

Supporting Information

Growth of Villi-Microstructured Bismuth Vanadate (Vm-BiVO₄) for Photocatalytic Degradation of Crystal Violet Dye

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λ-max determination: It is important to study the nature of dye, structure of dye and maximum absorption wavelength, before carrying out experiments. The CV dye shows maximum absorption at 584 nm by one major peak.

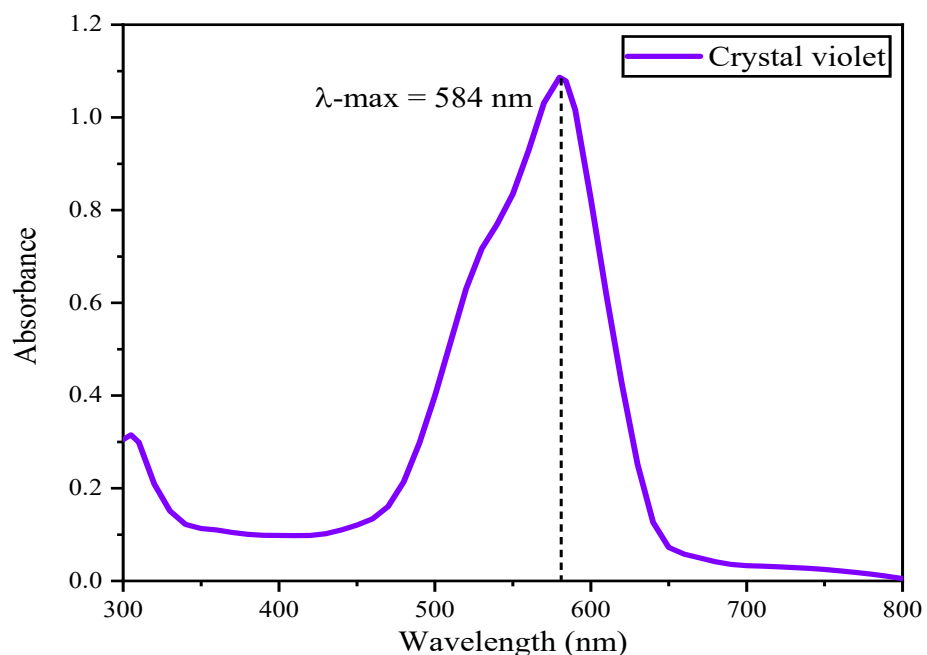


Figure S1: λ-max of crystal violet dye

Table S1: EDX analysis Wt% of elements

Element	Apparent Concentration	K ratio	Wt %	Weight % Sigma
C	0.81	0.00807	4.56	1
O	6.23	0.02098	16.68	1.32
V	6.57	0.06571	13.76	0.72
Au	0.94	0.00943	2.19	0.83
Bi	27.52	0.27523	62.81	1.55
Total:			100	

Structure of CV dye: Crystal violet or gentian triarylmethane is cationic dye, also known as hexamethyl pararosaniline chloride or methyl violet 10B. The molecular formula and molecular weight is $C_{25}H_{30}ClN_3$ and 407.98 respectively. The melting point of crystal violet is 205 °C (478 K or 401 °F) [1]. The molecular structure of dye is shown in Figure S1:

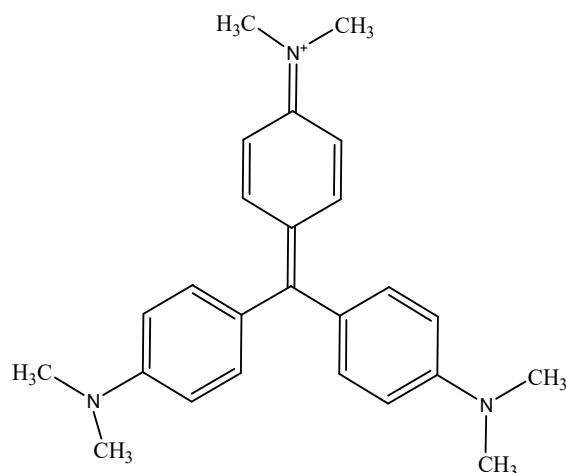


Figure S2: Structure of CV dye.

Table S2: Comparison of photocatalysts used for the degradation of CV dye

Photocatalysts	E _g (eV)	pH	Dosage (mg/L)	Time (min)	Dye conc. mg/L	Removal efficiency (%)	Light source	Ref
BiVO ₄	2.42	8	100	120	-	96.23%	Xe-lamp	[2]
BiVO ₄	2.35	3	500	180	20	-	60 W Xe-lamp	[3]
Mn doped BiVO ₄	2.05	10	200	-	-	-	300 W Xe-lamp	[4]
BiVO ₄	2.4	-	500	60	-	98%	Solar light	[5]
BiVO ₄ /FeVO ₄	1.98	7	100	60	10	71%	300 W Xe-lamp	[6]
BiVO ₄	2.25	7	200	120	0.5 mM	98.2%	300 W Xe-lamp	[7]
BiVO ₄ /p-MoS ₂	2.19	-	400	120	25	69.2%	Visible light	[8]
Au@Vm-BiVO ₄	2.39	9	200	40	15	99.5 %	Sunlight	Current Work

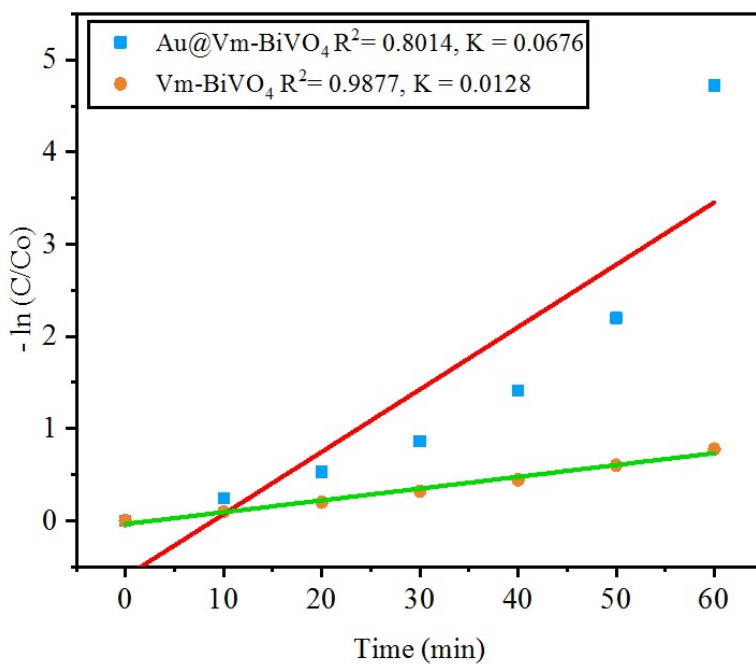


Figure S3: Comparison on the basis of R² and rate constant (K)

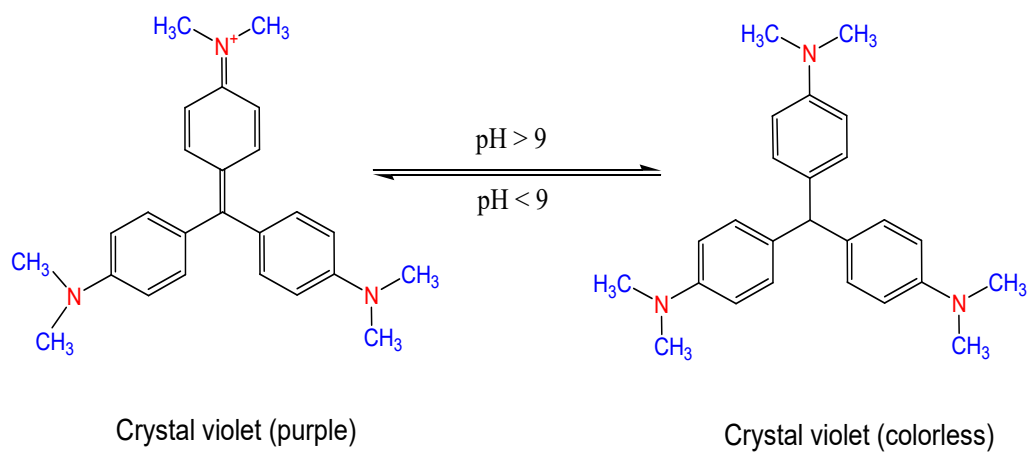


Figure S4: Structural conversion of CV above and below pH 9.

References:

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