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Supplementary Information

High Temperature stabilized Defect Pyrochlore Bi_{2-x}Fe_xWO₆ nanostructures and their effect on Photocatalytic Water Remediation and Photo-electrochemical Oxygen Evolution Kinetics

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Figure S1: EDX spectrum $Bi_{2-x}Fe_xWO_6$; (a)X = 0; (b)X = 0.2; (c)X = 0.5; (d)X = 1.0 and (e)X = 1.5.



Figure S2: Transient state PL spectra of $Bi_{2-x}Fe_xWO_6$ (X = 0 and 0.5)

Composition	τ ₁ (ns)	τ ₂ (ns)	A1	A2	χ^2	τ _{avg} (ns)
X = 0	0.67	9.42	0.35	4.39E-03	1.38	3.95
X = 0.5	1.16	7.97	6.54E-02	7.39E-03	1.61	4.14

Table S1: Fitted metrics and the average lifetime of $Bi_{2-x}Fe_xWO_6$ (X = 0 and 0.5)



Figure S3: Survey spectrum of $Bi_{2-x}Fe_xWO_6$; (a)X = 0; (b)X = 0.2; (c)X = 0.5; and (d)X = 1.5.



Figure S4: Absorbance spectra of RhB degradation using $Bi_{2-x}Fe_xWO_6$; (a)X = 0; (b)X = 0.2; (c)X = 0.5; (d)X = 1.0 and (e)X = 1.5.



Figure S5: Absorbance spectra of RhB degradation using $Bi_{2-x}Fe_xWO_6$; (a)X = 0; (b)X = 0.2; (c)X = 0.5; (d)X = 1.0 and (e)X = 1.5.



Figure S6: Pseudo first-order kinetics profile in the degradation of RhB and TCH using $Bi_{2-x}Fe_xWO_6$



*Figure S7: (a)-(b)Radical abduction profile in RhB and TCH during photocatalytic degradation using Bi*_{2-x} Fe_xWO_6 (X = 0.5) photocatalyst.

Composition	R _s	R _{ct}
$(Bi_{2-x}Fe_xWO_6)$	(Ω)	(ΜΩ)
X = 0 (Dark)	11.38	0.69
X = 0.2 (Dark)	12.44	0.25
X = 0.5 (Dark)	16.21	0.901
X = 1.5 (Dark)	14.85	0.29
X = 0 (Light)	11.28	0.39
X = 0.2 (Light)	12.36	0.19
X = 0.5 (Light)	16.56	0.57
X = 1.5 (Light)	15.67	0.19

Table S2: Metrics from EIS equivalent circuit