

Supplementary Information

The information and data here provided are intended to provide the necessary evidence to support the findings reported in the main article.

A. 185 nm photon absorption of major solutes

The following figures demonstrate that the solutions of inorganic ions and SRNOM used in the experiments followed the Beer-Lambert Law.

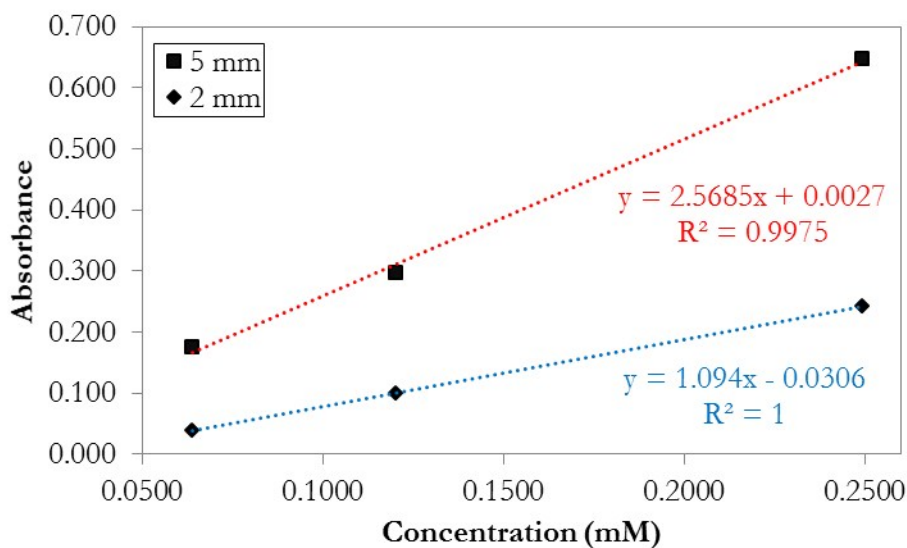


Figure A. 1 Linearity in the absorbance of nitrate solutions at 3.6 °C

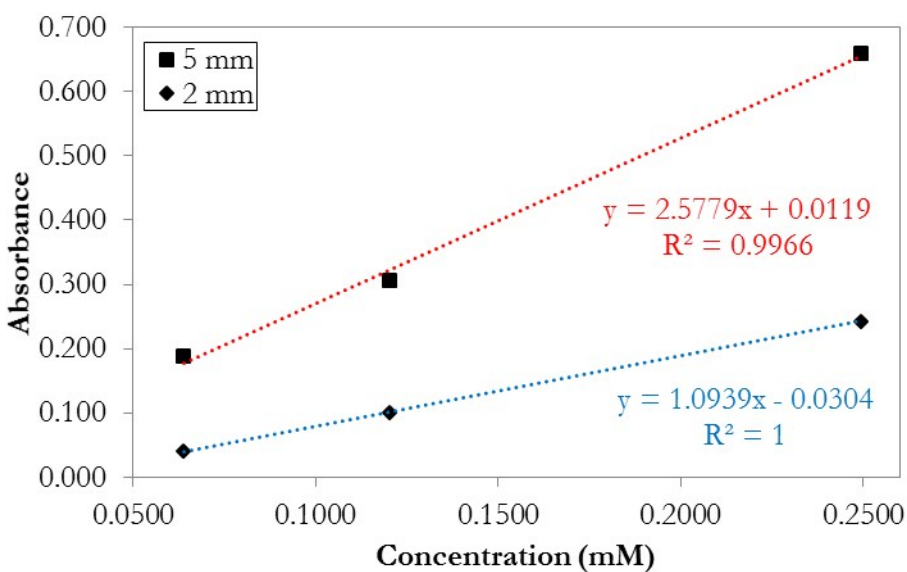


Figure A. 2 Linearity in the absorbance of nitrate solutions at 17.5 °C

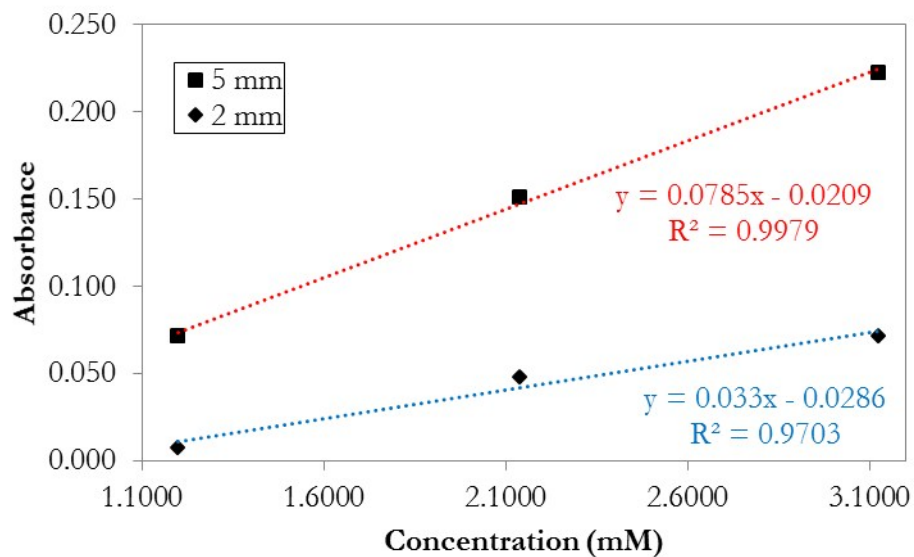


Figure A. 3 Linearity in the absorbance of sulphate solutions at 3.6 °C

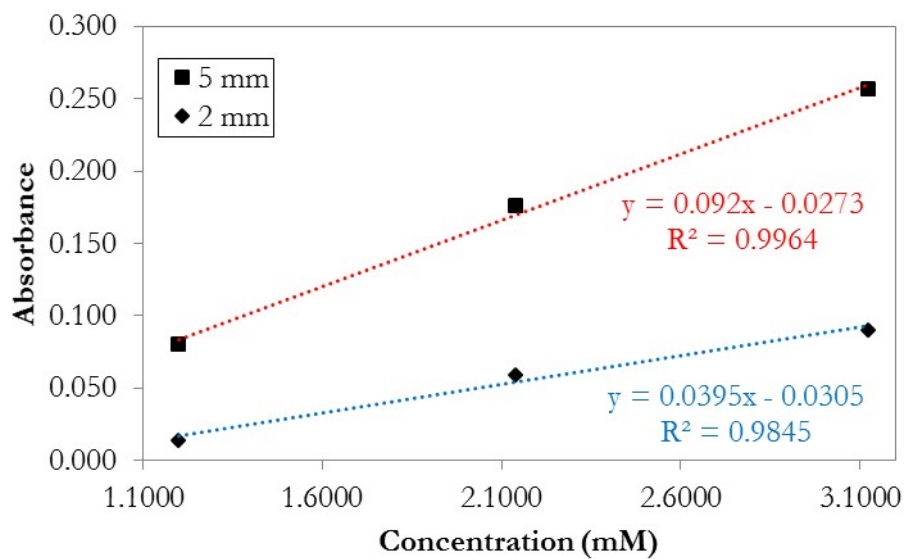


Figure A. 4 Linearity in the absorbance of sulphate solutions at 17.5 °C

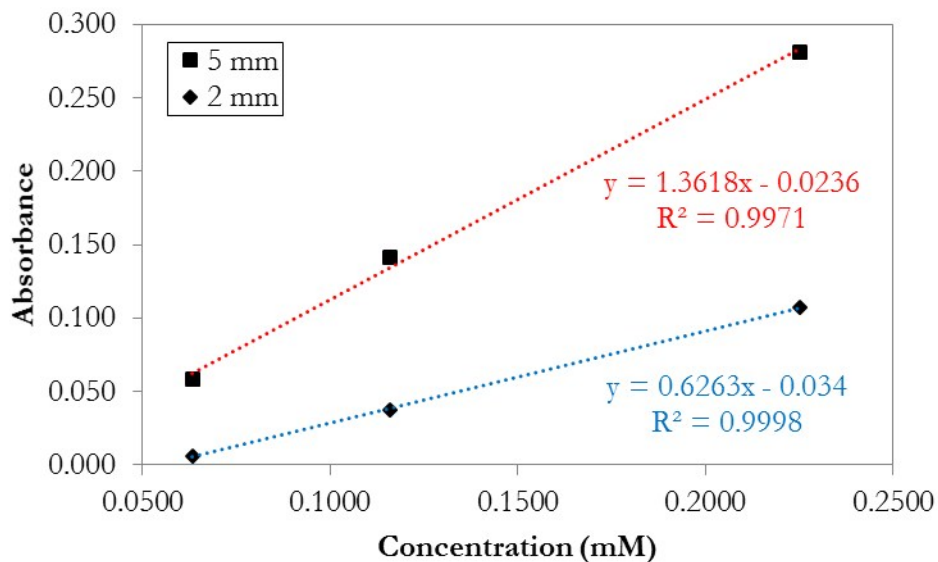


Figure A. 5 Linearity in the absorbance of chloride solutions at 3.6 °C

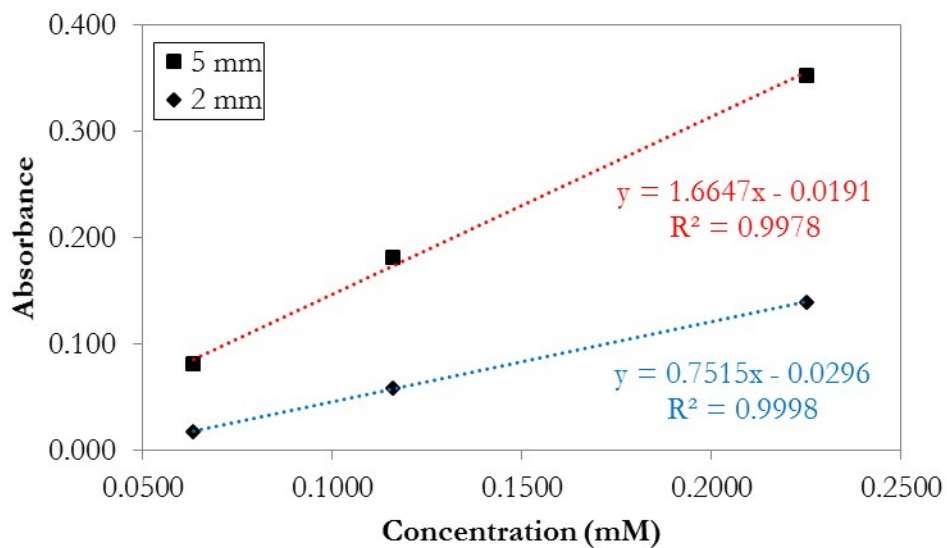


Figure A. 6 Linearity in the absorbance of chloride solutions at 17.5 °C

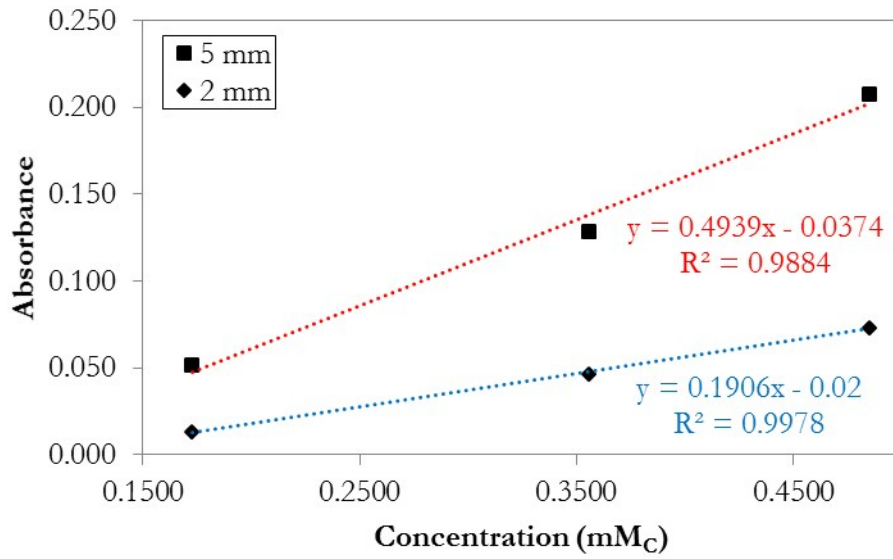


Figure A. 7 Linearity in the absorbance of SRNOM solutions at 3.6 °C

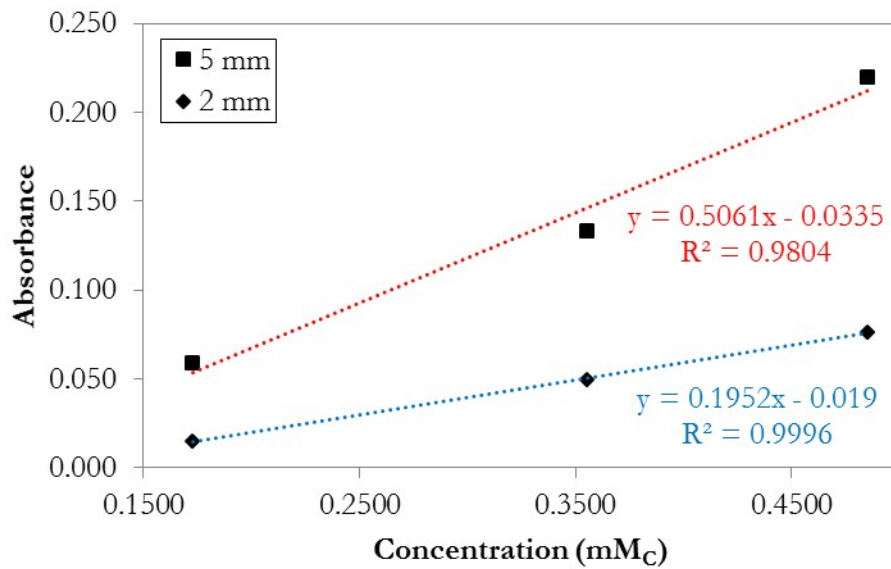


Figure A. 8 Linearity in the absorbance of SRNOM solutions at 17.5 °C

B. Corrections to the absorbance measurements

Due to the passage of radiation through different media, reflection losses have to be taken into account before reporting the measured value of absorbance. The Fresnel relation for the fraction reflected was calculated as shown by equation B.1, where n_i is the refractive media of the phases involved. The refractive index values used are shown in Table B.1.

$$f = \left(\frac{n_1 - n_2}{n_1 + n_2} \right)^2 \quad (\text{B.1})$$

Table B. 1 Refractive index used in the calculation of the Fresnel relation

| Media | Refractive Index (n) | Reference |
|--------------|----------------------|-----------|
| Fused-Quartz | 1.57505 | (1) |
| Nitrogen | 1.0003515 | (2) |
| Water | 1.458039 | (3) |

According to Goldring et al., (1953)⁽⁴⁾, the true absorbance, A_0 , can be calculated from

$$A_0 = A' - 0.434 \cdot (1 - T^2) \cdot \left(\frac{f_1 \cdot f_2}{1 - f_1} \right) \quad (\text{B.2})$$

with,

$$A' = \log \left(\frac{I_0}{I} \right) \quad (\text{B.3})$$

$$T = \frac{I}{I_0} \quad (\text{B.4})$$

For instance, at 3.6 °C for pure water and an aqueous solution of sodium nitrate with a concentration of 0.0639 ± 0.0007 mM the data shown in Table B.2 was obtained.

Table B. 2 Measured irradiance at 3.6 C and a path length of 0.2 cm for pure water and an aqueous sodium nitrate solution

| Component | Irradiance (W cm ⁻²) |
|----------------|----------------------------------|
| Water | 1.493×10^{-4} |
| Sodium Nitrate | 1.355×10^{-4} |

Nitrogen was used as a reference to obtain the absorption coefficient of water. With a path length of 0.2 cm, an irradiance value of 2.00×10^{-4} W cm⁻² was measured. This value was observed to be constant regardless of the cuvette holder temperature, but increased with path length.

Following equations B.1, B.2, B.3 and B.4 the true absorbance can be calculated. A summary of the intermediate and final values are shown in table B.3

Table B. 3 Intermediate parameters and corrected absorbance values for water and sodium nitrate solution at 3.6 °C and a path length of 0.2 cm

| Component | Reference Irradiance (W cm⁻²) | f₁ | f₂ | A' | T | A₀ |
|------------------|---|----------------------|----------------------|-----------|----------|----------------------|
| Water | 2.00x10 ⁻⁴ | 0.04980 | 0.04980 | 0.127 | 0.7465 | 0.126 |
| Sodium Nitrate | 1.488x10 ⁻⁴ | 0.04980 | 0.00149 | 0.041 | 0.9106 | 0.041 |

The factor f₁ and f₂ accounts for the transmission of 185 nm from N₂ to suprasil and from suprasil to water, respectively. In case of water f₁ equals f₂ as the reference for water was the cuvette filled with nitrogen.

C. Raw irradiance data

This section provides the tabulated raw data collected for pure water, nitrate, sulphate, chloride, Suwannee River NOM solutions and raw surface water at different path lengths, concentration and temperatures.

Water

| Path length = 1 cm | | Reading (W cm⁻²) | | |
|-------------------------------------|--------------------|------------------------------------|--------------------|--|
| Water Temperature (°C) | Replicate 1 | Replicate 2 | Replicate 3 | |
| 3.5 | 3.040E-05 | 3.170E-05 | 3.260E-05 | |
| 3.6 | 3.035E-05 | 3.150E-05 | 3.240E-05 | |
| 3.7 | 3.025E-05 | 3.130E-05 | 3.220E-05 | |
| 4.0 | 2.970E-05 | 3.085E-05 | 3.150E-05 | |
| 17.4 | 1.194E-05 | 1.275E-05 | 1.284E-05 | |
| 17.5 | 1.185E-05 | 1.267E-05 | 1.280E-05 | |
| 17.6 | 1.179E-05 | 1.257E-05 | 1.273E-05 | |
| 25.0 | 6.64E-06 | 7.02E-06 | 7.15E-06 | |
| <i>N₂ filled cuvette</i> | <i>2.08E-04</i> | <i>2.13E-04</i> | <i>2.23E-04</i> | |
| Path length = 0.5 cm | | Reading (W cm⁻²) | | |
| Water Temperature (°C) | Replicate 1 | Replicate 2 | Replicate 3 | |
| 3.5 | 7.610E-05 | 7.610E-05 | 7.440E-05 | |
| 3.6 | 7.620E-05 | 7.570E-05 | 7.420E-05 | |
| 3.7 | 7.570E-05 | 7.580E-05 | 7.390E-05 | |
| 4.0 | 7.520E-05 | 7.510E-05 | 7.360E-05 | |
| 17.4 | 4.540E-05 | 4.570E-05 | 4.550E-05 | |
| 17.5 | 4.530E-05 | 4.550E-05 | 4.515E-05 | |
| 17.6 | 4.515E-05 | 4.520E-05 | 4.485E-05 | |
| 25.0 | 3.17E-05 | 3.17E-05 | 3.18E-05 | |
| <i>N₂ filled cuvette</i> | <i>2.01E-04</i> | <i>2.13E-04</i> | <i>2.14E-04</i> | |
| Path length = 0.2 cm | | Reading (W cm⁻²) | | |
| Water Temperature (°C) | Replicate 1 | Replicate 2 | Replicate 3 | |
| 3.5 | 1.496E-04 | 1.492E-04 | 1.484E-04 | |
| 3.6 | 1.493E-04 | 1.489E-04 | 1.482E-04 | |
| 3.7 | 1.491E-04 | 1.484E-04 | 1.480E-04 | |
| 4.0 | 1.489E-04 | 1.482E-04 | 1.474E-04 | |
| 17.4 | 1.197E-04 | 1.200E-04 | 1.198E-04 | |
| 17.5 | 1.195E-04 | 1.197E-04 | 1.194E-04 | |
| 17.6 | 1.193E-04 | 1.191E-04 | 1.192E-04 | |
| 25.0 | 1.01E-04 | 1.02E-04 | 1.02E-04 | |
| <i>N₂ filled cuvette</i> | <i>2.00E-04</i> | <i>2.00E-04</i> | <i>2.00E-04</i> | |

Nitrate

Path length = 0.2 cm

| [NO₃⁻] = 0.0639 ± 0.0007 mM | | Reading (W cm⁻²) | | |
|--|----------------------------------|------------------------------------|--------------------|--------------------|
| Water Temperature (°C) | Reference (I₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 1.491E-04 | 1.358E-04 | 1.369E-04 | 1.361E-04 |
| 3.6 | 1.488E-04 | 1.355E-04 | 1.363E-04 | 1.358E-04 |
| 3.7 | 1.485E-04 | 1.352E-04 | 1.363E-04 | 1.355E-04 |
| 4.0 | 1.482E-04 | 1.343E-04 | 1.359E-04 | 1.346E-04 |
| 17.4 | 1.198E-04 | 1.088E-04 | 1.095E-04 | 1.096E-04 |
| 17.5 | 1.195E-04 | 1.086E-04 | 1.093E-04 | 1.093E-04 |
| 17.6 | 1.192E-04 | 1.083E-04 | 1.089E-04 | 1.086E-04 |
| 25.0 | 1.016E-04 | 9.290E-05 | 9.310E-05 | 9.320E-05 |
| <hr/> | | | | |
| [NO₃⁻] = 0.1201 ± 0.0003 mM | | Reading (W cm⁻²) | | |
| Water Temperature (°C) | Reference (I₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 1.491E-04 | 1.189E-04 | 1.185E-04 | 1.176E-04 |
| 3.6 | 1.488E-04 | 1.186E-04 | 1.182E-04 | 1.174E-04 |
| 3.7 | 1.485E-04 | 1.183E-04 | 1.172E-04 | 1.172E-04 |
| 4.0 | 1.482E-04 | 1.179E-04 | 1.166E-04 | 1.168E-04 |
| 17.4 | 1.198E-04 | 9.580E-05 | 9.480E-05 | 9.460E-05 |
| 17.5 | 1.195E-04 | 9.560E-05 | 9.450E-05 | 9.430E-05 |
| 17.6 | 1.192E-04 | 9.520E-05 | 9.380E-05 | 9.380E-05 |
| 25.0 | 1.016E-04 | 8.120E-05 | 8.080E-05 | 8.020E-05 |
| <hr/> | | | | |
| [NO₃⁻] = 0.2493 ± 0.0008 mM | | Reading (W cm⁻²) | | |
| Water Temperature (°C) | Reference (I₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 1.491E-04 | 8.580E-05 | 8.430E-05 | 8.650E-05 |
| 3.6 | 1.488E-04 | 8.550E-05 | 8.410E-05 | 8.600E-05 |
| 3.7 | 1.485E-04 | 8.510E-05 | 8.380E-05 | 8.560E-05 |
| 4.0 | 1.482E-04 | 8.420E-05 | 8.300E-05 | 8.480E-05 |
| 17.4 | 1.198E-04 | 6.880E-05 | 6.800E-05 | 6.920E-05 |
| 17.5 | 1.195E-04 | 6.850E-05 | 6.780E-05 | 6.890E-05 |
| 17.6 | 1.192E-04 | 6.830E-05 | 6.750E-05 | 6.850E-05 |
| 25.0 | 1.016E-04 | 5.880E-05 | 5.850E-05 | 5.880E-05 |

Path length = 0.5 cm

| [NO₃⁻] = 0.0639 ± 0.0007 mM | | Reading (W cm⁻²) | | |
|--|----------------------------------|------------------------------------|--------------------|--------------------|
| Water Temperature (°C) | Reference (I₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 7.553E-05 | 5.040E-05 | 5.050E-05 | 5.040E-05 |
| 3.6 | 7.537E-05 | 5.020E-05 | 5.020E-05 | 5.020E-05 |
| 3.7 | 7.513E-05 | 4.940E-05 | 4.980E-05 | 4.980E-05 |
| 4.0 | 7.463E-05 | 4.870E-05 | 4.950E-05 | 4.910E-05 |
| 17.4 | 4.553E-05 | 2.950E-05 | 2.970E-05 | 2.970E-05 |
| 17.5 | 4.532E-05 | 2.930E-05 | 2.940E-05 | 2.950E-05 |
| 17.6 | 4.507E-05 | 2.900E-05 | 2.930E-05 | 2.930E-05 |
| 25.0 | 3.172E-05 | 2.000E-05 | 2.020E-05 | 2.010E-05 |
| <hr/> | | | | |
| [NO₃⁻] = 0.1201 ± 0.0003 mM | | Reading (W cm⁻²) | | |
| Water Temperature (°C) | Reference (I₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 7.553E-05 | 3.760E-05 | 3.880E-05 | 3.830E-05 |
| 3.6 | 7.537E-05 | 3.740E-05 | 3.850E-05 | 3.810E-05 |
| 3.7 | 7.513E-05 | 3.710E-05 | 3.830E-05 | 3.770E-05 |
| 4.0 | 7.463E-05 | 3.650E-05 | 3.770E-05 | 3.720E-05 |
| 17.4 | 4.553E-05 | 2.230E-05 | 2.290E-05 | 2.270E-05 |
| 17.5 | 4.532E-05 | 2.210E-05 | 2.270E-05 | 2.250E-05 |
| 17.6 | 4.507E-05 | 2.180E-05 | 2.250E-05 | 2.230E-05 |
| 25.0 | 3.172E-05 | 1.506E-05 | 1.561E-05 | 1.553E-05 |
| <hr/> | | | | |
| [NO₃⁻] = 0.2493 ± 0.0008 mM | | Reading (W cm⁻²) | | |
| Water Temperature (°C) | Reference (I₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 7.553E-05 | 1.721E-05 | 1.694E-05 | 1.760E-05 |
| 3.6 | 7.537E-05 | 1.666E-05 | 1.686E-05 | 1.744E-05 |
| 3.7 | 7.513E-05 | 1.654E-05 | 1.674E-05 | 1.725E-05 |
| 4.0 | 7.463E-05 | 1.623E-05 | 1.651E-05 | 1.694E-05 |
| 17.4 | 4.553E-05 | 9.750E-06 | 1.001E-05 | 1.028E-05 |
| 17.5 | 4.532E-05 | 9.670E-06 | 9.950E-06 | 1.017E-05 |
| 17.6 | 4.507E-05 | 9.620E-06 | 9.880E-06 | 1.009E-05 |
| 25.0 | 3.172E-05 | 6.630E-06 | 6.820E-06 | 7.020E-06 |

Sulphate

Path length = 0.2 cm

| [SO₄²⁻] = 1.1993 ± 0.0240 mM | | Reading (W cm⁻²) | | |
|---|----------------------------------|------------------------------------|--------------------|--------------------|
| Water Temperature (°C) | Reference (I₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 1.491E-04 | 1.461E-04 | 1.468E-04 | 1.469E-04 |
| 3.6 | 1.488E-04 | 1.459E-04 | 1.464E-04 | 1.463E-04 |
| 3.7 | 1.485E-04 | 1.456E-04 | 1.461E-04 | 1.459E-04 |
| 4.0 | 1.482E-04 | 1.447E-04 | 1.453E-04 | 1.446E-04 |
| 17.4 | 1.198E-04 | 1.158E-04 | 1.166E-04 | 1.157E-04 |
| 17.5 | 1.195E-04 | 1.154E-04 | 1.164E-04 | 1.154E-04 |
| 17.6 | 1.192E-04 | 1.148E-04 | 1.160E-04 | 1.151E-04 |
| 25.0 | 1.016E-04 | 9.780E-05 | 9.820E-05 | 9.740E-05 |
| <hr/> | | | | |
| [SO₄²⁻] = 2.1391 ± 0.0208 mM | | Reading (W cm⁻²) | | |
| Water Temperature (°C) | Reference (I₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 1.491E-04 | 1.339E-04 | 1.336E-04 | 1.328E-04 |
| 3.6 | 1.488E-04 | 1.334E-04 | 1.334E-04 | 1.326E-04 |
| 3.7 | 1.485E-04 | 1.331E-04 | 1.330E-04 | 1.322E-04 |
| 4.0 | 1.482E-04 | 1.321E-04 | 1.323E-04 | 1.318E-04 |
| 17.4 | 1.198E-04 | 1.043E-04 | 1.051E-04 | 1.043E-04 |
| 17.5 | 1.195E-04 | 1.042E-04 | 1.044E-04 | 1.041E-04 |
| 17.6 | 1.192E-04 | 1.039E-04 | 1.041E-04 | 1.038E-04 |
| 25.0 | 1.016E-04 | 8.770E-05 | 8.830E-05 | 8.810E-05 |
| <hr/> | | | | |
| [SO₄²⁻] = 3.1228 ± 0.0117 mM | | Reading (W cm⁻²) | | |
| Water Temperature (°C) | Reference (I₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 1.491E-04 | 1.268E-04 | 1.269E-04 | 1.261E-04 |
| 3.6 | 1.488E-04 | 1.265E-04 | 1.266E-04 | 1.258E-04 |
| 3.7 | 1.485E-04 | 1.261E-04 | 1.264E-04 | 1.256E-04 |
| 4.0 | 1.482E-04 | 1.254E-04 | 1.256E-04 | 1.248E-04 |
| 17.4 | 1.198E-04 | 9.740E-05 | 9.800E-05 | 9.680E-05 |
| 17.5 | 1.195E-04 | 9.700E-05 | 9.780E-05 | 9.660E-05 |
| 17.6 | 1.192E-04 | 9.670E-05 | 9.760E-05 | 9.640E-05 |
| 25.0 | 1.016E-04 | 8.100E-05 | 8.240E-05 | 8.050E-05 |

Path length = 0.5 cm

| [SO₄²⁻] = 1.1993 ± 0.0240 mM | | Reading (W cm⁻²) | | |
|---|----------------------------------|------------------------------------|--------------------|--------------------|
| Water Temperature (°C) | Reference (I₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 7.553E-05 | 6.460E-05 | 6.420E-05 | 6.370E-05 |
| 3.6 | 7.537E-05 | 6.420E-05 | 6.420E-05 | 6.350E-05 |
| 3.7 | 7.513E-05 | 6.400E-05 | 6.400E-05 | 6.330E-05 |
| 4.0 | 7.463E-05 | 6.380E-05 | 6.380E-05 | 6.290E-05 |
| 17.4 | 4.553E-05 | 3.870E-05 | 3.790E-05 | 3.710E-05 |
| 17.5 | 4.532E-05 | 3.850E-05 | 3.770E-05 | 3.690E-05 |
| 17.6 | 4.507E-05 | 3.830E-05 | 3.750E-05 | 3.640E-05 |
| 25.0 | 3.172E-05 | 2.680E-05 | 2.580E-05 | 2.500E-05 |
| [SO₄²⁻] = 2.1391 ± 0.0208 mM | | Reading (W cm⁻²) | | |
| Water Temperature (°C) | Reference (I₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 7.553E-05 | 5.230E-05 | 5.410E-05 | 5.410E-05 |
| 3.6 | 7.537E-05 | 5.210E-05 | 5.380E-05 | 5.380E-05 |
| 3.7 | 7.513E-05 | 5.180E-05 | 5.350E-05 | 5.350E-05 |
| 4.0 | 7.463E-05 | 5.080E-05 | 5.300E-05 | 5.310E-05 |
| 17.4 | 4.553E-05 | 2.970E-05 | 3.090E-05 | 3.080E-05 |
| 17.5 | 4.532E-05 | 2.950E-05 | 3.060E-05 | 3.060E-05 |
| 17.6 | 4.507E-05 | 2.970E-05 | 3.030E-05 | 3.040E-05 |
| 25.0 | 3.172E-05 | 2.010E-05 | 2.060E-05 | 2.070E-05 |
| [SO₄²⁻] = 3.1228 ± 0.0117 mM | | Reading (W cm⁻²) | | |
| Water Temperature (°C) | Reference (I₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 7.553E-05 | 4.490E-05 | 4.590E-05 | 4.510E-05 |
| 3.6 | 7.537E-05 | 4.470E-05 | 4.580E-05 | 4.500E-05 |
| 3.7 | 7.513E-05 | 4.450E-05 | 4.570E-05 | 4.480E-05 |
| 4.0 | 7.463E-05 | 4.410E-05 | 4.510E-05 | 4.440E-05 |
| 17.4 | 4.553E-05 | 2.490E-05 | 2.560E-05 | 2.510E-05 |
| 17.5 | 4.532E-05 | 2.480E-05 | 2.540E-05 | 2.500E-05 |
| 17.6 | 4.507E-05 | 2.460E-05 | 2.520E-05 | 2.470E-05 |
| 25.0 | 3.172E-05 | 1.651E-05 | 1.684E-05 | 1.660E-05 |

Chloride

Path length = 0.2 cm

| [Cl⁻] = 0.0633 ± 0.0003 mM | | Reading (W cm⁻²) | | |
|--|----------------------------------|------------------------------------|--------------------|--------------------|
| Water Temperature (°C) | Reference (I₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 1.491E-04 | 1.469E-04 | 1.474E-04 | 1.469E-04 |
| 3.6 | 1.488E-04 | 1.466E-04 | 1.470E-04 | 1.465E-04 |
| 3.7 | 1.485E-04 | 1.464E-04 | 1.467E-04 | 1.462E-04 |
| 4.0 | 1.482E-04 | 1.456E-04 | 1.460E-04 | 1.456E-04 |
| 17.4 | 1.198E-04 | 1.156E-04 | 1.157E-04 | 1.148E-04 |
| 17.5 | 1.195E-04 | 1.150E-04 | 1.150E-04 | 1.146E-04 |
| 17.6 | 1.192E-04 | 1.147E-04 | 1.147E-04 | 1.143E-04 |
| 25.0 | 1.016E-04 | 9.680E-05 | 9.680E-05 | 9.640E-05 |
| <hr/> | | | | |
| [Cl⁻] = 0.1159 ± 0.0002 mM | | Reading (W cm⁻²) | | |
| Water Temperature (°C) | Reference (I₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 1.491E-04 | 1.377E-04 | 1.363E-04 | 1.365E-04 |
| 3.6 | 1.488E-04 | 1.370E-04 | 1.359E-04 | 1.363E-04 |
| 3.7 | 1.485E-04 | 1.364E-04 | 1.356E-04 | 1.361E-04 |
| 4.0 | 1.482E-04 | 1.356E-04 | 1.344E-04 | 1.356E-04 |
| 17.4 | 1.198E-04 | 1.048E-04 | 1.043E-04 | 1.053E-04 |
| 17.5 | 1.195E-04 | 1.043E-04 | 1.041E-04 | 1.050E-04 |
| 17.6 | 1.192E-04 | 1.039E-04 | 1.037E-04 | 1.048E-04 |
| 25.0 | 1.016E-04 | 8.600E-05 | 8.580E-05 | 8.680E-05 |
| <hr/> | | | | |
| [Cl⁻] = 0.2250 ± 0.0016 mM | | Reading (W cm⁻²) | | |
| Water Temperature (°C) | Reference (I₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 1.491E-04 | 1.164E-04 | 1.165E-04 | 1.164E-04 |
| 3.6 | 1.488E-04 | 1.161E-04 | 1.165E-04 | 1.162E-04 |
| 3.7 | 1.485E-04 | 1.156E-04 | 1.158E-04 | 1.158E-04 |
| 4.0 | 1.482E-04 | 1.153E-04 | 1.151E-04 | 1.151E-04 |
| 17.4 | 1.198E-04 | 8.690E-05 | 8.700E-05 | 8.720E-05 |
| 17.5 | 1.195E-04 | 8.650E-05 | 8.680E-05 | 8.700E-05 |
| 17.6 | 1.192E-04 | 8.600E-05 | 8.660E-05 | 8.660E-05 |
| 25.0 | 1.016E-04 | 7.050E-05 | 7.190E-05 | 7.170E-05 |

Path length = 0.5 cm

| [Cl⁻] = 0.0633 ± 0.0003 mM | | Reading (W cm⁻²) | | |
|--|----------------------------------|------------------------------------|--------------------|--------------------|
| Water Temperature (°C) | Reference (I₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 7.553E-05 | 6.590E-05 | 6.680E-05 | 6.570E-05 |
| 3.6 | 7.537E-05 | 6.560E-05 | 6.670E-05 | 6.550E-05 |
| 3.7 | 7.513E-05 | 6.530E-05 | 6.640E-05 | 6.520E-05 |
| 4.0 | 7.463E-05 | 6.500E-05 | 6.580E-05 | 6.460E-05 |
| 17.4 | 4.553E-05 | 3.780E-05 | 3.820E-05 | 3.760E-05 |
| 17.5 | 4.532E-05 | 3.740E-05 | 3.790E-05 | 3.740E-05 |
| 17.6 | 4.507E-05 | 3.700E-05 | 3.760E-05 | 3.710E-05 |
| 25.0 | 3.172E-05 | 2.500E-05 | 2.550E-05 | 2.520E-05 |
| [Cl⁻] = 0.1159 ± 0.0002 mM | | Reading (W cm⁻²) | | |
| Water Temperature (°C) | Reference (I₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 7.553E-05 | 5.520E-05 | 5.450E-05 | 5.450E-05 |
| 3.6 | 7.537E-05 | 5.480E-05 | 5.430E-05 | 5.430E-05 |
| 3.7 | 7.513E-05 | 5.450E-05 | 5.400E-05 | 5.410E-05 |
| 4.0 | 7.463E-05 | 5.410E-05 | 5.340E-05 | 5.360E-05 |
| 17.4 | 4.553E-05 | 3.040E-05 | 3.000E-05 | 3.020E-05 |
| 17.5 | 4.532E-05 | 2.990E-05 | 2.970E-05 | 3.000E-05 |
| 17.6 | 4.507E-05 | 2.970E-05 | 2.950E-05 | 2.980E-05 |
| 25.0 | 3.172E-05 | 1.967E-05 | 1.950E-05 | 1.983E-05 |
| [Cl⁻] = 0.2250 ± 0.0016 mM | | Reading (W cm⁻²) | | |
| Water Temperature (°C) | Reference (I₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 7.553E-05 | 4.000E-05 | 3.960E-05 | 3.970E-05 |
| 3.6 | 7.537E-05 | 3.970E-05 | 3.940E-05 | 3.940E-05 |
| 3.7 | 7.513E-05 | 3.970E-05 | 3.940E-05 | 3.930E-05 |
| 4.0 | 7.463E-05 | 3.910E-05 | 3.870E-05 | 3.870E-05 |
| 17.4 | 4.553E-05 | 2.030E-05 | 2.030E-05 | 2.020E-05 |
| 17.5 | 4.532E-05 | 2.020E-05 | 2.010E-05 | 2.000E-05 |
| 17.6 | 4.507E-05 | 1.985E-05 | 1.991E-05 | 1.987E-05 |
| 25.0 | 3.172E-05 | 1.284E-05 | 1.292E-05 | 1.283E-05 |

Suwannee River NOM

Path length = 0.2 cm

| [SRNOM] = 0.1728 ± 0.0045 mM_C | | Reading (W cm⁻²) | | |
|---|----------------------------------|------------------------------------|--------------------|--------------------|
| Water Temperature (°C) | Reference (I₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 1.491E-04 | 1.446E-04 | 1.455E-04 | 1.438E-04 |
| 3.6 | 1.488E-04 | 1.444E-04 | 1.448E-04 | 1.434E-04 |
| 3.7 | 1.485E-04 | 1.436E-04 | 1.440E-04 | 1.430E-04 |
| 4.0 | 1.482E-04 | 1.430E-04 | 1.429E-04 | 1.424E-04 |
| 17.4 | 1.198E-04 | 1.160E-04 | 1.163E-04 | 1.156E-04 |
| 17.5 | 1.195E-04 | 1.155E-04 | 1.158E-04 | 1.151E-04 |
| 17.6 | 1.192E-04 | 1.151E-04 | 1.151E-04 | 1.146E-04 |
| 25.0 | 1.016E-04 | 9.950E-05 | 9.870E-05 | 9.720E-05 |
| <hr/> | | | | |
| [SRNOM] = 0.3555 ± 0.0013 mM_C | | Reading (W cm⁻²) | | |
| Water Temperature (°C) | Reference (I₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 1.491E-04 | 1.319E-04 | 1.359E-04 | 1.352E-04 |
| 3.6 | 1.488E-04 | 1.316E-04 | 1.352E-04 | 1.346E-04 |
| 3.7 | 1.485E-04 | 1.312E-04 | 1.348E-04 | 1.342E-04 |
| 4.0 | 1.482E-04 | 1.306E-04 | 1.338E-04 | 1.333E-04 |
| 17.4 | 1.198E-04 | 1.056E-04 | 1.083E-04 | 1.077E-04 |
| 17.5 | 1.195E-04 | 1.050E-04 | 1.075E-04 | 1.073E-04 |
| 17.6 | 1.192E-04 | 1.046E-04 | 1.070E-04 | 1.068E-04 |
| 25.0 | 1.016E-04 | 8.890E-05 | 9.130E-05 | 9.060E-05 |
| <hr/> | | | | |
| [SRNOM] = 0.4851 ± 0.0047 mM_C | | Reading (W cm⁻²) | | |
| Water Temperature (°C) | Reference (I₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 1.491E-04 | 1.284E-04 | 1.235E-04 | 1.227E-04 |
| 3.6 | 1.488E-04 | 1.281E-04 | 1.230E-04 | 1.259E-04 |
| 3.7 | 1.485E-04 | 1.278E-04 | 1.227E-04 | 1.255E-04 |
| 4.0 | 1.482E-04 | 1.267E-04 | 1.219E-04 | 1.244E-04 |
| 17.4 | 1.198E-04 | 1.030E-04 | 9.880E-05 | 1.008E-04 |
| 17.5 | 1.195E-04 | 1.025E-04 | 9.820E-05 | 1.003E-04 |
| 17.6 | 1.192E-04 | 1.020E-04 | 9.790E-05 | 1.000E-04 |
| 25.0 | 1.016E-04 | 8.700E-05 | 8.450E-05 | 8.460E-05 |

Path length = 0.5 cm

| [SRNOM] = 0.1728 ± 0.0045 mM_C | | Reading (W cm⁻²) | | |
|---|----------------------------------|------------------------------------|--------------------|--------------------|
| Water Temperature (°C) | Reference (I₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 7.553E-05 | 6.740E-05 | 6.710E-05 | 6.670E-05 |
| 3.6 | 7.537E-05 | 6.710E-05 | 6.680E-05 | 6.670E-05 |
| 3.7 | 7.513E-05 | 6.670E-05 | 6.660E-05 | 6.610E-05 |
| 4.0 | 7.463E-05 | 6.570E-05 | 6.610E-05 | 6.540E-05 |
| 17.4 | 4.553E-05 | 3.980E-05 | 4.000E-05 | 4.010E-05 |
| 17.5 | 4.532E-05 | 3.930E-05 | 3.970E-05 | 3.960E-05 |
| 17.6 | 4.507E-05 | 3.900E-05 | 3.940E-05 | 3.930E-05 |
| 25.0 | 3.172E-05 | 2.700E-05 | 2.730E-05 | 2.720E-05 |
| <hr/> | | | | |
| [SRNOM] = 0.3555 ± 0.0013 mM_C | | Reading (W cm⁻²) | | |
| Water Temperature (°C) | Reference (I₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 7.553E-05 | 5.760E-05 | 5.630E-05 | 5.540E-05 |
| 3.6 | 7.537E-05 | 5.720E-05 | 5.590E-05 | 5.510E-05 |
| 3.7 | 7.513E-05 | 5.680E-05 | 5.570E-05 | 5.470E-05 |
| 4.0 | 7.463E-05 | 5.570E-05 | 5.490E-05 | 5.380E-05 |
| 17.4 | 4.553E-05 | 3.480E-05 | 3.330E-05 | 3.280E-05 |
| 17.5 | 4.532E-05 | 3.450E-05 | 3.300E-05 | 3.250E-05 |
| 17.6 | 4.507E-05 | 3.420E-05 | 3.280E-05 | 3.220E-05 |
| 25.0 | 3.172E-05 | 2.440E-05 | 2.260E-05 | 2.220E-05 |
| <hr/> | | | | |
| [SRNOM] = 0.4851 ± 0.0047 mM_C | | Reading (W cm⁻²) | | |
| Water Temperature (°C) | Reference (I₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 7.553E-05 | 4.680E-05 | 4.690E-05 | 4.730E-05 |
| 3.6 | 7.537E-05 | 4.660E-05 | 4.660E-05 | 4.690E-05 |
| 3.7 | 7.513E-05 | 4.640E-05 | 4.620E-05 | 4.670E-05 |
| 4.0 | 7.463E-05 | 4.570E-05 | 4.550E-05 | 4.600E-05 |
| 17.4 | 4.553E-05 | 2.750E-05 | 2.750E-05 | 2.760E-05 |
| 17.5 | 4.532E-05 | 2.740E-05 | 2.720E-05 | 2.740E-05 |
| 17.6 | 4.507E-05 | 2.720E-05 | 2.700E-05 | 2.720E-05 |
| 25.0 | 3.172E-05 | 1.885E-05 | 1.881E-05 | 1.889E-05 |

Raw Surface Water

| Path length = 0.2 cm | | Reading (W cm ⁻²) | | |
|------------------------|-----------------------------|-------------------------------|-------------|-------------|
| Water Temperature (°C) | Reference (I ₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 1.491E-04 | 1.400E-04 | 1.414E-04 | 1.417E-04 |
| 3.6 | 1.488E-04 | 1.397E-04 | 1.411E-04 | 1.413E-04 |
| 3.7 | 1.485E-04 | 1.393E-04 | 1.405E-04 | 1.408E-04 |
| 4.0 | 1.482E-04 | 1.386E-04 | 1.396E-04 | 1.399E-04 |
| 17.4 | 1.198E-04 | 1.107E-04 | 1.118E-04 | 1.120E-04 |
| 17.5 | 1.195E-04 | 1.102E-04 | 1.114E-04 | 1.116E-04 |
| 17.6 | 1.192E-04 | 1.096E-04 | 1.107E-04 | 1.111E-04 |
| 25.0 | 1.016E-04 | 9.240E-05 | 9.430E-05 | 9.460E-05 |
| <hr/> | | | | |
| Path length = 0.5 cm | | Reading (W cm ⁻²) | | |
| Water Temperature (°C) | Reference (I ₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 7.553E-05 | 5.850E-05 | 5.610E-05 | 5.790E-05 |
| 3.6 | 7.537E-05 | 5.810E-05 | 5.580E-05 | 5.750E-05 |
| 3.7 | 7.513E-05 | 5.770E-05 | 5.550E-05 | 5.700E-05 |
| 4.0 | 7.463E-05 | 5.700E-05 | 5.470E-05 | 5.620E-05 |
| 17.4 | 4.553E-05 | 3.435E-05 | 3.290E-05 | 3.390E-05 |
| 17.5 | 4.532E-05 | 3.400E-05 | 3.260E-05 | 3.360E-05 |
| 17.6 | 4.507E-05 | 3.360E-05 | 3.220E-05 | 3.330E-05 |
| 25.0 | 3.172E-05 | 2.320E-05 | 2.230E-05 | 2.280E-05 |
| <hr/> | | | | |
| Path length = 1.0 cm | | Reading (W cm ⁻²) | | |
| Water Temperature (°C) | Reference (I ₀) | Replicate 1 | Replicate 2 | Replicate 3 |
| 3.5 | 3.157E-05 | 1.561E-05 | 1.468E-05 | 1.494E-05 |
| 3.6 | 3.142E-05 | 1.555E-05 | 1.463E-05 | 1.490E-05 |
| 3.7 | 3.125E-05 | 1.553E-05 | 1.459E-05 | 1.486E-05 |
| 4.0 | 3.068E-05 | 1.547E-05 | 1.445E-05 | 1.468E-05 |
| 17.4 | 1.251E-05 | 6.060E-06 | 5.870E-06 | 6.030E-06 |
| 17.5 | 1.244E-05 | 6.030E-06 | 5.810E-06 | 6.000E-06 |
| 17.6 | 1.236E-05 | 5.990E-06 | 5.770E-06 | 5.960E-06 |
| 25.0 | 6.937E-06 | 3.440E-06 | 3.340E-06 | 3.480E-06 |

The reported measured absorption in Table 5 is the average value of the three path lengths used.

D. Spectral response of the 185 nm detector (SED185)

In Figure D.1, the spectral response for the 185 nm detector is provided. This information can be found in the [manufacturer's website](#). As it is seen, there is no response at 254 nm and has a near maximum response at 185 nm.

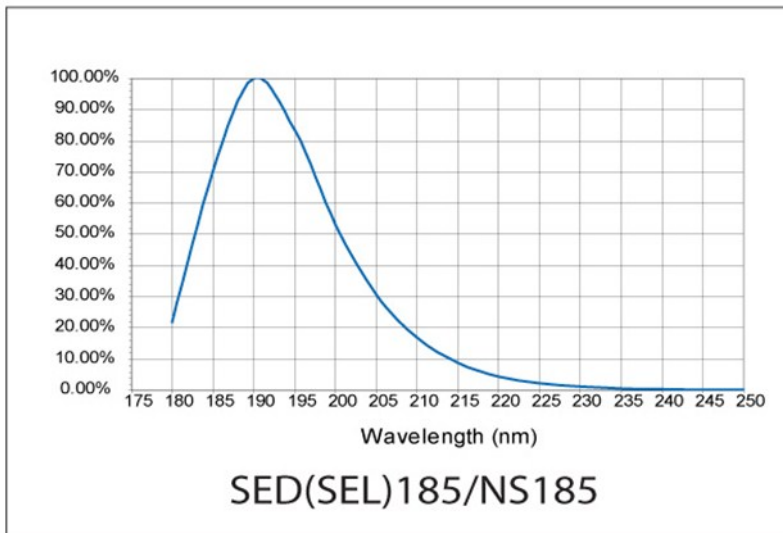


Figure D. 1 Spectral response of the detector used in the absorption experiments.

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