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Supporting Information

Uniform Core-Shell Structured Magnetic Mesoporous TiO_2 Nanospheres as a Highly Efficient and Stable Sonocatalyst for Degradation of Bisphenol-A

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Table S1. Physicochemical properties of the resultant core-shell nanospheres.

Sample Name	D_A (nm)	D (nm)	S_{BET} (m^2/g)	V (cm^3/g)
P25	13.6	-	50.1	0.065
Fe_3O_4@mTiO_2-600	7.3	6.32	146.4	0.122
Fe_3O_4@SiO_2@mTiO_2	-	3.2	384.3	0.36
Fe_3O_4@SiO_2@TiO_2-600	10.0	11.6	25.6	0.048
Fe_3O_4@SiO_2@mTiO_2-600	5.5	5.2	216.0	0.20

D_A, the particle size of anatase nanocrystals calculated by Scherrer formula; **S_{BET}**, BET surface area; **D**, pore-size diameter; **V**, total pore volume.

Table S2. Contents of C, O, Si, Ti, and Fe element in the surface of Fe_3O_4@SiO_2, Fe_3O_4@mTiO_2-600 and Fe_3O_4@SiO_2@mTiO_2-600 core-shell nanospheres.

Samples	C (%)	O (%)	Si (%)	Ti (%)	Fe (%)
Fe_3O_4@SiO_2	6.0	65.7	28.3	-	-
Fe_3O_4 @mTiO_2-600	42.84	41.38	-	12.52	3.62
Fe_3O_4@SiO_2@mTiO_2-600	40.88	42.90	1.50	14.72	-

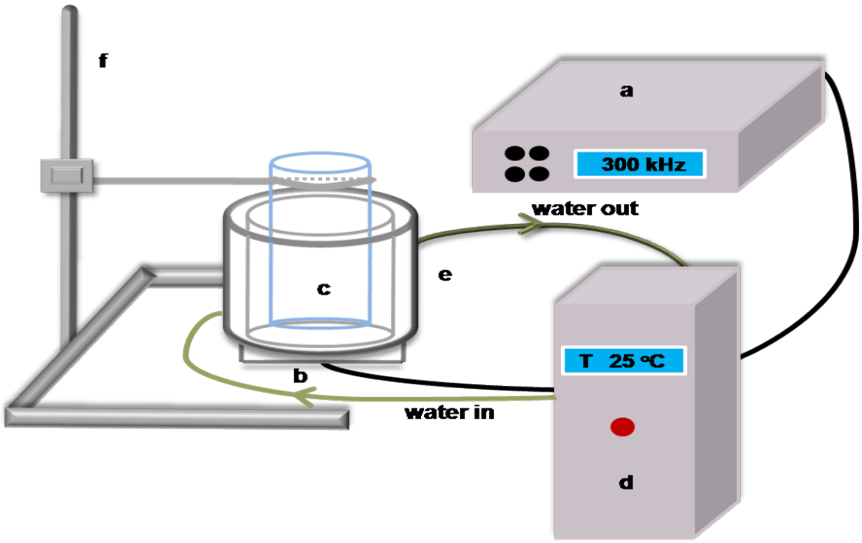

Fig.S1. Sonocatalytic degradation experimental setup. (a) amplifier, (b) transducer, (c) reactor , (d) water jacket, (e) container, (f) retort stand .

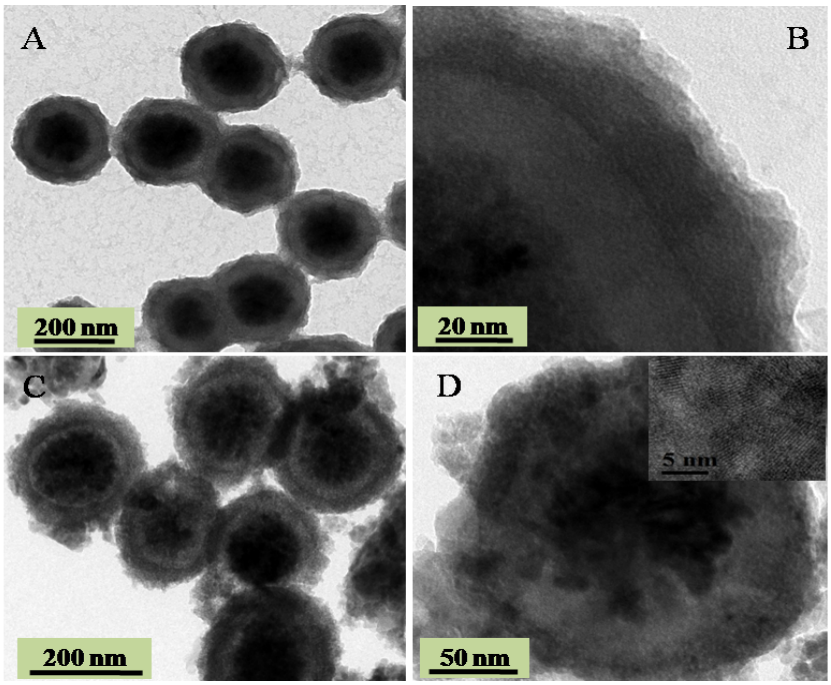

Fig. S2.TEM images of (A and B) Fe_3O_4@SiO_2@TiO_2 core-shell nanospheres prepared *via* two-steps modified stöber method without post-hydrolysis process and (C and D) nonporous Fe_3O_4@SiO_2@TiO_2-600 core-shell nanospheres obtained by directly annealing Fe_3O_4@SiO_2@TiO_2 samples.

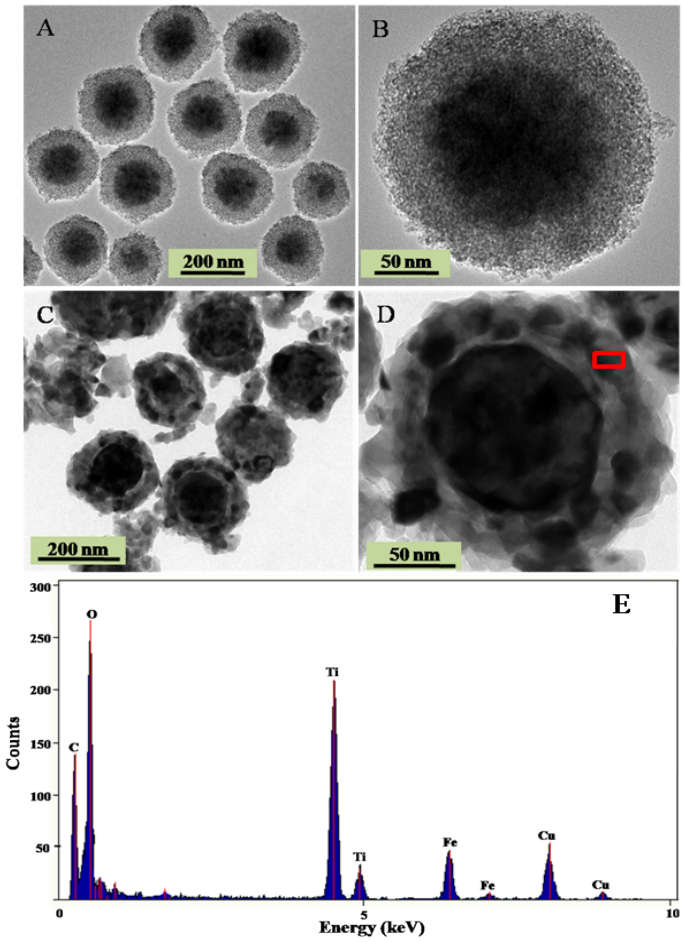

Fig. S3. TEM images of (A and B) mesoporous Fe_3O_4@mTiO_2 core-shell nanospheres before calcination, (C and D) after calcination and (E) EDX analysis taken at red square.

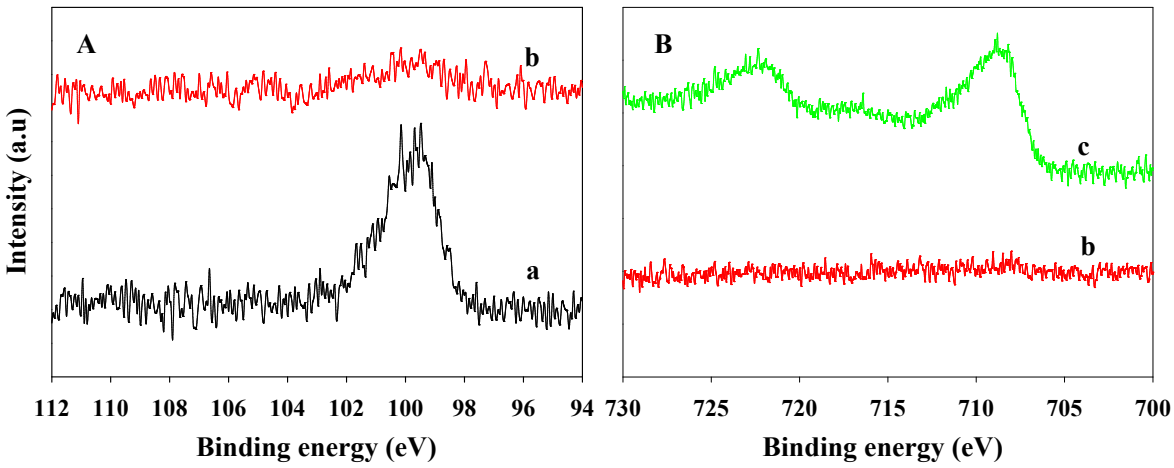

Fig. S4. Amplified pattern for (A) Si 2p peak and (B) Fe 2p peak. (a) the $Fe_3O_4@SiO_2$ core-shell nanospheres (b) mesoporous $Fe_3O_4@SiO_2@mTiO_2$-600 core-shell nanospheres, and (c) mesoporous $Fe_3O_4@mTiO_2$-600 core-shell nanospheres without the silica layer.

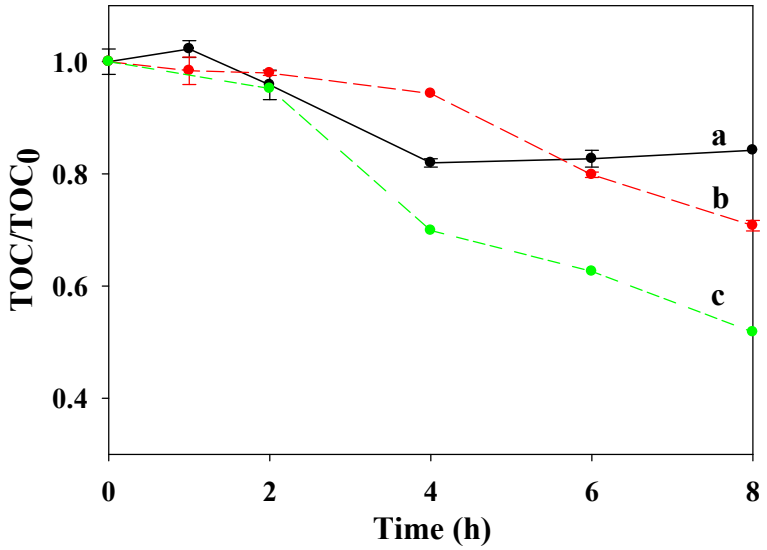

Fig. S5. The TOC revmoal rate of BPA with varied sonocatalysts. (a) US alone, (b) P25, and (c) magnetic mesoporous Fe_3O_4@SiO_2@mTiO_2-600 core-shell nanospheres.

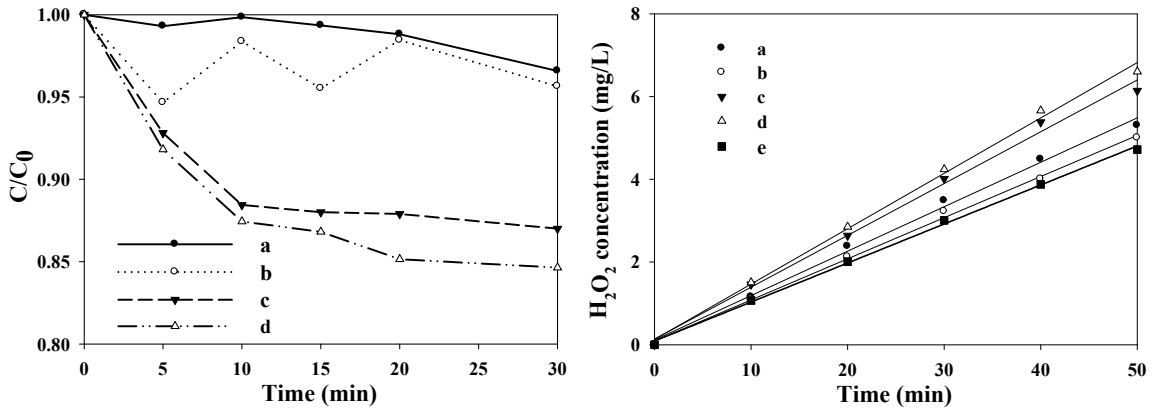

Fig. S6. (A) Adsorption kinetic plot and (B) sonocatalytic H_2O_2 generation rate. (a) P25, (b) nonporous Fe_3O_4@SiO_2@TiO_2-600 core-shell nanospheres, (c) mesoporous Fe_3O_4@mTiO_2-600 core-shell nanospheres without silica layer, (d) mesoporous Fe_3O_4@SiO_2@mTiO_2-600 core-shell nanospheres, and (e) US.

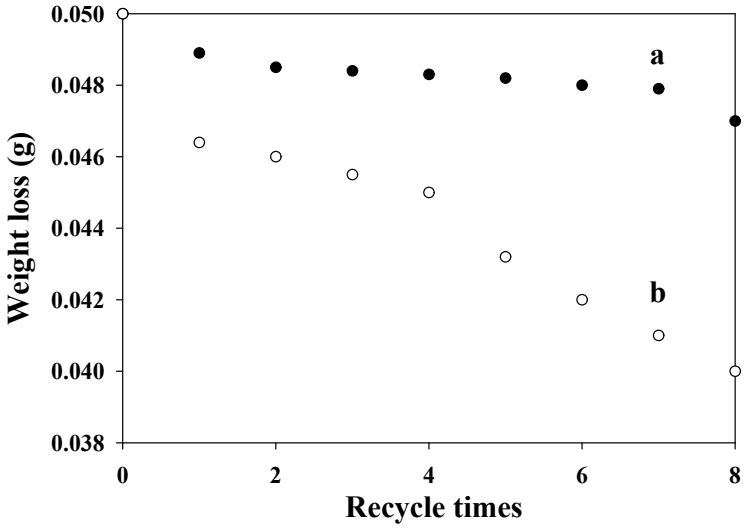

Fig. S7. Catalyst weight loss at each recycle with a magnetic separation time of 2 minutes. (a) mesoporous Fe_3O_4@SiO_2@mTiO_2-600 core-shell nanospheres and (b) mesoporous Fe_3O_4@mTiO_2-600 core-shell nanospheres without silica layer.

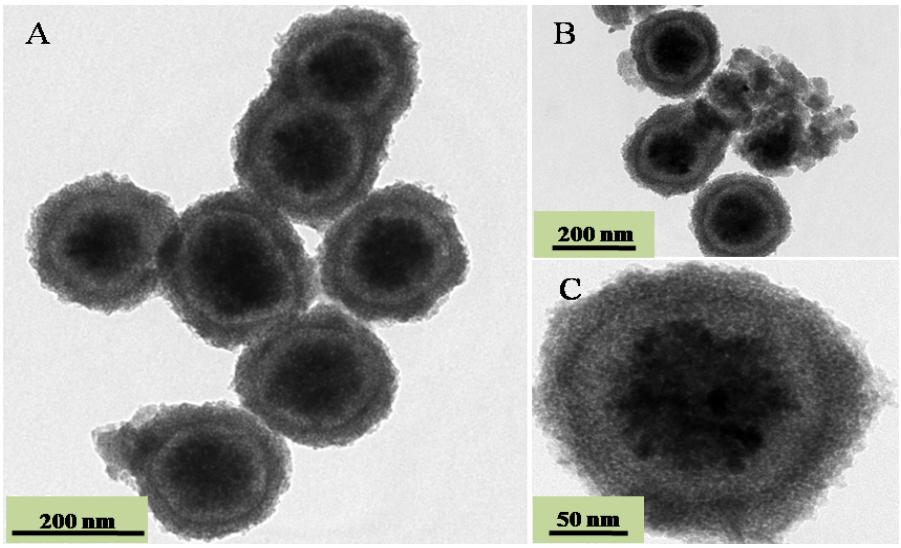

Fig. S8. TEM images of mesoporous Fe_3O_4@SiO_2@mTiO_2-600 core-shell nanospheres after eight cycles.