

Emergence of bismuth substituted cobalt ferrite nanostructures as versatile candidates for the enhanced oxidative degradation of hazardous organic dyes.

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Supplementary information

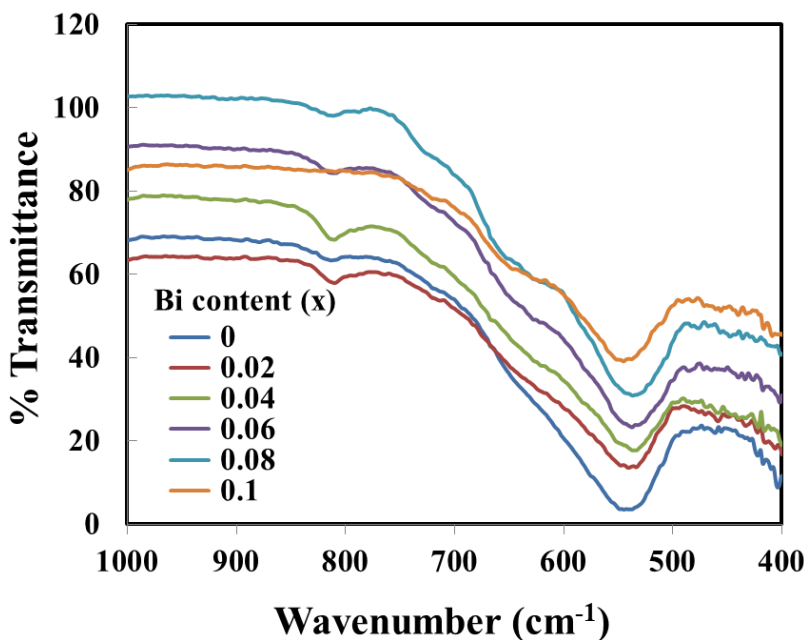


Fig S1 FT-IR spectra of CoBi_xFe_{2-x}O₄ (x = 0, 0.02, 0.04, 0.06, 0.08, 0.1).

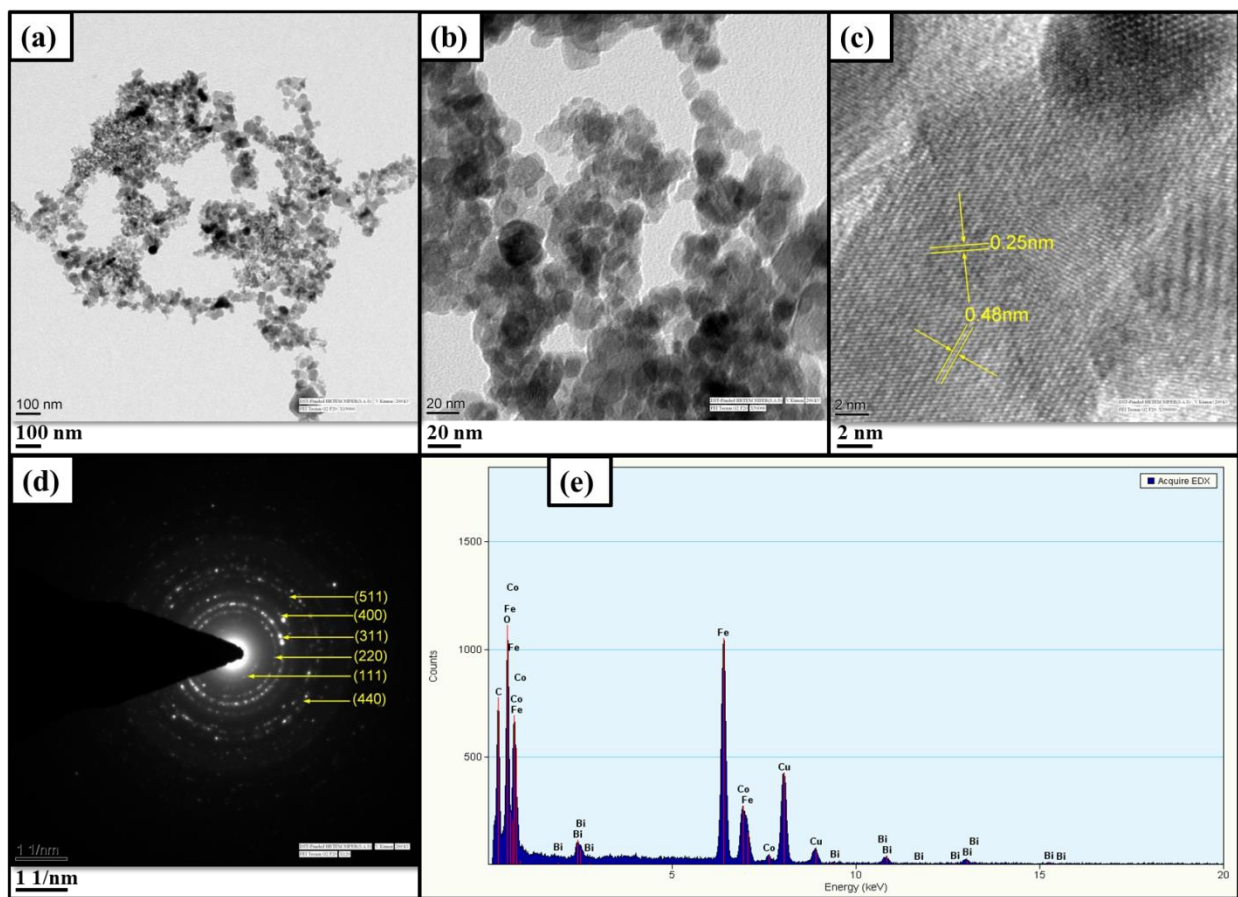


Fig S2 (a,b) Typical low resolution TEM micrographs (c) high resolution TEM micrograph (d) SAED pattern and (e) EDX spectrum of $\text{CoBi}_{0.1}\text{Fe}_{1.9}\text{O}_4$.

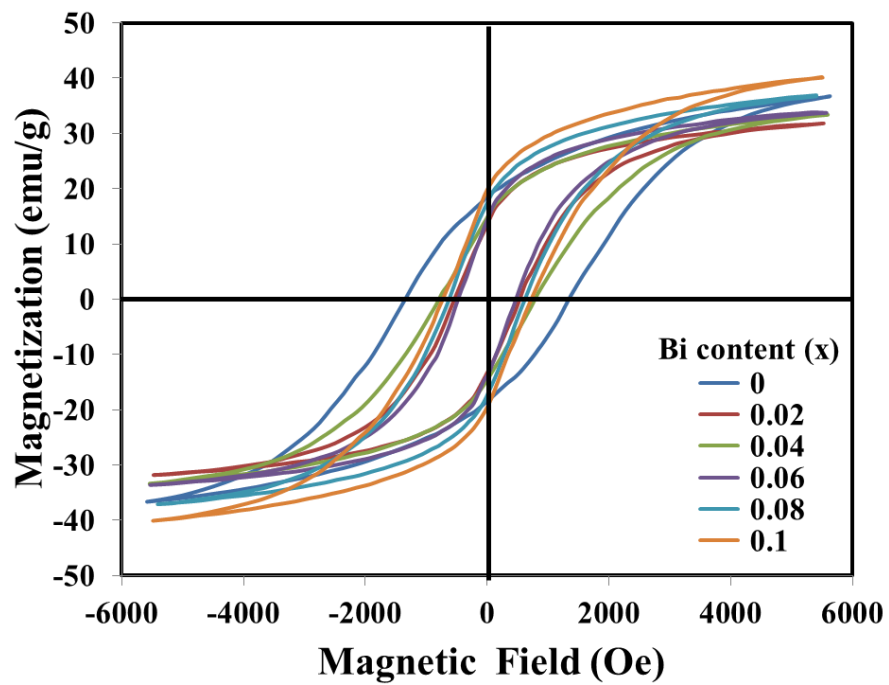


Fig S3 Hysteresis loops of $\text{CoBi}_x\text{Fe}_{2-x}\text{O}_4$ ($x = 0, 0.02, 0.04, 0.06, 0.08, 0.1$).

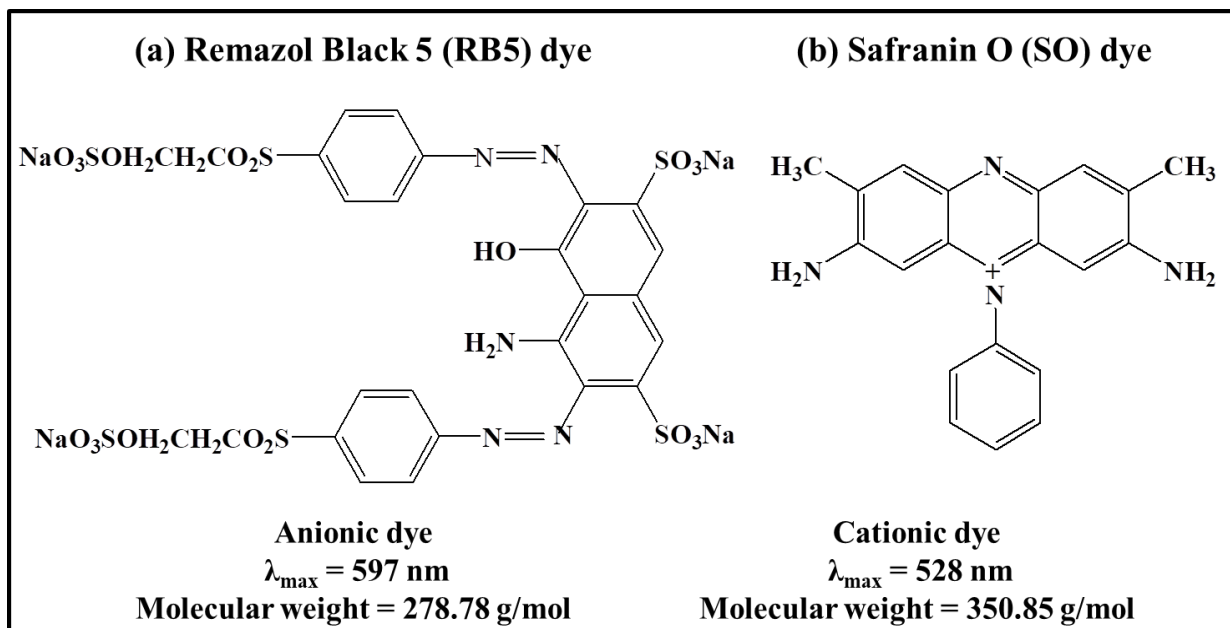


Fig S4 Structures of (a) Remazol Black 5 (RB5) and (b) Safranin O (SO) dyes.

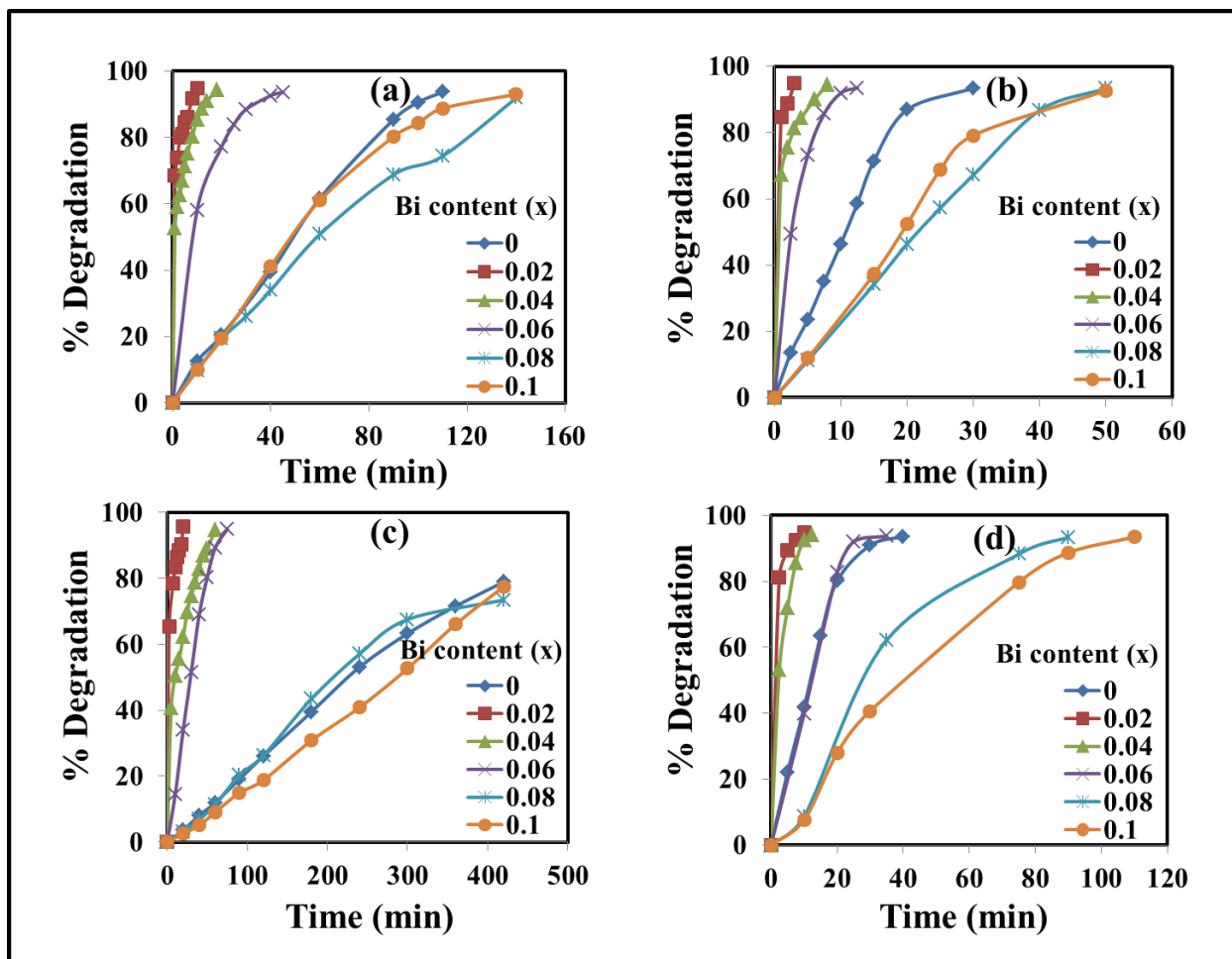


Fig S5 % Degradation vs. time curves for the degradation of (a) RB5 dye by Fenton process (b) RB5 dye by photo-Fenton process (c) SO dye by Fenton process (d) SO dye by photo-Fenton process in the presence of $\text{CoBi}_x\text{Fe}_{2-x}\text{O}_4$ ($x = 0, 0.02, 0.04, 0.06, 0.08, 0.1$).

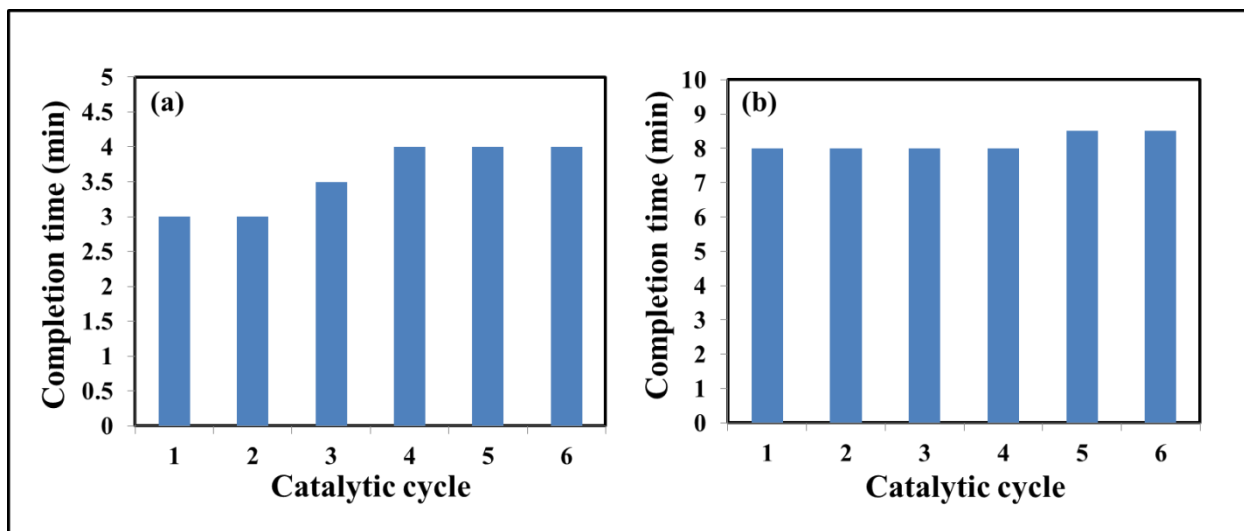


Fig S6 The completion time values for various catalytic cycles for the degradation of RB5 dye in the presence of (a) $\text{CoBi}_{0.02}\text{Fe}_{1.98}\text{O}_4$ and (b) $\text{CoBi}_{0.04}\text{Fe}_{1.96}\text{O}_4$ by photo-Fenton process.

Table S1 The values of ν_1 , crystallite size and lattice parameter of $\text{CoBi}_x\text{Fe}_{2-x}\text{O}_4$ ($x = 0, 0.02, 0.04, 0.06, 0.08, 0.1$) nanostructures.

$\text{CoBi}_x\text{Fe}_{2-x}\text{O}_4$ (x)	ν_1 (cm^{-1})	Crystallite size (nm)	Lattice parameter (\AA)
0	544	17.4	8.375
0.02	540	15.3	8.378
0.04	533	16.2	8.387
0.06	537	16.9	8.383
0.08	536	17.5	8.374
0.1	545	17.6	8.378

Table S2 Optimization of reaction conditions (pH, H₂O₂ dosage, CoFe₂O₄ loading).

	Fixed variable	Conditions	Rate constant (min⁻¹) (kx10⁻²)
Variation of pH	[CoFe ₂ O ₄] = 0.50 g/L,	2	8.91
	[H ₂ O ₂] = 8.8 mM	2.5	9.23
		3	5.95
Variation of H₂O₂ (mM)	[CoFe ₂ O ₄] = 0.50 g/L	4.4	8.86
	pH = 2.5	8.8	9.23
		13.2	8.70
Variation of CoFe₂O₄ (g/L)	pH = 2.5	0.25	8.87
	[H ₂ O ₂] = 8.8 mM	0.50	9.23
		0.75	8.67
		1.00	8.46