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Cobalt oxide confined in mesoporous SBA-15 as a highly efficient catalyst for enhanced degradation of sulfamethoxazole

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Material characterization

The morphology of materials was determined by scanning electron microscope (SEM, Quanta FEG 250, USA). The TEM images of the samples were determined on a TF20 electron microscope using an operating voltage of 200 kV. The XRD patterns of the materials were obtained on an D/max-RA powder diffraction meter (Bruker D8 Advance, Germany), operating with Cu Kα radiation (40 kV, 40 mA). The contents of Co were measured by inductively coupled plasma atomic emission spectrometry (ICP-AES, J-A1100, Jarrell-Ash, Franklin, USA). The XPS of the materials was conducted on a ESCALAB 250 X-ray Photoelectron Spectroscopy (Thermo, Co., USA) equipped with a monochromatized Al $K\alpha$ excitation source (hv = 1486.6 eV).

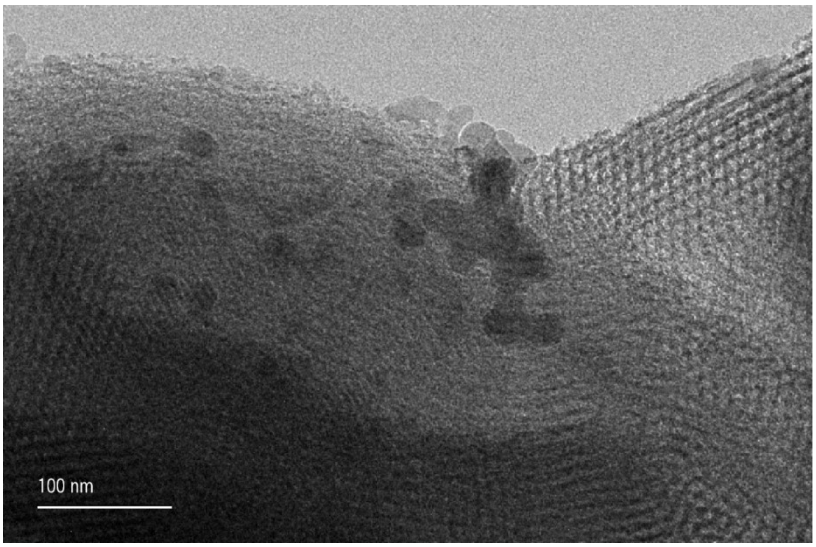

Fig. S1 TEM image of Co_3O_4/SBA-15

Table S1 Suraface elemental composition of catalysts determined from XPS

Samples	Co (atom %) [a]	Co^{2+}/Co^{3+} [b]
Co_3O_4(I)	12.57	1.13
Co_3O_4(II)	12.78	0.72
Co_3O_4(III)	23.11	0.61
Co_3O_4/SiO_2	1.49	0.78
Co_3O_4/SBA-15	1.32	0.95
Co_3O_4@SBA-15(I)	0.45	1.19
Co_3O_4@SBA-15(II)	0.88	0.93
Co_3O_4@SBA-15(III)	1.05	0.73

[a] Atomic percentages of surface elements are obtained from XPS measurements;

[b] Calculated by the peak area of Co 2p in XPS spectrum.

Fig. S2 Co 2p3/2 XPS spectra of catalysts