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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

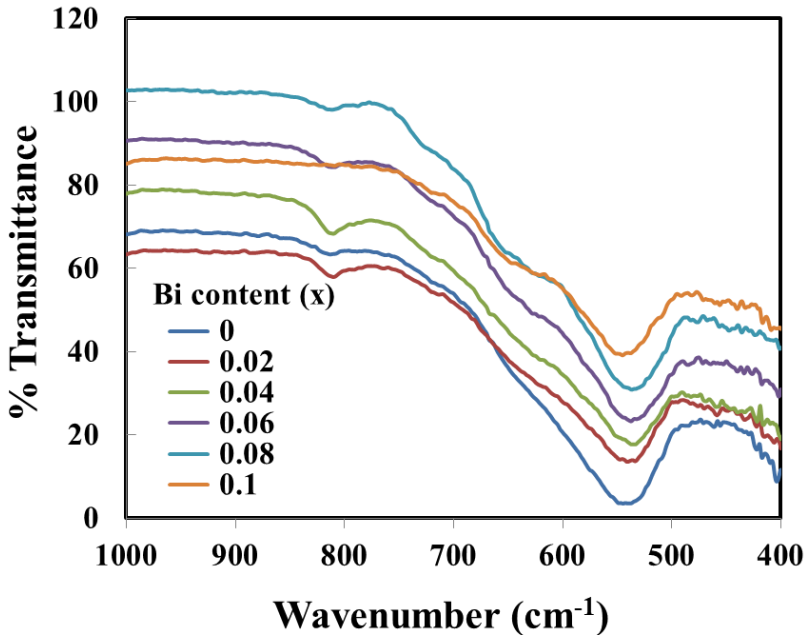

Fig S1 FT-IR spectra of $CoBi_xFe_{2-x}O_4$ (x = 0, 0.02, 0.04, 0.06, 0.08, 0.1).

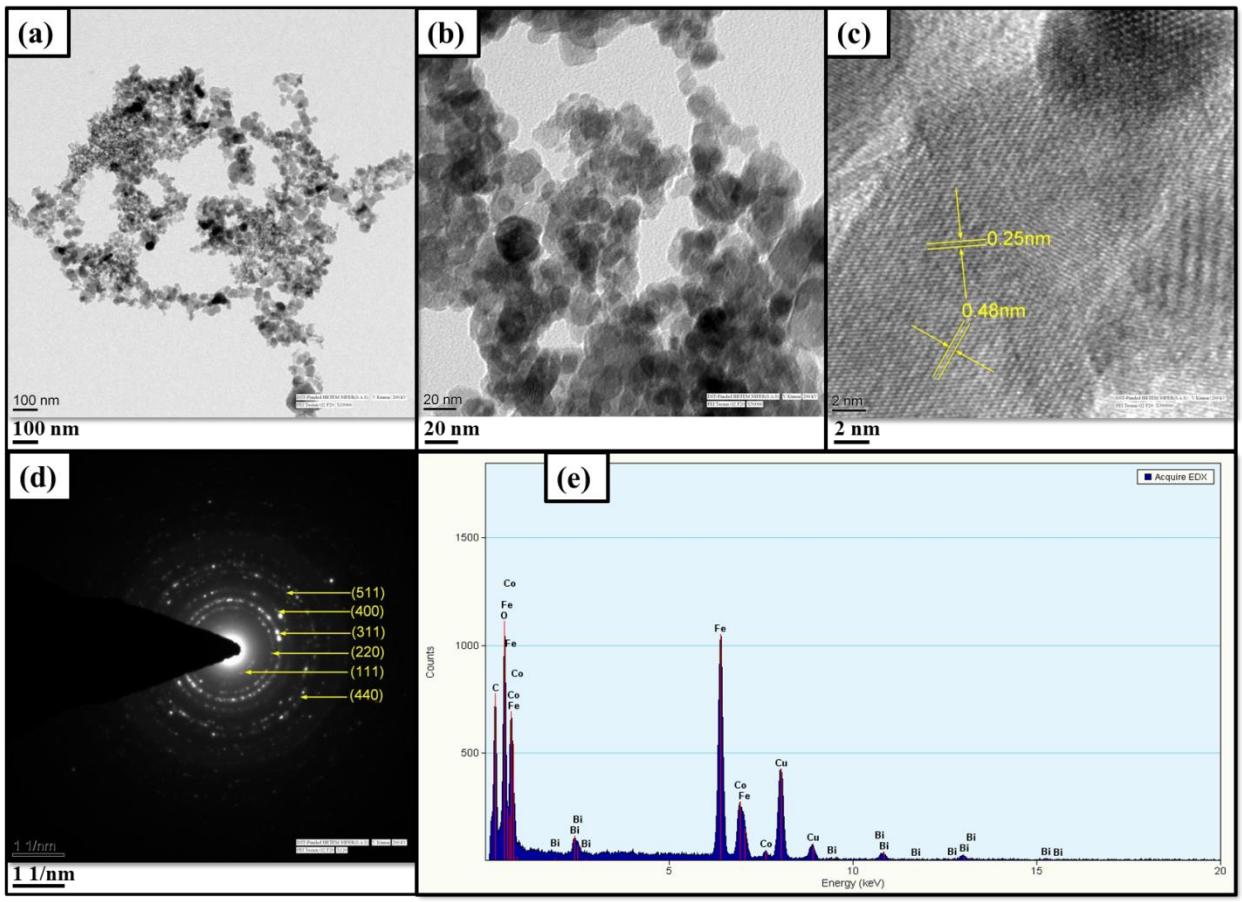

Fig S2 (a,b) Typical low resolution TEM micrographs (c) high resolution TEM micrograph (d) SAED pattern and (e) EDX spectrum of $CoBi_{0.1}Fe_{1.9}O_4$.

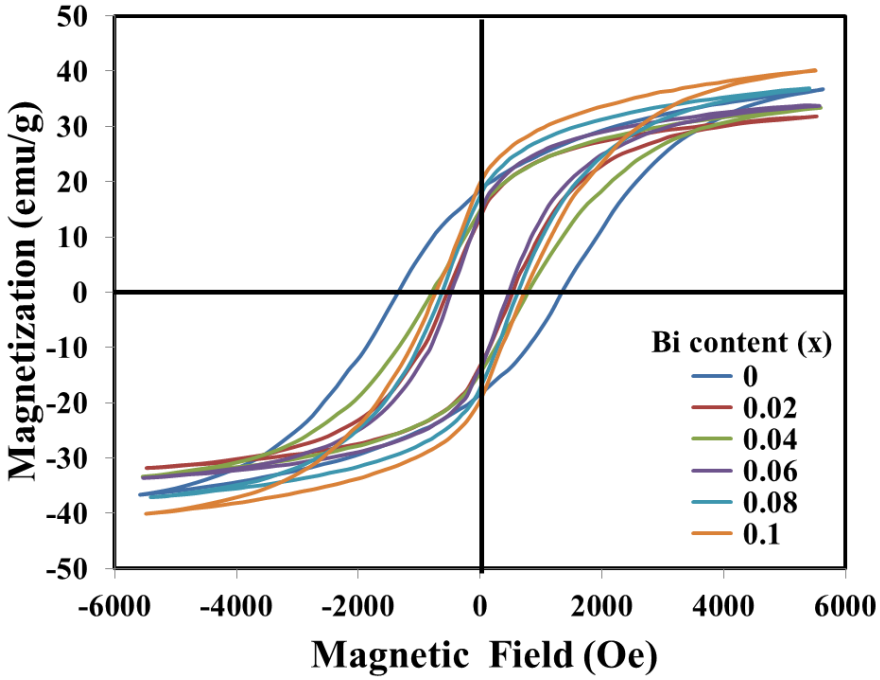

Fig S3 Hysteresis loops of $CoBi_xFe_{2-x}O_4$ (x = 0, 0.02, 0.04, 0.06, 0.08, 0.1).

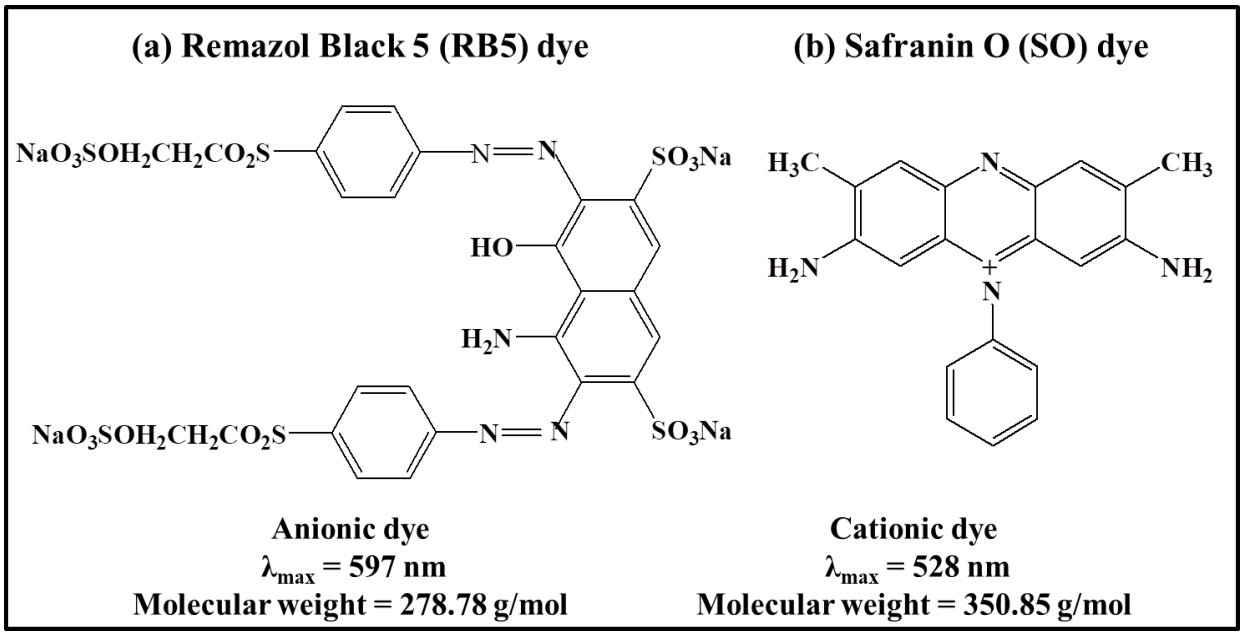

Fig S4 Structures of (a) Remazol Black 5 (RB5) and (b) Safranin O (SO) dyes.

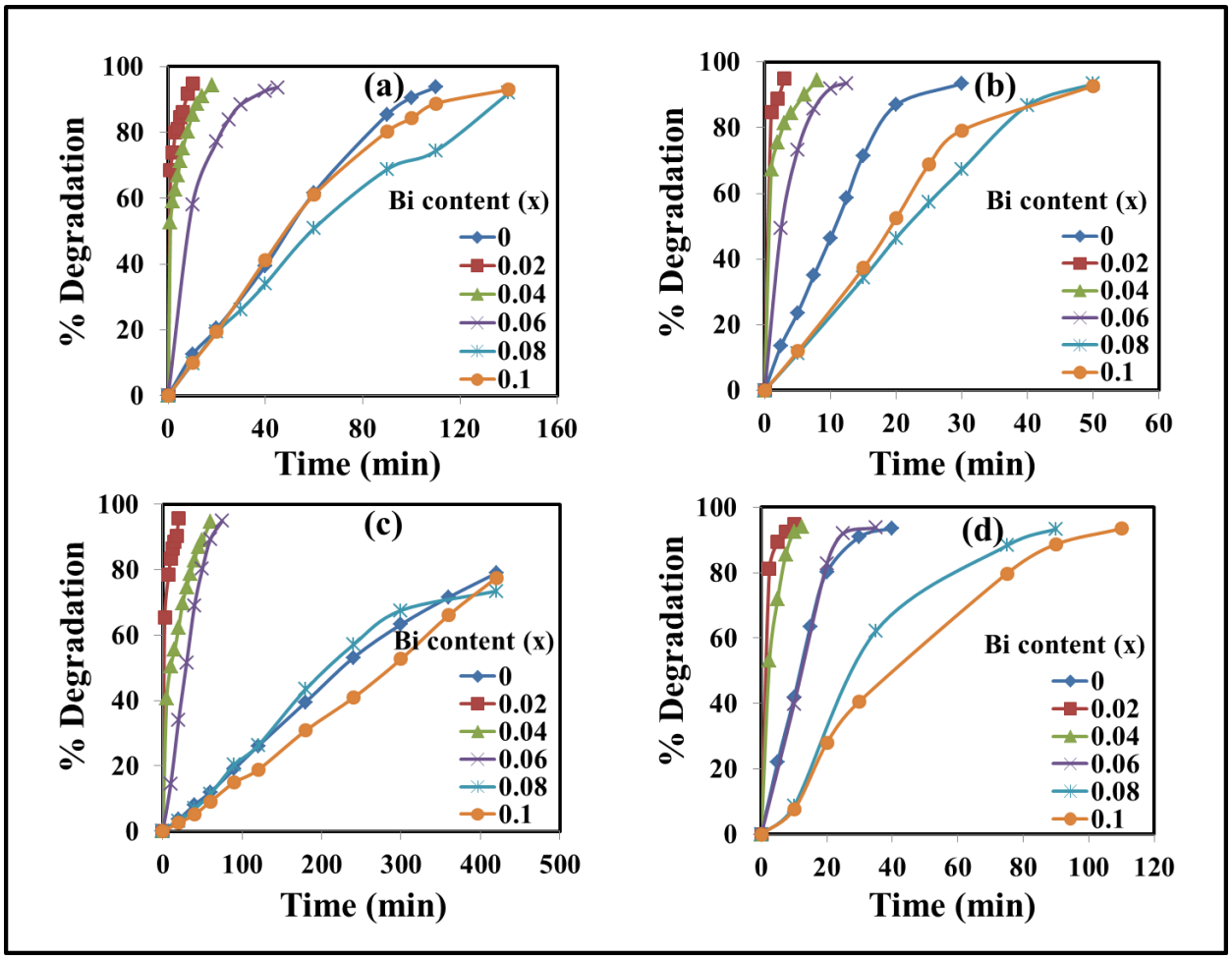

Fig S5 % Degradation *vs.* time curves for the degradation of (a) RB5 dye by Fenton process (b) RB5 dye by photo-Fenton process (c) SO dye by Fenton process (d) SO dye by photo-Fenton process in the presence of $CoBi_xFe_{2-x}O_4$ (x = 0, 0.02, 0.04, 0.06, 0.08, 0.1).

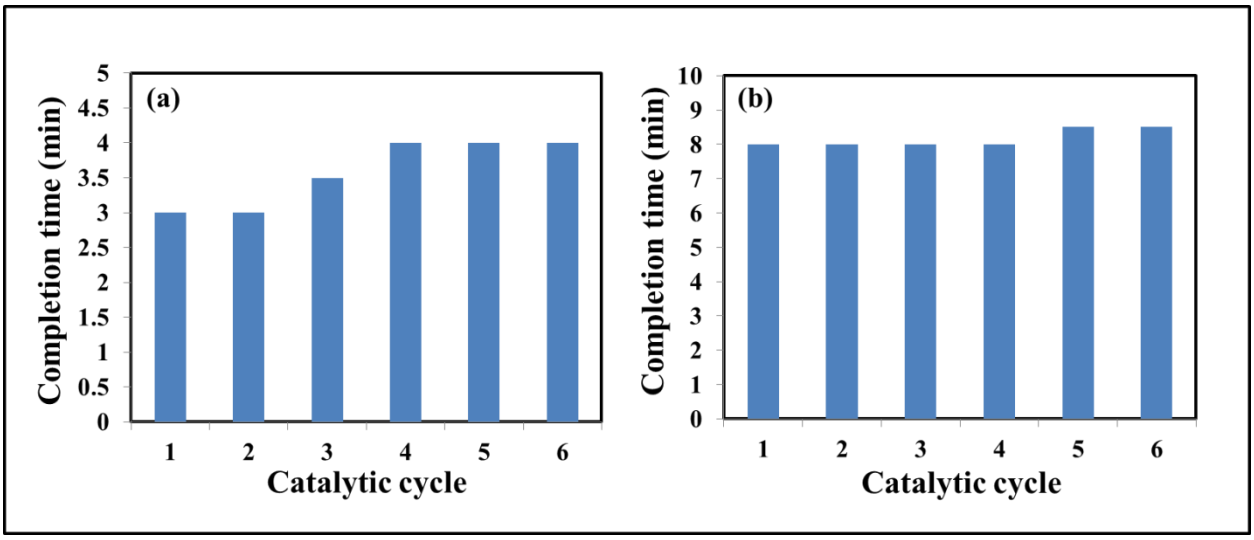

Fig S6 The completion time values for various catalytic cycles for the degradation of RB5 dye in the presence of (a) $CoBi_{0.02}Fe_{1.98}O_4$ and (b) $CoBi_{0.04}Fe_{1.96}O_4$ by photo-Fenton process.

Table S1 The values of υ_1, crystallite size and lattice parameter of $CoBi_xFe_{2-x}O_4$ (x = 0, 0.02, 0.04, 0.06, 0.08, 0.1) nanostructures.

$CoBi_xFe_{2-x}O_4$ (x)	**υ_1 (cm^{-1})**	**Crystallite size (nm)**	**Lattice parameter (Å)**
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, H_2O_2 dosage, $CoFe_2O_4$ loading).

	Fixed variable	Conditions	Rate constant (min^{-1}) ($kx10^{-2}$)
Variation of pH	$[CoFe_2O_4]$ = 0.50 g/L, $[H_2O_2]$ = 8.8 mM	2	8.91
		2.5	**9.23**
		3	5.95
Variation of H_2O_2 (mM)	$[CoFe_2O_4]$ = 0.50 g/L pH = 2.5	4.4	8.86
		8.8	**9.23**
		13.2	8.70
Variation of $CoFe_2O_4$ (g/L)	pH = 2.5 $[H_2O_2]$ = 8.8 mM	0.25	8.87
		0.50	**9.23**
		0.75	8.67
		1.00	8.46