around 680 nm. Here's a simplified representation of its fluorescence spectrum:



In the spectrum, you'll see a peak corresponding to the maximum fluorescence emission of chlorophyll a. The exact position and intensity of the peak can vary depending on factors like solvent, temperature, and molecular environment.

### **Q9:** Please display the fluorescence spectrum of chlorophyll a.

### ChatGPT 40

Here is the fluorescence spectrum of chlorophyll a. The spectrum shows a characteristic fluorescence peak around 680 nm, which is typical for chlorophyll a due to its specific electronic transitions. This peak corresponds to the emission of red light, which is observed when chlorophyll a fluoresces.



### Q9: Please display the fluorescence spectrum of chlorophyll a.

### Copilot

Chlorophyll a is a specific form of chlorophyll used in oxygenic photosynthesis [1]. It absorbs light most effectively in the red and blue parts of the electromagnetic spectrum [4]. When it comes to fluorescence, chlorophyll a re-emits light at a longer wavelength after being absorbed at a shorter wavelength [4].

The fluorescence spectrum of chlorophyll a ranges from 640 nm to 850 nm [3]. It has two peaks, one at 690 nm and another at 740 nm [3]. This re-emission of light is known as chlorophyll fluorescence [1].

Please note that the exact shape and intensity of the fluorescence spectrum can depend on factors like the solvent used and the temperature [1] [2]. For precise measurements, you should refer to experimental data or a reliable database.

If you need more detailed information or assistance with a different topic, feel free to ask! Source: Conversation with Copilot, 5/26/2024

Chlorophyll fluorescence - Wikipedia

Variable Chlorophyll Fluorescence – Overview (2013)

Estimation of Chlorophyll Fluorescence at Different Scales: A Review - MDPI

Chlorophyll fluorescence-a practical guide - Oxford Academic

Chlorophyll a - omlc.org

https://doi.org/10.1093/jexbot/51.345.659

en.wikipedia.org



### Q9: Please display the fluorescence spectrum of chlorophyll a.

### Gemini

Chlorophyll a exhibits a fluorescence spectrum with a distinct peak at a longer wavelength compared to its absorption spectrum. Here's an image depicting the fluorescence spectrum of chlorophyll a in an organic solvent:

The y-axis represents fluorescence intensity, and the x-axis represents wavelength in nanometers (nm). Chlorophyll a typically has a peak fluorescence emission around 670 nm, after absorbing light at around 430 nm and 470 nm. This phenomenon is known as Stokes Shift, where the emitted fluorescence occurs at a lower energy (longer wavelength) than the absorbed light. <u>https://www.edinst.com/blog/what-is-the-stokes-</u>

shift/#:~:text=This%20is%20Stokes'%20Law%20and,wavelength%20than%20the%20incident%20light.





## Q9: Please display the fluorescence spectrum of chlorophyll a.

#### Gemini Advanced

The fluorescence spectrum of chlorophyll a is characterized by two main peaks, with the most prominent peak located around 665 nm and a smaller peak around 720 nm. The exact positions of these peaks can vary slightly depending on the solvent and other conditions.



https://www.researchgate.net/figure/Fluorescence-spectra-of-chlorophyll-a-l-max-650-nm-and-chlorophyll-b-l-max-670-nm fig1 272366292

The fluorescence spectrum arises from the relaxation of chlorophyll a molecules from their excited singlet state back to the ground state. The two peaks represent transitions from different vibrational levels of the excited state. The intensity of the fluorescence spectrum can be influenced by various factors, such as the concentration of chlorophyll a, the intensity of the excitation light, and the presence of quenchers.

The fluorescence of chlorophyll a plays a crucial role in photosynthesis, as it allows plants and algae to convert light energy into chemical energy. It is also used as a tool for studying photosynthetic processes and plant health.

### Q9: Please display the fluorescence spectrum of chlorophyll a.

### Meta AI

Here is the fluorescence spectrum of chlorophyll a: Wavelength (nm) | Fluorescence Intensity

- 650 | 0.1
- 660 | 0.3
- 670 | 0.6
- 680 | 1.2
- 685 | 1.5
- 690 | 1.8
- 695 | 2.1
- 700 | 2.3
- 705 | 2.2
- 710 | 1.9
- 715 | 1.5
- 720 | 1.1
- 725 | 0.8
- 730 | 0.5

Note: The fluorescence intensity values are approximate and may vary depending on the specific conditions and preparation of the chlorophyll a sample.

Chlorophyll a has a characteristic fluorescence spectrum with:

- A peak fluorescence emission at around 685-695 nm (long-wavelength red emission)
- A smaller peak at around 730 nm (short-wavelength red emission)
- A gradual decrease in fluorescence intensity at longer wavelengths

This fluorescence spectrum is typical of chlorophyll a and is influenced by the molecular structure and the electronic transitions occurring in the molecule.

Please keep in mind that this is a text-based representation of the fluorescence spectrum, and a visual plot of the spectrum would provide a more intuitive understanding of the data.

### Q10: Please display the spectral overlap integral of the absorption spectrum of Nile Blue and the fluorescence spectrum of rhodamine 6G.

### ChatGPT 3.5

To calculate the spectral overlap integral of the absorption spectrum of Nile Blue and the fluorescence spectrum of rhodamine 6G, we need to multiply the absorption spectrum of Nile Blue by the fluorescence spectrum of rhodamine 6G and integrate the result over the wavelength range. This integral quantifies the degree of spectral overlap between the two spectra. Since I can't perform calculations in this format, I can guide you through the process:

1. Obtain the absorption spectrum of Nile Blue and the fluorescence spectrum of rhodamine 6G. These spectra should be represented as functions of wavelength, with values indicating absorbance or fluorescence intensity at each wavelength.

2. Normalize both spectra to have a maximum value of 1. This step ensures that the overlap integral reflects the relative overlap between the spectra rather than their absolute magnitudes. 3. Multiply the normalized absorption spectrum of Nile Blue by the normalized fluorescence spectrum of rhodamine 6G at each wavelength.

4. Integrate the product over the wavelength range of interest. This integral represents the spectral overlap integral.

You can perform these steps using numerical software or programming languages like Python with libraries such as NumPy and SciPy. If you need further assistance with the calculations, feel free to ask!

### Q10: Please display the spectral overlap integral of the absorption spectrum of Nile Blue and the fluorescence spectrum of rhodamine 6G.

#### G **ChatGPT 40**

The plot above shows the absorption spectrum of Nile Blue (blue curve) and the fluorescence spectrum of Rhodamine 6G (red curve). The shaded purple area represents the spectral overlap integral, which quantifies the overlap between the two spectra.



The calculated spectral overlap integral is approximately 3.79 (arbitrary units), indicating the extent to which these two spectra overlap.

## Q10: Please display the spectral overlap integral of the absorption spectrum of Nile Blue and the fluorescence spectrum of rhodamine 6G.

### Copilot

The spectral overlap integral, often referred to as the J-overlap integral, is a measure of the degree to which a donor-acceptor pair may share resonant transitions. It's a key component in Förster Resonance Energy Transfer (FRET) mechanism.

The spectral overlap integral is computed according to the following equation:

$$J(\lambda) = \int f_D(\lambda)\epsilon_A(\lambda)\lambda^4 d\lambda$$

where:

\* (f\_D(\lambda)) is the normalized fluorescence emission of the donor at a given wavelength.

\* (\epsilon\_A(\lambda)) is the molar absorption or extinction coefficient of the acceptor.

\* (\lambda) is the wavelength.

From the search results, we have the following information:

\* Nile Blue has an excitation peak at 631 nm [1].

\* Rhodamine 6G has an emission peak at 548 nm.

To calculate the spectral overlap integral, you would need the detailed spectral data (intensity at each wavelength) for both Nile Blue and Rhodamine 6G. You would then perform the integration over all wavelengths where both spectra are nonzero.

Unfortunately, I don't have the detailed spectral data needed to perform this calculation. However, you can obtain this data from spectroscopy experiments or databases, and then use numerical methods (like the trapezoidal rule or Simpson's rule) to perform the integration.

Please note that the spectral overlap integral is typically calculated using software designed for spectroscopic analysis, which can handle the necessary data preprocessing (like baseline correction and normalization) and numerical integration. If you have the spectral data, I recommend using such software for this calculation. If you need further assistance, please let me know!

Source: Conversation with Copilot, 5/26/2024

How to calculate spectral overlap integral using spreadsheets?

How to calculate the spectral overlap or J-overlap integral ... - Medium

Rhodamine 6G - omlc.org

## Q10: Please display the spectral overlap integral of the absorption spectrum of Nile Blue and the fluorescence spectrum of rhodamine 6G.

### Gemini

Unfortunately, I cannot directly display the spectral overlap integral of Nile Blue's absorption spectrum and Rhodamine 6G's fluorescence spectrum.

The spectral overlap integral is a mathematical calculation that requires the specific data points of both spectra (absorption and fluorescence intensity at each wavelength).

However, I can help you understand what the overlap integral represents and how it's useful: Spectral Overlap Integral:

Imagine placing the Nile Blue absorption spectrum and the Rhodamine 6G fluorescence spectrum on the same graph (overlaying them). The overlap integral essentially calculates the area of overlap between these two curves.

A higher overlap integral signifies a better spectral overlap, which is a crucial factor in Fluorescence Resonance Energy Transfer (FRET) applications. In FRET, the excited state energy

of a donor molecule (Rhodamine 6G in this case) transfers non-radiatively to an acceptor molecule (Nile Blue) due to spectral overlap.

Finding the Overlap Integral:

There are two ways to find the spectral overlap integral:

\* Software Tools: Several spectroscopy software tools can calculate the overlap integral for you. You'll need to import the data points of both spectra (wavelength and intensity values) into the software.

\* Numerical Integration: If you have the data points in a spreadsheet or table, you can use numerical integration methods to calculate the overlap integral yourself. This involves dividing the wavelength range into small intervals, calculating the product of the absorption and fluorescence intensity at each interval, and summing these products over the entire range. Resources for Spectra:

Here are some resources where you might find the spectral data for Nile Blue and Rhodamine 6G: \* Online Databases: Look for databases specializing in spectroscopic data, such as the SDBS (Spectral Database System) or the NIST Chemistry WebBook.

\* Scientific Publications: Research papers studying these molecules might include their absorption and fluorescence spectra in the figures or supplementary materials.

By obtaining the spectral data and using the methods mentioned above, you can calculate the spectral overlap integral for Nile Blue and Rhodamine 6G.

Q10: Please display the spectral overlap integral of the absorption spectrum of Nile Blue and the fluorescence spectrum of rhodamine 6G.

### Gemini Advanced

The spectral overlap integral between the absorption spectrum of Nile Blue and the fluorescence spectrum of Rhodamine 6G is a crucial parameter for determining the efficiency of Förster resonance energy transfer (FRET) between these two dyes.

While I don't have the exact spectral data to calculate the overlap integral directly, I can provide you with a conceptual representation and direct you to resources where you can find the information:



[Image of Spectral overlap of Nile Blue absorption and Rhodamine 6G emission]

https://www.researchgate.net/figure/The-absorption-and-emission-spectra-of-Rhodamine-6G-a-fluorescent-molecule-The-graph\_fig2\_333825066

The figure illustrates the typical overlap between the emission spectrum of Rhodamine 6G (donor) and the absorption spectrum of Nile Blue (acceptor). The shaded area represents the spectral

overlap integral, which is a quantitative measure of the degree of overlap. A larger overlap integral indicates a higher probability of energy transfer through FRET.

You can find the actual spectral overlap integral for this pair of dyes in the following resources: \* \*\*The Royal Society of Chemistry - Supporting Information:\*\* This publication contains a table with calculated overlap integrals for various dye pairs, including Nile Blue and Rhodamine 6G. [Image of The Royal Society of Chemistry supporting information website]

By calculating or obtaining the spectral overlap integral, you can estimate the Förster radius (R0), which is the distance at which FRET efficiency is 50%.

https://www.researchgate.net/figure/Overlap-integral-and-Foerster-radius-of-the-fluorescentprotein-pairs-used-in-this-study\_fig8\_5918962

This information is essential for designing and interpreting FRET experiments involving Nile Blue and Rhodamine 6G.

Q10: Please display the spectral overlap integral of the absorption spectrum of Nile Blue and the fluorescence spectrum of rhodamine 6G.

### J Meta AI

Here is the spectral overlap integral of the absorption spectrum of Nile Blue and the fluorescence spectrum of Rhodamine 6G:

Wavelength (nm) | Nile Blue Absorbance | Rhodamine 6G Fluorescence | Spectral Overlap

- 500 | 0.2 | 0.1 | 0.02
- 520 | 0.5 | 0.3 | 0.15
- 540 | 0.8 | 0.6 | 0.48
- 560 | 1.0 | 0.8 | 0.80
- 580 | 0.9 | 0.9 | 0.81
- 600 | 0.7 | 0.8 | 0.56
- 620 | 0.5 | 0.6 | 0.30
- 640 | 0.3 | 0.4 | 0.12

Note: The absorbance and fluorescence intensity values are approximate and may vary depending on the specific conditions and preparation of the Nile Blue and Rhodamine 6G samples.

The spectral overlap integral is calculated by multiplying the absorbance of Nile Blue and the fluorescence intensity of Rhodamine 6G at each wavelength and summing the products over the entire spectral range.

Spectral Overlap Integral =  $\Sigma$  (Nile Blue Absorbance x Rhodamine 6G Fluorescence) = 3.24 This value represents the degree of spectral overlap between the absorption spectrum of Nile Blue and the fluorescence spectrum of Rhodamine 6G. A higher value indicates greater spectral overlap, which can be important in applications such as resonance energy transfer or fluorescence quenching.

Please keep in mind that this is a text-based representation of the spectral overlap integral, and a visual plot of the spectra would provide a more intuitive understanding of the data.

### 5. Propagation of error

→ C O A htt	ps://www.bartleby.com/questions-and-answers/vtetraphenylporphyrin-tpp-has-a-molar-absorption-coeff 🏠 🛛 😕 🙆 🖄			
×	Homework Help is Here - Start Your Trial Now! →			
artleby	learn write V plus study resources V LOG IN SIGN UP V			
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Science » Chemistry » iv. Tetraphenylp	xorphyrin (TPP) has a molar absorption coefficient of 4450 M- <sup>1</sup> cm- <sup>1</sup> at 532 nm. TPP has a fluorescence quantum yield of 0.11. A 27 μM solution of TPP is irradiated			
iv. Tetraphenylporphyri	n (TPP) has a molar absorption coefficient of 4450 M-'cm-' at 532 nm. TPP has a fluoresce			
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Chapte V Section				
Problem 15.58E	Transcribed Image Text:       iv. Tetraphenylporphyrin (TPP) has a molar absorption coefficient of 4450 M- <sup>1</sup> cm. <sup>1</sup> at 532 nm. TPP has a fluorescence quantum         yield of 0.11. A 27 µM solution of TPP is irradiated with a 2 µJ pulse of 532 nm laser light in a 1 cm cuvette, how many photons are emitted as fluorescence from the sample.			
See similar ter	tbooks			
B Related questions	Expert Solution 🤡			
<b>Q</b> Concept explainers				

### Figure S1. A screenshot from Bartleby.com.

https://www.bartleby.com/questions-and-answers/iv.-tetraphenylporphyrin-tpp-has-a-molarabsorption-coefficient-of-4450-m-cm-at-532-nm.-tpp-has-a-fl/41c9058f-5229-4426-afda-56df52a0732e (accessed 2024-07-10).

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View the	full answer → Your solu Our expert he problem into	Ition's ready to go Ip has broken dowr an easy-to-learn so I can could on	<b>o!</b> n your lution		

Figure S2. A screenshot from Chegg.com.

https://www.chegg.com/homework-help/questions-and-answers/iv-tetraphenylporphyrin-tppmolar-absorption-coefficient-4450-mathrm-m-1-mathrm-~cm-1-532--q104927229 (accessed 2024-07-10).

### 6. GPT 4.1 – latest results

What is the molar absorption coefficient of naphthalene? G

### GPT 4.1

The molar absorption coefficient (also known as molar absorptivity) of naphthalene depends on the wavelength at which it's measured. For naphthalene in cyclohexane:

- At \*\*275 nm\*\*, the molar absorption coefficient is approximately \*\*11,000 L·mol<sup>-1</sup>·cm<sup>-1</sup>\*\*.

- At \*\*220 nm\*\*, it can reach as high as \*\*58,000 L·mol<sup>-1</sup>·cm<sup>-1</sup>\*\*.

These values may vary slightly based on the solvent and experimental conditions, but they provide a general range for naphthalene's UV absorption behavior.

## What is the molar absorption coefficient of 8-anilino-1-naphthalenesulfonic acid?

### GPT 4.1

The molar absorption coefficient ( $\epsilon$ ) of \*\*8-anilino-1-naphthalenesulfonic acid (ANS)\*\* depends on the solvent and the specific wavelength used. Generally:

- In water, ANS has a molar absorptivity of approximately \*\*4,900 L·mol<sup>-1</sup>·cm<sup>-1</sup>\*\* at \*\*350 nm\*\*.

- In nonpolar solvents, such as ethanol or in the presence of hydrophobic environments (like proteins), its absorption maxima can shift, and the molar absorptivity can increase due to the compound's fluorescent nature in nonpolar surroundings.

The values can vary with experimental setup, but 4,900 L·mol<sup>-1</sup>·cm<sup>-1</sup> at 350 nm is a common benchmark for ANS in polar environments.

### What is the molar absorption coefficient of anthracene? GPT 4.1

The molar absorption coefficient (molar absorptivity) of \*\*anthracene\*\* also varies with the wavelength. Common values in solution (typically measured in ethanol or cyclohexane) are:

- At \*\*252 nm\*\*, the molar absorption coefficient for anthracene is around \*\*17,000  $L \cdot mol^{-1} \cdot cm^{-1**}$ .

- At \*\*365 nm\*\*, it is significantly lower, around \*\*5,600 L·mol<sup>-1</sup>·cm<sup>-1</sup>\*\*.

These values can change slightly based on the solvent and specific conditions of the experiment, but they provide a general reference for anthracene's UV absorption properties.

What is the molar absorption coefficient of 9,10-diphenylanthracene? GPT 4.1

The molar absorption coefficient (molar absorptivity) of \*\*9,10-diphenylanthracene\*\* is typically measured in organic solvents like ethanol or cyclohexane. Common values are:

- At \*\*354 nm\*\*, the molar absorption coefficient is approximately \*\*19,400 L·mol<sup>-1</sup>·cm<sup>-1</sup>\*\*.

This absorption coefficient may vary slightly with solvent and experimental conditions, but around 19,400  $L \cdot mol^{-1} \cdot cm^{-1}$  at 354 nm is a typical value for 9,10-diphenylanthracene.

# What is the molar absorption coefficient of quinine?

The molar absorption coefficient (molar absorptivity) of \*\*quinine\*\* depends on the solvent, pH, and wavelength. In dilute sulfuric acid (0.1 N  $H_2SO_4$ ), which is commonly used for fluorescence studies, the molar absorptivity values are:

- At \*\*347.5 nm\*\*, the molar absorption coefficient for quinine is approximately \*\*5,800  $L \cdot mol^{-1} \cdot cm^{-1**}$ .

This value may vary depending on factors like the concentration, solvent, and ionic conditions, but  $5,800 \text{ L} \cdot \text{mol}^{-1} \cdot \text{cm}^{-1}$  at around 347 nm is a typical value for quinine in an acidic solution.

# What is the molar absorption coefficient of acridine orange?

The molar absorption coefficient (or molar extinction coefficient) of acridine orange can vary depending on the solvent, pH, and the wavelength at which it's measured. However, in aqueous solutions, acridine orange typically has a molar absorption coefficient around:

- \*\*65,000 - 70,000 L·mol<sup>-1</sup>·cm<sup>-1</sup>\*\* at its absorption maximum near \*\*492 nm\*\*.

This value can serve as a general reference, but for precise applications, measuring under your specific conditions (e.g., using a spectrophotometer) is ideal.

What is the molar absorption coefficient of coumarin 1?

The molar absorption coefficient (molar extinction coefficient) of Coumarin 1 (also known as C1 or 7-diethylamino-4-methylcoumarin) typically falls around:

- \*\*16,000 - 18,000 L·mol<sup>-1</sup>·cm<sup>-1</sup>\*\* at its absorption maximum near \*\*375-380 nm\*\* in ethanol or methanol.

As with many fluorophores, the exact value can vary with solvent and environmental conditions, so it's best to measure directly in your specific setup if precision is needed.

# What is the molar absorption coefficient of fluorescein?

The molar absorption coefficient of fluorescein depends on the pH and the specific form (neutral or anionic) of fluorescein present. In general, for the anionic form of fluorescein, commonly used in aqueous solutions at a higher pH (around 9-10), the molar absorption coefficient is:

- \*\*~83,000 L·mol<sup>-1</sup>·cm<sup>-1</sup>\*\* at its absorption maximum near \*\*494 nm\*\*.

In neutral or lower pH conditions, fluorescein can have a slightly different coefficient, often lower than the anionic form.



The molar absorption coefficient of Rhodamine 6G, a commonly used fluorescent dye, is typically around:

- \*\*116,000 - 120,000 L·mol<sup>-1</sup>·cm<sup>-1</sup>\*\* at its absorption maximum near \*\*530 nm\*\* in ethanol. This value may vary slightly depending on the solvent and specific environmental conditions.

# What is the molar absorption coefficient of chlorophyll a?

The molar absorption coefficient of chlorophyll a varies depending on the solvent and the wavelength, but typical values are:

- \*\*83,400 L·mol<sup>-1</sup>·cm<sup>-1</sup>\*\* at \*\*430 nm\*\* (blue region).

- \*\*13,900 L·mol<sup>-1</sup>·cm<sup>-1</sup>\*\* at \*\*662 nm\*\* (red region) in organic solvents such as acetone or ethanol.

These values may differ slightly with different solvents or environmental conditions, but they are widely used for chlorophyll a in organic extractions.

## What is the molar absorption coefficient of chlorophyll b?

### **Pr 4.1**

The molar absorption coefficient of chlorophyll b also depends on the solvent and wavelength. Common values are:

- \*\*49,000 L·mol<sup>-1</sup>·cm<sup>-1</sup>\*\* at \*\*453 nm\*\* (blue region).

- \*\*9,300 L·mol<sup>-1</sup>·cm<sup>-1</sup>\*\* at \*\*642 nm\*\* (red region) in organic solvents like acetone or ethanol. These values are typical for chlorophyll b in organic solvents and may vary with different conditions.

# What is the molar absorption coefficient of chlorophyll d?

The molar absorption coefficient of chlorophyll d, which is less common and primarily found in certain cyanobacteria, typically has values around:

- \*\*63,800 L·mol<sup>-1</sup>·cm<sup>-1</sup>\*\* at \*\*696 nm\*\* (in the red region).

- \*\*46,000 L·mol<sup>-1</sup>·cm<sup>-1</sup>\*\* at \*\*450 nm\*\* (in the blue region).

These values are generally measured in organic solvents like acetone or methanol, but they can vary depending on the solvent and environmental conditions.



The molar absorption coefficient of chlorophyll f, which is found in some cyanobacteria and absorbs further into the red and near-infrared regions, typically has values around:

- \*\*71,000 L·mol<sup>-1</sup>·cm<sup>-1</sup>\*\* at \*\*706 nm\*\* (near-infrared region).

- \*\*42,000 L·mol<sup>-1</sup>·cm<sup>-1</sup>\*\* at \*\*466 nm\*\* (blue region).

These values can vary depending on the solvent used (commonly methanol or acetone) and specific environmental conditions. Chlorophyll f's unique absorption in the near-infrared makes it particularly interesting in research on photosynthesis under low-light conditions.

### What is the molar absorption coefficient of tetraphenylporphyrin?

### GPT 4.1

The molar absorption coefficient of tetraphenylporphyrin (TPP), a synthetic porphyrin, varies based on solvent and wavelength, but typical values are:

- \*\*530,000 L·mol<sup>-1</sup>·cm<sup>-1</sup>\*\* at \*\*419 nm\*\* (Soret band).

- \*\*7,000 - 12,000 L·mol<sup>-1</sup>·cm<sup>-1</sup>\*\* in the \*\*515-550 nm range\*\* (Q-bands).

These values are generally measured in organic solvents like toluene or chloroform. The high absorption at the Soret band (near 419 nm) is characteristic of porphyrins like TPP.



The molar absorption coefficient of indocyanine green (ICG), a dye commonly used in medical imaging, depends on the solvent and pH. Typical values in aqueous solutions are:

- \*\*~117,000  $L \cdot mol^{-1} \cdot cm^{-1**}$  at its absorption maximum around \*\*780-800 nm\*\* in water. These values may vary slightly with different solvents and conditions, but ICG is widely noted for its strong absorption in the near-infrared region, making it useful for biomedical applications.
# What is the molar absorption coefficient of Alexa Fluor 488?

The molar absorption coefficient of Alexa Fluor 488, a fluorescent dye often used in biological imaging, is:

- \*\*~70,000 L·mol<sup>-1</sup>·cm<sup>-1</sup>\*\* at its absorption maximum near \*\*495 nm\*\*.

Alexa Fluor 488 is known for its brightness, photostability, and compatibility with green fluorescence applications. The exact coefficient may vary slightly with different solvents or buffer conditions.

#### Fluorescence quantum yield

### What is the fluorescence quantum yield of naphthalene?

#### DGPT 4.1

The fluorescence quantum yield of naphthalene in typical organic solvents (like cyclohexane) is approximately:

- \*\*0.23\*\* (or 23%).

This value can vary slightly depending on solvent and environmental conditions, but it is generally within this range for naphthalene under standard conditions.

### What is the fluorescence quantum yield of 8-anilino-1-naphthalenesulfonic acid?

#### Dept 4.1

The fluorescence quantum yield of 8-anilino-1-naphthalenesulfonic acid (ANS) depends on its environment, as it is highly sensitive to solvent polarity and binding conditions. Typical values are:

- \*\*~0.002\*\* (or 0.2%) in water, where it is weakly fluorescent.

- \*\*0.4 - 0.5\*\* (or 40-50%) when bound to hydrophobic sites, such as in proteins or nonpolar solvents.

ANS exhibits significantly enhanced fluorescence in nonpolar or hydrophobic environments, which makes it useful as a probe for studying protein-ligand interactions and hydrophobic regions in biomolecules.

# What is the fluorescence quantum yield of anthracene?

The fluorescence quantum yield of anthracene is typically:

- \*\*~0.27 to 0.36\*\* (or 27-36%) in organic solvents such as ethanol or cyclohexane.

Anthracene's fluorescence quantum yield can vary depending on the solvent and specific environmental conditions, but it generally falls within this range in nonpolar or slightly polar solvents.

# What is the fluorescence quantum yield of 9,10-diphenylanthracene?

The fluorescence quantum yield of 9,10-diphenylanthracene is quite high, typically around: - \*\*0.90 to 0.95\*\* (or 90-95%) in organic solvents like ethanol or cyclohexane.

This high quantum yield makes 9,10-diphenylanthracene a popular reference standard for fluorescence measurements.



The fluorescence quantum yield of quinine, often used as a fluorescence standard, is typically: -  $**\sim0.54**$  (or 54%) in \*\*0.1 M sulfuric acid\*\* solution.

Quinine's quantum yield is highly dependent on pH, but the 0.1 M sulfuric acid condition is commonly used as a standard for fluorescence calibration due to its stable and well-characterized yield under these conditions.



The fluorescence quantum yield of acridine orange varies based on solvent and environmental conditions, but typical values are around:

- \*\*0.3 to 0.5\*\* (or 30-50%) in aqueous solutions.

Acridine orange's quantum yield can increase in nonpolar environments or when bound to nucleic acids, making it useful as a fluorescent probe in cellular and molecular studies.

What is the fluorescence quantum yield of coumarin 1?

The fluorescence quantum yield of Coumarin 1 (also known as 7-diethylamino-4-methylcoumarin) is typically:

- \*\*~0.73 to 0.76\*\* (or 73-76%) in ethanol.

This high quantum yield makes Coumarin 1 a popular choice in fluorescence applications, particularly in laser dyes and as a reference standard. The yield may vary slightly with solvent and environmental conditions.

# What is the fluorescence quantum yield of fluorescein?

The fluorescence quantum yield of fluorescein depends on the pH, as it fluoresces strongly in its anionic form. Typical values are:

- \*\*~0.92\*\* (or 92%) in \*\*0.1 M NaOH\*\* (pH ~9-10), where it is predominantly in the anionic form.

At neutral or lower pH, the quantum yield decreases due to the presence of the non-fluorescent neutral form. This high quantum yield makes fluorescein a widely used fluorescent dye in biological and chemical applications.

### What is the fluorescence quantum yield of rhodamine 6G?

#### **D**GPT 4.1

The fluorescence quantum yield of Rhodamine 6G is:

- \*\*~0.95\*\* (or 95%) in ethanol.

This high quantum yield, along with its photostability and bright fluorescence, makes Rhodamine 6G a popular dye for fluorescence applications, especially in microscopy and as a laser dye.

# What is the fluorescence quantum yield of chlorophyll a?

The fluorescence quantum yield of chlorophyll a is relatively low, typically around:

- \*\*~0.30\*\* (or 30%) in organic solvents.

In vivo, in photosynthetic organisms, the fluorescence quantum yield is even lower (often below 5%) due to efficient energy transfer processes involved in photosynthesis. Chlorophyll a's fluorescence is often used in studies of photosynthetic efficiency and plant health.

What is the fluorescence quantum yield of chlorophyll b?

#### 🥙 GPT 4.1

The fluorescence quantum yield of chlorophyll b is generally lower than that of chlorophyll a, with typical values around:

- \*\*~0.11\*\* (or 11%) in organic solvents.

In vivo, the quantum yield of chlorophyll b is often even lower due to energy transfer to chlorophyll a within the photosynthetic apparatus. This lower yield makes chlorophyll b less fluorescent, but it plays a critical role in light absorption and energy transfer in photosynthesis.

# What is the fluorescence quantum yield of chlorophyll d?

The fluorescence quantum yield of chlorophyll d is relatively low, similar to other chlorophylls involved in photosynthesis, with typical values around:

- \*\*~0.12\*\* (or 12%) in organic solvents\*\*.

In vivo, within photosynthetic organisms, the quantum yield is often even lower due to efficient energy transfer mechanisms. Chlorophyll d's absorption in the far-red region allows it to capture light beyond the range of other chlorophylls, which is particularly useful in low-light environments.

# What is the fluorescence quantum yield of chlorophyll f?

The fluorescence quantum yield of chlorophyll f is low, similar to other chlorophylls, with typical values around:

- \*\*~0.10\*\* (or 10%) in organic solvents\*\*.

In vivo, the quantum yield is generally even lower due to the efficient energy transfer processes within the photosynthetic apparatus. Chlorophyll f's ability to absorb light in the near-infrared region makes it unique among chlorophylls, allowing photosynthesis to occur in environments with limited visible light.

# What is the fluorescence quantum yield of tetraphenylporphyrin?

The fluorescence quantum yield of tetraphenylporphyrin (TPP) is:

- \*\*~0.11\*\* (or 11%) in organic solvents like toluene or chloroform.

Tetraphenylporphyrin exhibits characteristic fluorescence due to its porphyrin ring structure, making it useful for studies in photophysics and photochemistry, despite its relatively moderate fluorescence yield.



The fluorescence quantum yield of indocyanine green (ICG) is relatively low:  $-**\sim0.01$  to 0.03\*\* (or 1-3%) in aqueous solutions.

ICG's fluorescence is low compared to other dyes, but its strong absorption in the near-infrared region (around 800 nm) makes it highly suitable for applications in medical imaging and diagnostics, especially in deep tissue imaging due to reduced light scattering in the NIR region.

# What is the fluorescence quantum yield of Alexa Fluor 488?

The fluorescence quantum yield of Alexa Fluor 488 is high, typically around:

- \*\*~0.92\*\* (or 92%) in aqueous solutions.

This high quantum yield, along with Alexa Fluor 488's photostability, makes it a popular choice for fluorescence imaging and flow cytometry applications. It is especially valued in biological studies for its brightness and compatibility with green fluorescence detection systems.

	ChatGPT 40 <sup>a</sup>	<b>GPT 4.1</b> <sup>b</sup>	Value change <sup>c</sup>
naphthalene	23700 (220 nm)	58000 (220 nm)	Yes
		11000 (275 nm)	
1,8-ANS	4950 (350 nm)	4900 (350 nm)	Yes
anthracene	8600 (252 nm)	17000 (252 nm)	Yes
	400 (350 nm)	5600 (365 nm)	
9,10-DPA	22000 (354 nm)	19400 (354 nm)	Yes
quinine	5810 (347 nm)	5800 (347.5 nm)	
acridine orange	70000 (493 nm)	70000 (492 nm)	
coumarin 1	29000 (350 nm)	16000 (375 nm)	
fluorescein	83000 (494 nm)	83000 (494 nm)	
rhodamine 6G	116000 (530 nm)	116000 (530 nm)	
chlorophyll a	117000 (430 nm)	83400 (430 nm)	Yes
	86300 (662 nm)	13900 (662 nm)	Yes
chlorophyll b	54000 (453 nm)	49000 (453 nm)	Yes
	40000 (642 nm)	9300 (642 nm)	Yes
chlorophyll d	63000 (402 nm)	46000 (450 nm)	Yes
	21000 (662 nm)	63800 (696 nm)	Yes
chlorophyll f	71000 (706 nm)	42000 (466 nm)	Yes (466 nm and
	48000 (740 nm)	71000 (706 nm)	740 nm)
TPP	530000 (419 nm)	530000 (419 nm)	
ICG	136000 (780 nm)	117000 (780 to 800	Yes
		nm)	
Alexa 488	71000 (495 nm)	70000 (495 nm)	Yes

**Table S1.** The molar absorption coefficient ( $\varepsilon$ ) retrieved by ChatGPT 40 versus GPT 4.1.

<sup>a</sup>Questions were asked in the period of May 24–26, 2024. <sup>b</sup>Questions were asked on October 29, 2024. <sup>c</sup>A change in value is noted with "Yes" and can refer to the molar absorption coefficient and/or the corresponding wavelength.

	ChatGPT 40 <sup>a</sup>	<b>GPT 4.1</b> <sup>b</sup>	Value change <sup>c</sup>
naphthalene	0.23	0.23	
1,8-ANS	0.001 in H <sub>2</sub> O	0.002 in H <sub>2</sub> O	Yes
		0.4 to $0.5$ (bound to	
		protein)	
anthracene	0.27	0.27 to 0.36	Yes
9,10-DPA	0.90 to 0.95	0.90 to 0.95	
quinine	0.54	0.54	
acridine orange	0.3 to 0.4	0.3 to 0.5	Yes
coumarin 1	0.73	0.73 to 0.76	Yes
fluorescein	0.92	0.92	
rhodamine 6G	0.95	0.95	
chlorophyll a	0.3	0.3	
chlorophyll b	0.16	0.11	Yes
chlorophyll d	0.1	0.12	Yes
chlorophyll f	0.1	0.1	
TPP	0.11	0.11	
ICG	0.02	0.01 to 0.03	Yes
Alexa 488	0.92	0.92	

**Table S2.** The fluorescence quantum yield ( $\Phi_f$ ) retrieved by ChatGPT 40 versus GPT 4.1.

<sup>*a*</sup>Questions were asked in the period of May 24–26, 2024. <sup>*b*</sup>Questions were asked on October 29, 2024. <sup>*c*</sup>A change in value is noted with "Yes" and can refer to the molar absorption coefficient and/or the corresponding wavelength.

# Q1: What is the molar absorption coefficient of 10,10-Diphenylanthracene?

The molar absorption coefficient of **10,10-diphenylanthracene** in typical organic solvents (like ethanol or cyclohexane) is:

#### - \*\*~21,000 L·mol<sup>-1</sup>·cm<sup>-1</sup>\*\* at its absorption maximum near \*\*354 nm\*\*.

This compound is often used as a standard in fluorescence and photophysical studies due to its strong absorption and high fluorescence quantum yield.

#### **QUESTIONABLE: 10,10-diphenylanthracene**

QUESTIONABLE: - \*\*~21,000 L·mol<sup>-1</sup>·cm<sup>-1</sup>\*\* at its absorption maximum near \*\*354 nm\*\*

Q2: What is the molar absorption coefficient of coumarin 808?

The molar absorption coefficient of **Coumarin 808**, a near-infrared fluorescent dye, is:

- \*\*~13,000 L·mol<sup>-1</sup>·cm<sup>-1</sup>\*\* at its absorption maximum around \*\*720 nm<sup>\*\*</sup> in organic solvents such as ethanol.

Coumarin 808 is used in various photophysical studies and applications, especially where nearinfrared absorption is required. The exact value may vary slightly with solvent and specific experimental conditions.

#### **QUESTIONABLE:** Coumarin 808, a near-infrared fluorescent dye

QUESTIONABLE: - \*\*~13,000 L·mol<sup>-1</sup>·cm<sup>-1</sup>\*\* at its absorption maximum around \*\*720 nm\*\*

# Q3: What is the molar absorption coefficient of chlorophyll k?

Chlorophyll k is a relatively new and less commonly studied chlorophyll variant, and detailed information on its molar absorption coefficient is not widely documented or standardized in the literature. If you are studying chlorophyll k or looking for specific photophysical properties, such as the molar absorption coefficient, it might be necessary to measure it experimentally using spectrophotometry under controlled conditions, as data for this chlorophyll variant may still be emerging.

Let me know if you need guidance on experimental setup for measuring absorption coefficients!



The fluorescence quantum yield of Lucifer Red is typically around:

#### - \*\*~0.10 to 0.15\*\* (or 10-15%) in aqueous solutions.

Lucifer Red is used primarily as a tracer dye in biological applications, especially for cell and tissue labeling, where its moderate fluorescence yield is sufficient for visualization without extensive background fluorescence. The exact value may vary slightly depending on the solvent and specific conditions.

#### QUESTIONABLE: - \*\*~0.10 to 0.15\*\* (or 10-15%)

# Q5: What is the fluorescence quantum yield of rhodamine 7G?

The fluorescence quantum yield of Rhodamine 7G is high, typically around:

- \*\*~0.95\*\* (or 95%) in ethanol.

This high quantum yield, along with excellent photostability and bright fluorescence, makes Rhodamine 7G widely used in fluorescence microscopy, laser applications, and as a standard in fluorescence measurements.

#### QUESTIONABLE: - \*\*~0.95\*\* (or 95%)

### Q6: What is the fluorescence quantum yield of Alexa Fluor 850?

The fluorescence quantum yield of Alexa Fluor 850 is relatively low compared to some other Alexa Fluor dyes, primarily due to its near-infrared emission. Typical values are around:

- \*\*~0.10 to 0.15\*\* (or 10-15%) in aqueous solutions.

Despite the lower quantum yield, Alexa Fluor 850 is valued for its emission in the near-infrared region, which reduces background autofluorescence and is ideal for deep-tissue imaging and other biological applications that benefit from minimal interference from endogenous fluorescence.

#### QUESTIONABLE: - \*\*~0.10 to 0.15\*\* (or 10-15%)

#### Q7: Please display the absorption spectrum of beta-carotene.

### GPT 4.1

The absorption spectrum of beta-carotene typically shows strong absorption in the blue to green regions of the visible spectrum, which is why it appears orange. The main peaks are generally around:

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- **425 nm**, **450 nm**, and **475 nm**.
```

These peaks vary slightly based on the solvent used, but the spectrum generally has a broad absorption band from approximately 400 to 500 nm, with maxima near these wavelengths.

If you'd like, I can generate a plot of a typical beta-carotene absorption spectrum for visual reference. Would that work for you?

# Q7-1. Please generate a plot of a typical beta-carotene absorption spectrum.

Here is a plot of the typical absorption spectrum of beta-carotene. The spectrum shows strong absorption peaks around 425 nm, 450 nm, and 475 nm, which contribute to its characteristic orange color. Let me know if you need further details on the spectrum!



### Q8: Please display the absorption spectrum of tetraphenylporphyrin.

Tetraphenylporphyrin (TPP) has a characteristic absorption spectrum with a prominent \*\*Soret band\*\* and \*\*Q-bands\*\*:

- The \*\*Soret band\*\* is typically around \*\*419 nm\*\*, showing a strong absorption peak.
- The \*\*Q-bands\*\* appear in the range of \*\*515-550 nm\*\* but are generally less intense.



I'll generate a simulated absorption spectrum to illustrate this typical pattern.

Here is a plot of the typical absorption spectrum of tetraphenylporphyrin (TPP). The spectrum features a strong Soret band around 419 nm and weaker Q-bands around 515 nm and 550 nm. This pattern is characteristic of porphyrin compounds and is useful in photophysical studies. Let me know if you have any further questions about this spectrum!

# Q9: Please display the fluorescence spectrum of chlorophyll a.

The fluorescence spectrum of chlorophyll a typically shows emission peaks in the red region:

- \*\*Around 680 nm\*\* (main peak) and a smaller shoulder around \*\*730 nm\*\*.

This emission pattern is characteristic of chlorophyll a and is observed under excitation in the blue region, around 430 nm. I'll create a simulated fluorescence spectrum to illustrate this.



Here is a plot of the typical fluorescence spectrum of chlorophyll a, showing a main emission peak around 680 nm and a smaller shoulder around 730 nm. This red-region fluorescence is characteristic of chlorophyll a and is widely used in studies of photosynthetic activity and plant health. Let me know if you need further details!

### **Q10:** Please display the spectral overlap integral of the absorption spectrum of Nile Blue and the fluorescence spectrum of rhodamine 6G.

#### GPT 4.1

To display the spectral overlap integral of the absorption spectrum of Nile Blue with the fluorescence spectrum of Rhodamine 6G, I'll simulate:

- 1. \*\*Absorption spectrum of Nile Blue\*\*: Typically peaking around 630-650 nm.
- 2. \*\*Fluorescence spectrum of Rhodamine 6G\*\*: Emitting primarily in the 550-650 nm range.

The spectral overlap integral will be visualized by plotting both spectra together and highlighting their overlapping region. Let's create this plot.



Spectral Overlap Integral of Nile Blue Absorption and Rhodamine 6G Fluorescence

Here is a plot showing the spectral overlap integral between the absorption spectrum of Nile Blue and the fluorescence spectrum of Rhodamine 6G. The shaded purple region represents the overlap, which is essential for applications like Förster resonance energy transfer (FRET), where efficient energy transfer depends on this spectral overlap. Let me know if you'd like further analysis!

#### 7. Identical questions repeatedly

### What is the molar absorption coefficient of naphthalene? GPT 4.1 (1st response)

The molar absorption coefficient (\( \varepsilon \)) of naphthalene depends on the wavelength and solvent. Here are approximate values typically seen for naphthalene in common solvents:

- \*\*In hexane\*\*:

 $\det\{cm\}^{-1}$ 

- \*\*At 220 nm\*\*:  $( \ ext{L} \ cdot \ text{mol}^{-1} \ cdot \ ext{mol}^{-1} \ ext{mol}^{-1} \ cdot \ ext{mol}^{-1} \ ext{mol}^{-1$  $\det\{cm\}^{-1}$ 

- \*\*In ethanol\*\*:

 $text{cm}^{-1}$ 

These values give an idea of naphthalene's strong absorbance near the UV region, particularly around 275 nm. Exact values may vary with solvent and specific experimental setups.

#### B GPT 4.1 (2nd response)

The molar absorption coefficient (\(\varepsilon \)) of naphthalene, especially in the UV range, varies with solvent but typically includes these values:

- \*\*In hexane\*\*:

- \*\*275 nm\*\*:  $(\sqrt{100} \times 11.000)$ ,  $\det{L} \times (\sqrt{100} \times 10.00)$  $1 \} ))$ 

- \*\*220 nm\*\*:  $( \operatorname{varepsilon} \operatorname{oprox} 60,000 \, \operatorname{text} L \ \operatorname{cdot} \operatorname{text} \operatorname{mol}^{-1} \ \operatorname{cdot} \operatorname{text} \operatorname{cm}^{-1} \$ 1} \)

- \*\*In ethanol\*\*:

- \*\*275 nm\*\*:  $( \operatorname{varepsilon} \operatorname{approx} 10,800 \, \operatorname{text} L \ \operatorname{cdot} \operatorname{text} \operatorname{mol}^{-1} \ \operatorname{cdot} \operatorname{text} \operatorname{cm}^{-1} \$  $1\}$  \)

These values indicate strong absorption in the UV range, particularly around 220 nm and 275 nm, but can vary slightly based on experimental conditions and solvent.

### GPT 4.1 (3rd response)

The molar absorption coefficient ( $\langle varepsilon \rangle$ ) of naphthalene in the UV region is commonly reported as follows:

- \*\*In hexane\*\*:

 $\det\{cm\}^{-1}$ 

- \*\*At 220 nm\*\*:  $( \ ext{mol}^{-1} \ cdot \ text{mol}^{-1} \ cdot \ ext{mol}^{-1} \ ext{mol}^{-1} \ cdot \ ext{mol}^{-1} \ ext{mol}^{-1}$  $text{cm}^{-1}$ 

- \*\*In ethanol\*\*:

 $\det\{cm\}^{-1}$ 

These coefficients reflect strong absorption by naphthalene in the UV range, specifically at 220 nm and 275 nm.

### GPT 4.1 (4th response)

The molar absorption coefficient (\( \varepsilon \)) of naphthalene is frequently measured in the UV range, particularly around 220 nm and 275 nm, as follows:

- \*\*In hexane\*\*:

- \*\*In ethanol\*\*:

These values represent typical absorptions for naphthalene in the UV spectrum, where it has strong absorbance.

### GPT 4.1 (5th response)

The molar absorption coefficient (\( \varepsilon \)) of naphthalene is well-known in the ultraviolet (UV) region, with typical values as follows:

- \*\*In hexane\*\*:

These values highlight naphthalene's strong absorbance in the UV region.

### What is the molar absorption coefficient of chlorophyll b?

#### GPT 4.1 (1st response)

The molar absorption coefficient (also known as the molar extinction coefficient) of chlorophyll b varies depending on the solvent and the specific wavelength of light. In organic solvents like ethanol or methanol, chlorophyll b typically has two main absorption peaks:

- \*\*Around 455 nm (blue region)\*\*: the molar absorption coefficient is approximately \*\*50,000– $60,000 \text{ L} \cdot \text{mol}^{-1} \cdot \text{cm}^{-1}$ \*\*.

- \*\*Around 645 nm (red region)\*\*: the molar absorption coefficient is around \*\*30,000-40,000 L·mol<sup>-1</sup>·cm<sup>-1</sup>\*\*.

These values can vary slightly based on the solvent and specific experimental conditions, but they provide a general idea of chlorophyll b's strong absorbance in both the blue and red regions of the visible spectrum.



The molar absorption coefficient ( $\epsilon$ ) of chlorophyll b depends on the wavelength and the solvent used. Here are approximate values:

- \*\*In ethanol\*\*:
- \*\*At 452 nm\*\*:  $\varepsilon \approx 53,000 \text{ L} \cdot \text{mol}^{-1} \cdot \text{cm}^{-1}$
- \*\*At 642 nm\*\*:  $\varepsilon \approx 40,000 \text{ L} \cdot \text{mol}^{-1} \cdot \text{cm}^{-1}$

These values reflect the absorbance in the blue (452 nm) and red (642 nm) regions, where chlorophyll b has its absorption peaks. These coefficients can vary slightly with different solvents or specific experimental setups but are generally in this range.

### GPT 4.1 (3rd response)

The molar absorption coefficient of chlorophyll b can be found with some standard values depending on the solvent and wavelength. For example:

- \*\*In 80% acetone\*\*:

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- **At 455 nm**: \epsilon \approx 59,000 \text{ L} \cdot \text{mol}^{-1} \cdot \text{cm}^{-1}
```

- \*\*At 646 nm\*\*:  $\varepsilon \approx 34,000 \text{ L} \cdot \text{mol}^{-1} \cdot \text{cm}^{-1}$ 

- \*\*In methanol\*\*:

- \*\*At 460 nm\*\*:  $\varepsilon \approx 48,000 \text{ L} \cdot \text{mol}^{-1} \cdot \text{cm}^{-1}$ 

- \*\*At 642 nm\*\*:  $\varepsilon \approx 40.000 \text{ L} \cdot \text{mol}^{-1} \cdot \text{cm}^{-1}$ 

These coefficients represent the peaks in the blue and red regions of chlorophyll b's absorption spectrum. The exact values may vary based on experimental conditions and purity of the sample.

### GPT 4.1 (4th response)

The molar absorption coefficient ( $\epsilon$ ) of chlorophyll b is often referenced in standard solvents at specific wavelengths. Here's a summary of typical values:

- \*\*In 80% acetone\*\*:

- \*\*At 455 nm (blue peak)\*\*:  $\epsilon \approx 59,000 \text{ L} \cdot \text{mol}^{-1} \cdot \text{cm}^{-1}$ 

- \*\*At 646 nm (red peak)\*\*:  $\varepsilon \approx 34,000 \text{ L} \cdot \text{mol}^{-1} \cdot \text{cm}^{-1}$
- \*\*In methanol\*\*:
- \*\*At 460 nm (blue region)\*\*:  $\varepsilon \approx 48,000 \text{ L} \cdot \text{mol}^{-1} \cdot \text{cm}^{-1}$
- \*\*At 642 nm (red region)\*\*:  $\epsilon \approx 40,000 \text{ L} \cdot \text{mol}^{-1} \cdot \text{cm}^{-1}$

These values provide an estimate for chlorophyll b's absorbance characteristics, with slight variations possible depending on sample purity and measurement conditions.

### GPT 4.1 (5th response)

The molar absorption coefficient ( $\epsilon$ ) of chlorophyll b varies with wavelength and solvent. Typical values are:

- \*\*In 80% acetone\*\*:

- \*\*455 nm (blue peak)\*\*:  $\varepsilon \approx 59,000 \text{ L} \cdot \text{mol}^{-1} \cdot \text{cm}^{-1}$
- \*\*646 nm (red peak)\*\*:  $\varepsilon \approx 34,000 \text{ L} \cdot \text{mol}^{-1} \cdot \text{cm}^{-1}$
- \*\*In methanol\*\*:

- \*\*460 nm (blue region)\*\*:  $\epsilon \approx 48,000 \text{ L} \cdot \text{mol}^{-1} \cdot \text{cm}^{-1}$ 

- \*\*642 nm (red region)\*\*:  $\varepsilon \approx 40,000 \text{ L} \cdot \text{mol}^{-1} \cdot \text{cm}^{-1}$ 

These coefficients are standard references, though they may vary slightly based on experimental conditions.

# Q3: What is the molar absorption coefficient of chlorophyll k?

Chlorophyll k is a rare and less commonly studied variant of chlorophyll. As of now, detailed information on its molar absorption coefficient is limited because it has not been as extensively characterized as chlorophylls a, b, c, and d. Most available research focuses on chlorophylls found abundantly in plants and algae.

If you are looking for information on a less common chlorophyll variant or recently discovered pigment, it would typically require consulting specialized literature or recent research publications that might have measured these properties. Let me know if you'd like assistance with related chlorophyll absorption properties or general information on chlorophyll research!

### GPT 4.1 (2nd response)

As of current scientific knowledge, there is no widely recognized pigment classified as "chlorophyll k." The chlorophyll types traditionally studied and well-characterized are chlorophylls \*\*a\*\*, \*\*b\*\*, \*\*c1\*\*, \*\*c2\*\*, \*\*d\*\*, and \*\*f\*\*, each of which has distinct molar absorption coefficients based on specific wavelengths and solvents.

If you came across "chlorophyll k" in recent research or literature, it might be a novel or hypothetical pigment, and detailed properties like its molar absorption coefficient may not yet be available in standard databases. If you'd like, I can help explore related chlorophyll research or alternative pigments that may have similar properties!

### GPT 4.1 (3rd response)

Currently, there is no known chlorophyll variant officially named "chlorophyll k" in the scientific literature. The primary chlorophyll types studied and cataloged are \*\*chlorophyll a, b, c1, c2, d,\*\* and \*\*f\*\*. Each of these has specific molar absorption coefficients based on their absorption peaks, particularly in the blue and red regions of the spectrum, and in various solvents.

If "chlorophyll k" is mentioned in recent studies, it might refer to a newly identified pigment or a hypothetical variant, but it has not been characterized in detail, including properties like its molar absorption coefficient. For now, standard databases and sources do not include data on "chlorophyll k."

### GPT 4.1 (4th response)

The molar absorption coefficient (also called the molar extinction coefficient) of chlorophyll, particularly chlorophyll \*a\* or \*b\*, is commonly measured for specific wavelengths of light, typically in the visible spectrum, where chlorophyll absorbs light most strongly. For chlorophyll

\*a\*, the highest absorption peaks are usually around 430 nm (blue) and 662 nm (red), while for chlorophyll \*b\*, they are around 453 nm (blue) and 642 nm (red). For chlorophyll \*a\*:

At around \*\*430 nm\*\*, the molar absorption coefficient is approximately \*\*86,300 M<sup>-1</sup>cm<sup>-1\*\*</sup>.
At around \*\*662 nm\*\*, the molar absorption coefficient is approximately \*\*60,000 M<sup>-1</sup>cm<sup>-1\*\*</sup>. For chlorophyll \*b\*:

- At around \*\*453 nm\*\*, it has a molar absorption coefficient of about \*\*50,000 M<sup>-1</sup>cm<sup>-1</sup>\*\*.

- At around \*\*642 nm\*\*, it has a molar absorption coefficient of about \*\*40,000 M<sup>-1</sup>cm<sup>-1</sup>\*\*.

If you're referring to a different chlorophyll derivative or to "chlorophyll k" (which is less common or may be a typo for chlorophyll generally), please specify, as the values can vary slightly across different chlorophyll types and conditions.

### GPT 4.1 (5th response)

It appears that "chlorophyll k" is not a well-documented chlorophyll variant in the literature or standard resources. Chlorophyll types generally characterized and documented include chlorophylls a, b, c, d, and f, each with distinct molar absorption coefficients and spectra. For example, chlorophyll a, one of the most common types, has molar absorption coefficients around 111,700 M<sup>-1</sup>cm<sup>-1</sup> at 428 nm in the blue range and about 71,400 M<sup>-1</sup>cm<sup>-1</sup> at 665 nm in the red range, commonly used as references for chlorophyll studies. Other chlorophyll types such as chlorophyll b and d also have characterized peaks with values suited to specific absorption ranges, but no standard information on a chlorophyll "k" exists in published datasets.

If "chlorophyll k" is hypothesized in experimental contexts or within specialized applications, it might refer to a modified or artificial chlorophyll derivative, but additional research or specific publications would be necessary to verify this. You may find more details in specialized photobiology databases or research articles on chlorophyll analogs and derivatives in photosynthesis research resources  $[8 \dagger \text{ source}]$   $[10 \dagger \text{ source}]$   $[12 \dagger \text{ source}]$ .