

Supporting Information for

**Phase-controlled synthesis of bismuth oxide polymorphs
for photocatalytic applications**

Thangavel Selvamani^a, Sambandam Anandan^{a,*}, Luis Granone^b, Detlef W.

Bahnemann^b, Muthupandian Ashokkumar^c

^aNanomaterials and Solar Energy Conversion Lab, Department of Chemistry,
National Institute of Technology, Trichy 620 015, India.

^bPhotocatalysis and Nanotechnology, Institut fuer Technische Chemie, Leibniz
Universitaet Hannover, Germany

^cSchool of Chemistry, University of Melbourne, Vic 3010, Australia.

*Corresponding author: E-mail: sanand@nitt.edu, Tel.: +91- 431-2503639, Fax:
+91-431-2500133

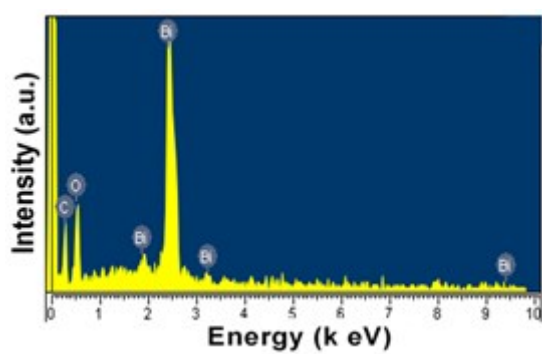


Fig. S1 EDS spectrum of Bi₂O₂CO₃ nanoflakes.

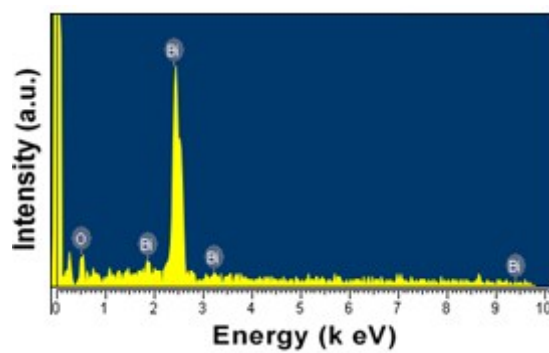


Fig. S2 EDS spectrum of β -Bi₂O₃ nanoparticle.

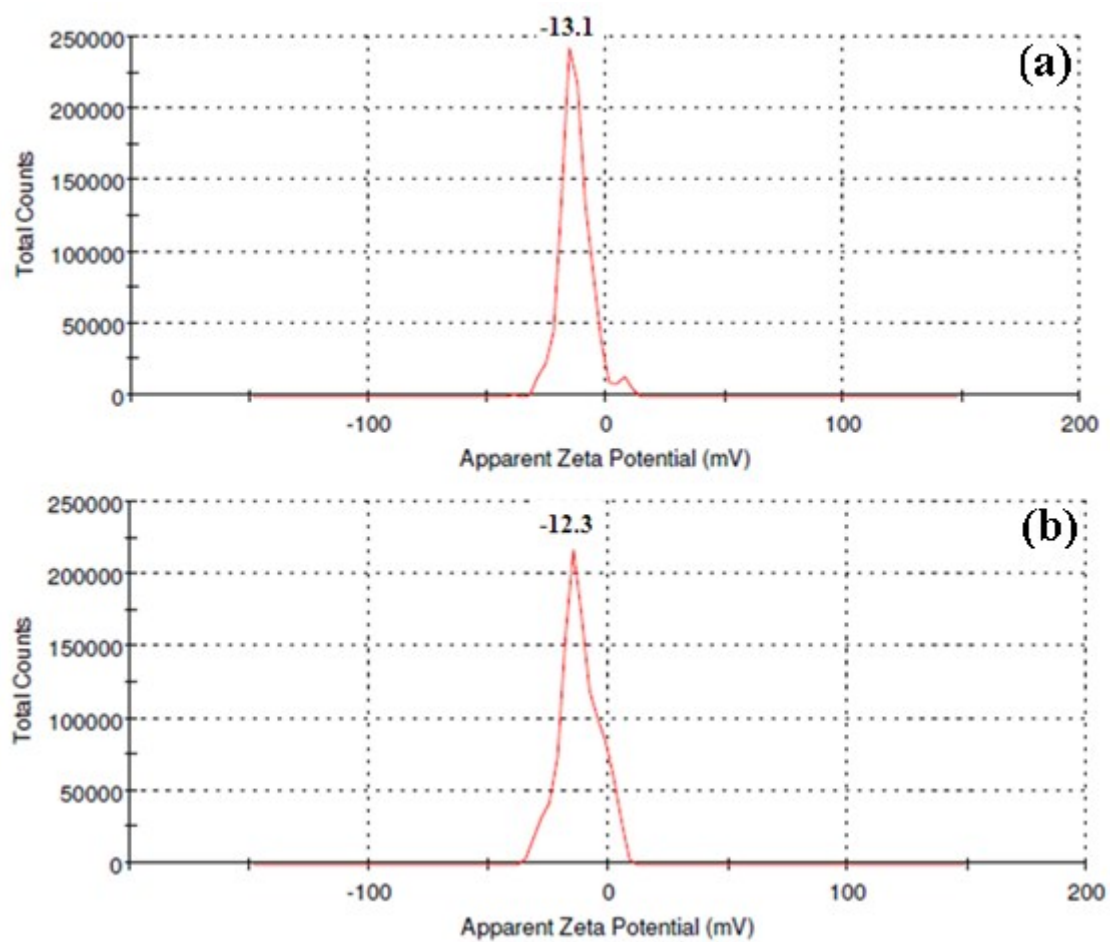


Fig. S3 Zeta potential results of (a) β - Bi_2O_3 and (b) α - Bi_2O_3 samples.

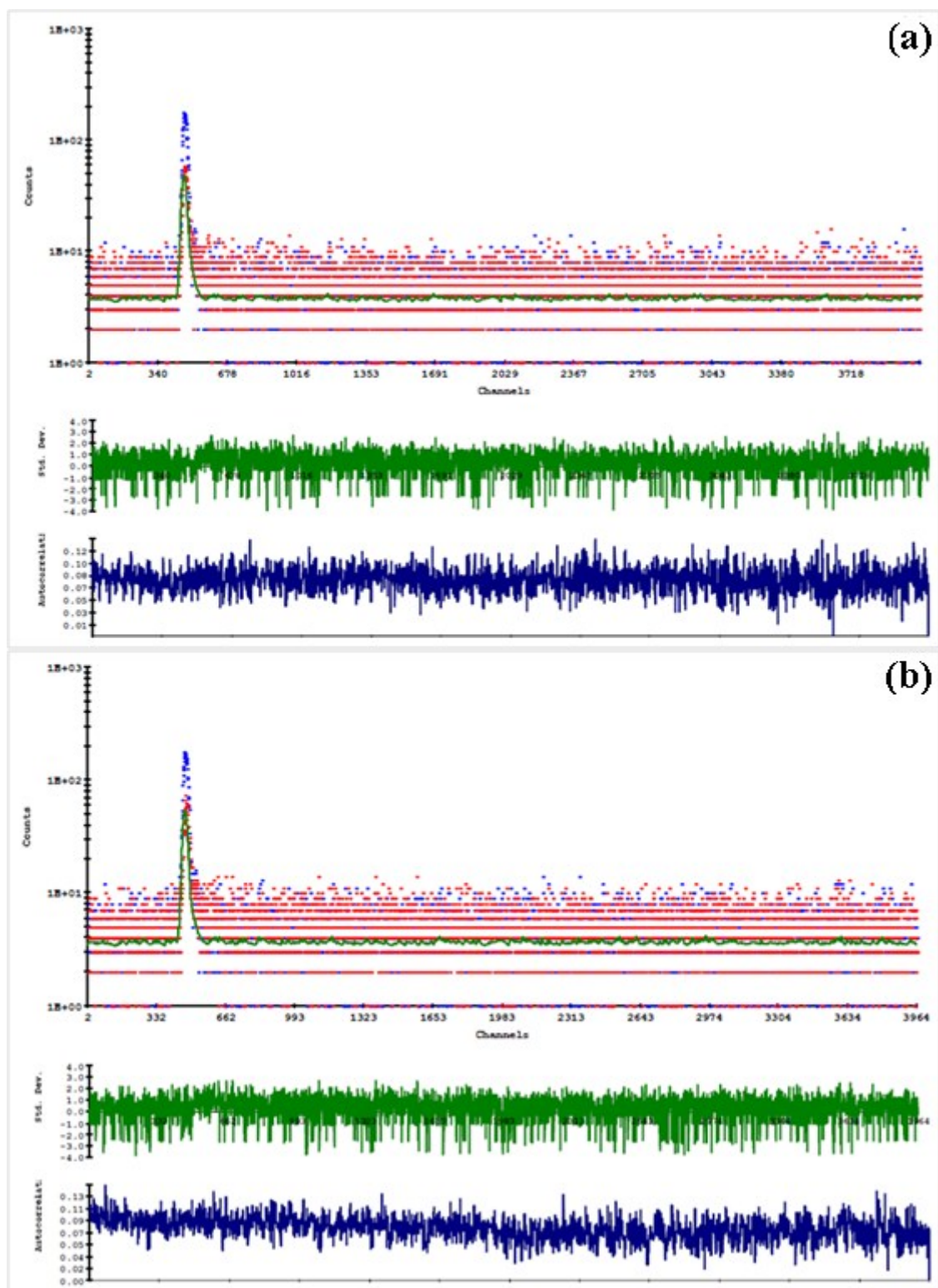


Fig. S4 Time-resolved fluorescence spectra of (a) β - Bi_2O_3 and (b) α - Bi_2O_3 sample. The lifetime was calculated by fitting the data with DAS (data analysis software).

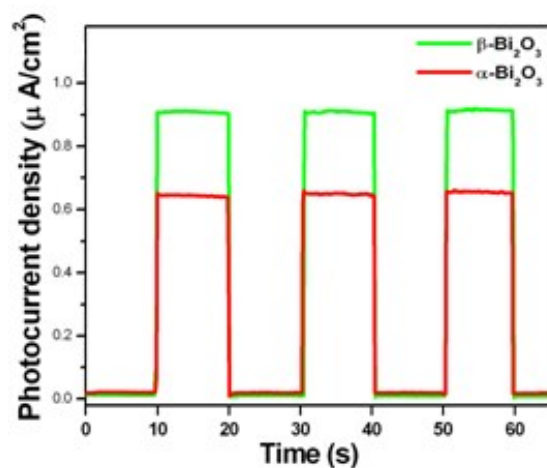


Fig. S5 The photocurrent response of bismuth oxide samples.

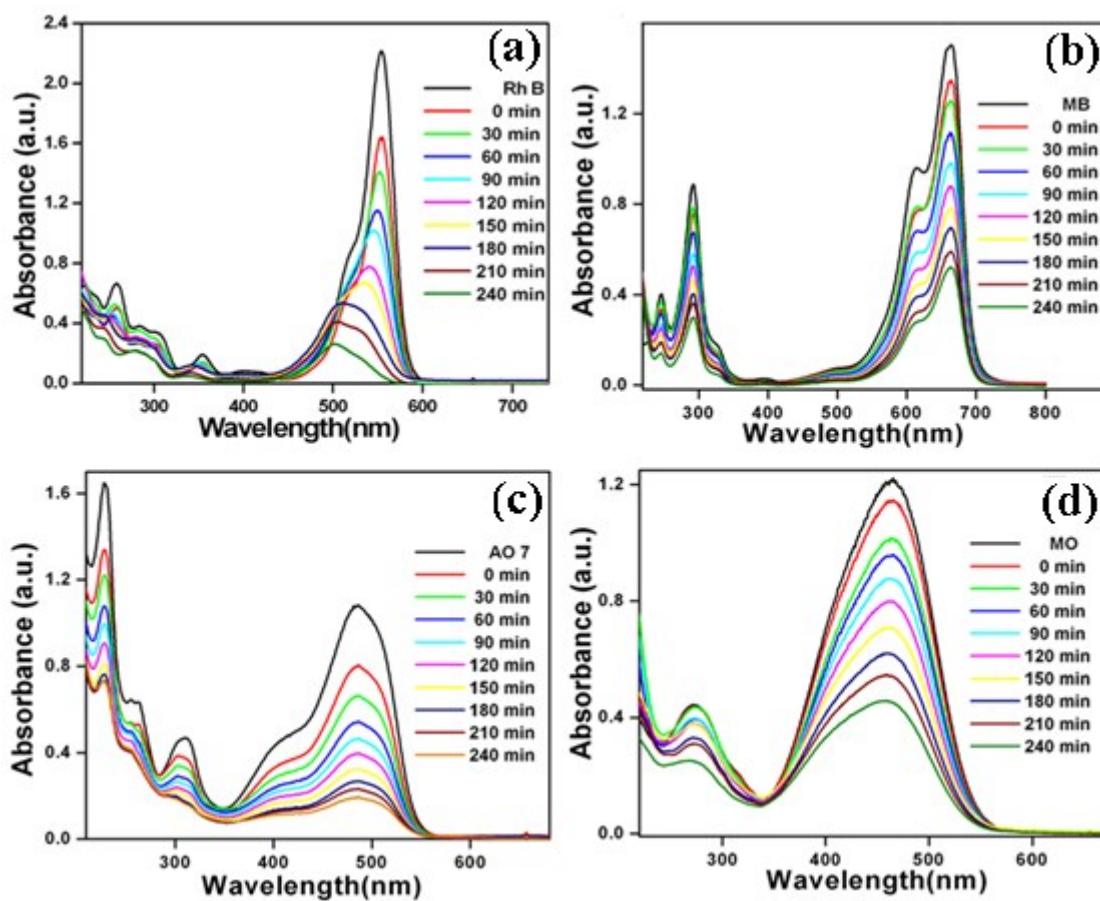


Fig. S6 Time dependence UV-vis absorption spectra of (a) Rh B, (b) MB, (c) AO 7 and (d) MO dye degradation over β - Bi_2O_3 nanoparticles under illumination.

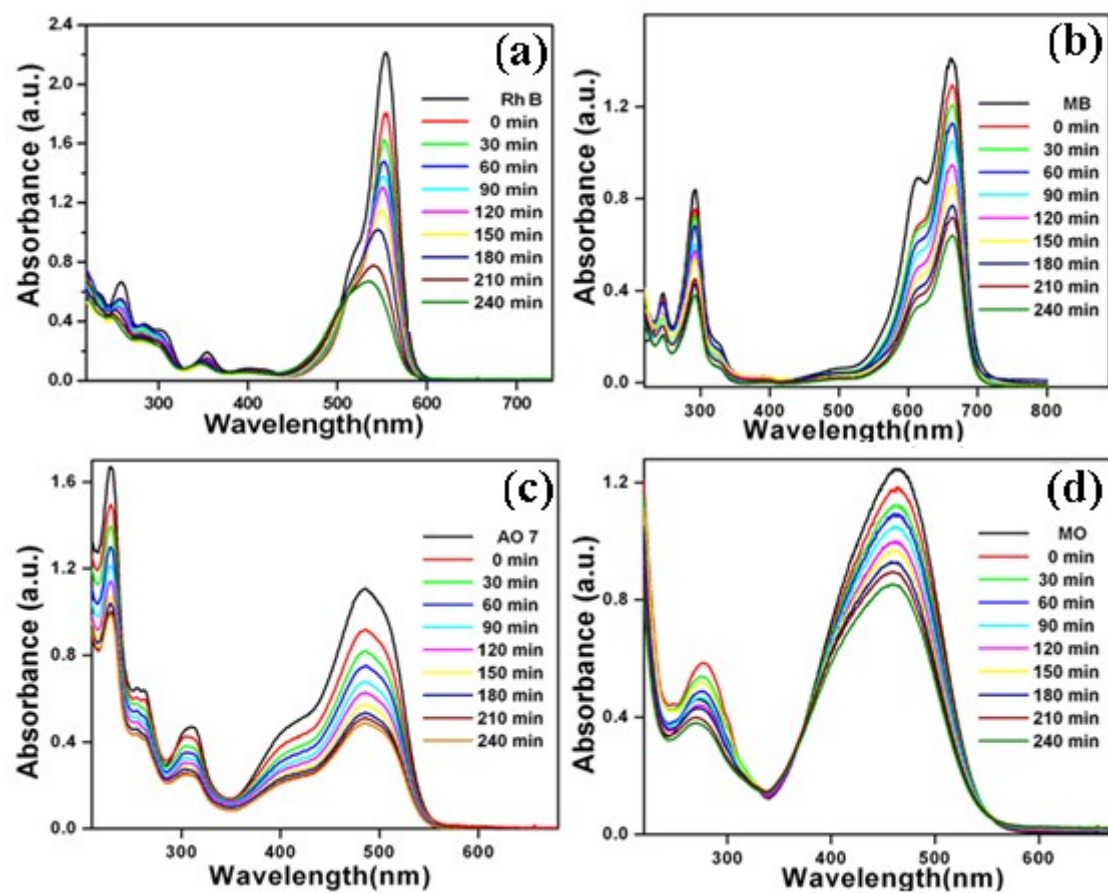


Fig. S7 Time dependence UV-vis absorption spectra of (a) Rh B, (b) MB, (c) AO 7 and (d) MO dye degradation over α - Bi_2O_3 coral-like morphology under illumination.

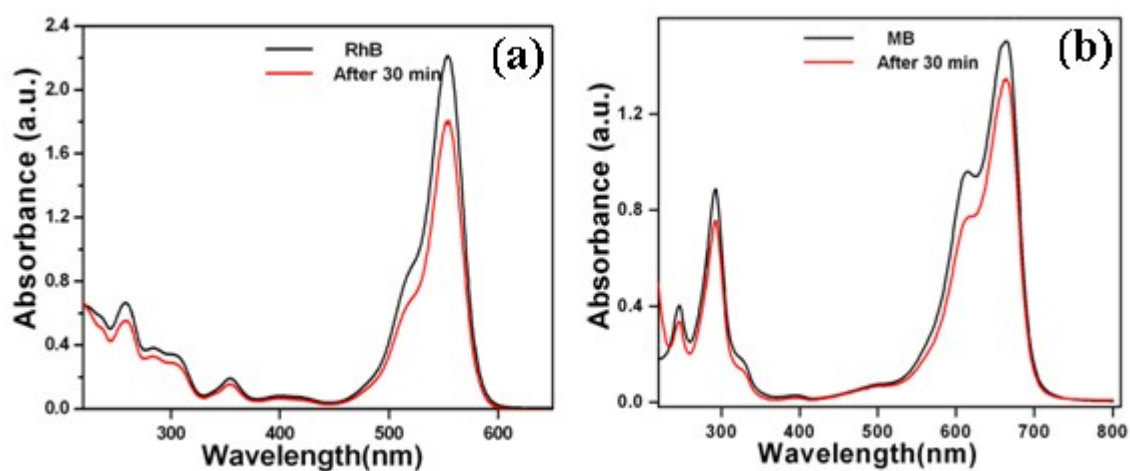


Fig. S8 Time dependence UV-vis absorption spectra of (a) Rh B and (b) MB dye over β - Bi_2O_3 nanoparticles under without illumination.

Table ST1. Crystalline size and unit cell parameters of as-synthesized Bi_2O_3 samples

S. No	Samples	Crystalline size (nm)	Lattice parameters ($\text{\AA}$)			Volume ($\text{\AA}^3$)
			a	b	c	
1.	β - Bi_2O_3	56	7.74	-	5.63	337.67
2.	α - Bi_2O_3	42	5.85	8.17	7.51	330.81

Table ST2. The calculated E_g value and E_{VB} , E_{CB} positions for as-synthesized Bi_2O_3 samples

S. No	Samples	$E_g(\text{eV})$	$E_{\text{VB}}(\text{eV})$	$E_{\text{CB}}(\text{eV})$
1.	β - Bi_2O_3	2.2	2.83	0.63
2.	α - Bi_2O_3	2.56	3.01	0.45