Electronic Supplementary Material (ESI) for Journal of Materials Chemistry

Supporting information

A General and Feasible Method for Fabrication of Functional Nanoparticles in Mesoporous Silica Hollow Composite Spheres

Yuyong Yin, Min Chen, Shuxue Zhou, Limin Wu*

Department of Materials Science and State Key Laboratory of Molecular Engineering of Polymers, Advanced Materials Laboratory, Fudan University, Shanghai 200433, China

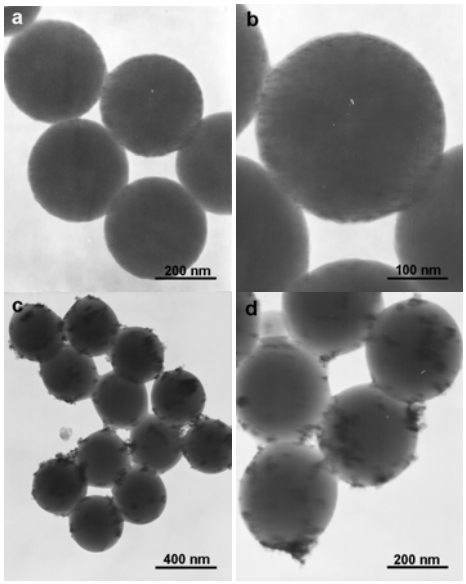


Figure S1. TEM images of (a, b) PS-Pt composite microspheres and (c, d) PS-Fe_3O_4 composite microspheres.

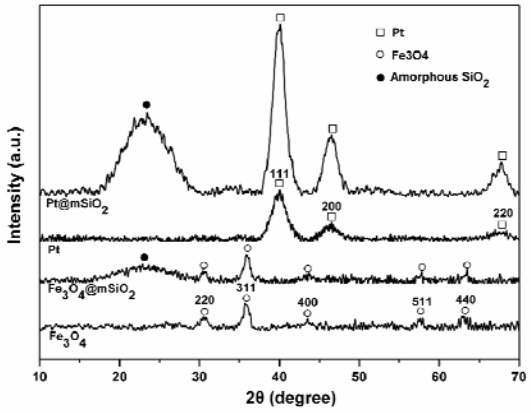


Figure S2. XRD patterns of Pt, Fe_3O_4 nanoparticles and their HMNSs.

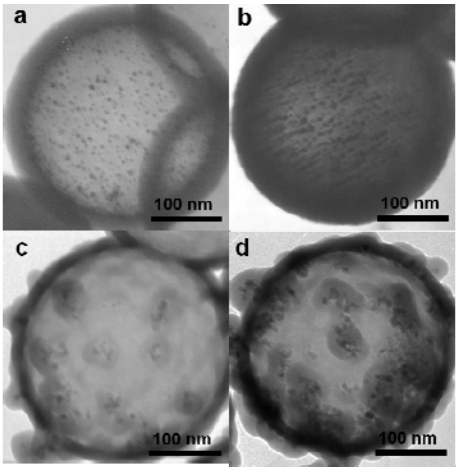


Figure S3. TEM images of Pt@SiO_2 HMNSs containing Pt NPs: (a) 2.3 wt%, (b) 4.6 wt%, and Fe_3O_4@SiO_2 HMNSs containing Fe_3O_4 NPs: (c)1 wt%, (d) 2 wt%.

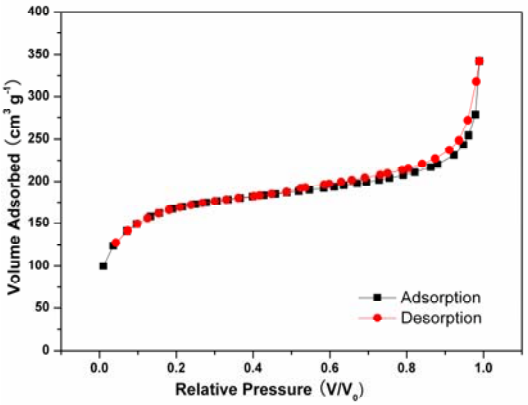


Figure S4. BET of the pure hollow mesoporous silica spheres.

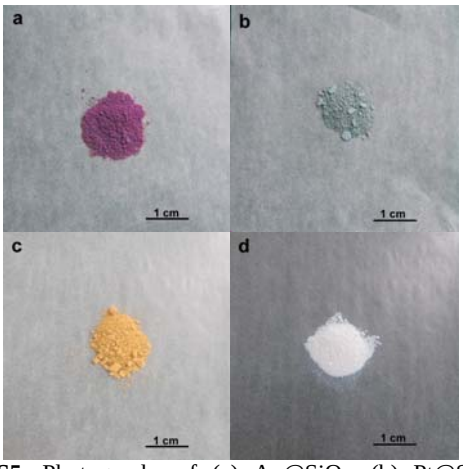


Figure S5. Photographs of (a) Au@SiO_2, (b) Pt@SiO_2, (c) Fe_3O_4@SiO_2 HMNS powders and (d) pure hollow mesoporous silica sphere powders.

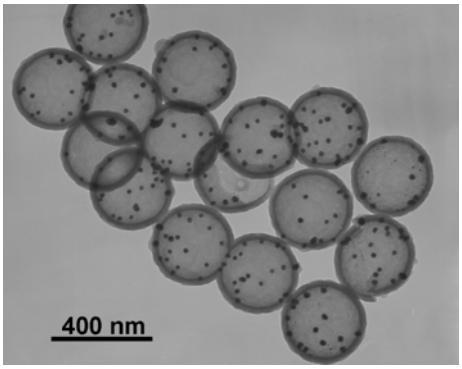


Figure S6. Typical TEM image of the Au@SiO_2 HMNSs after 8 cycles of catalysis.

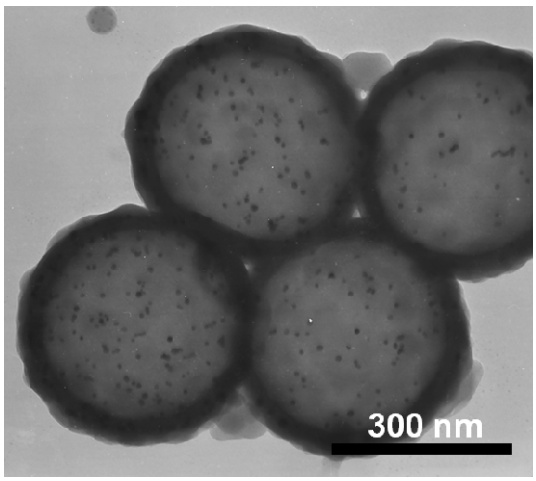


Figure S7. TEM image of Au@SiO_2 HMNSs with Au NPs of 4-5 nm.

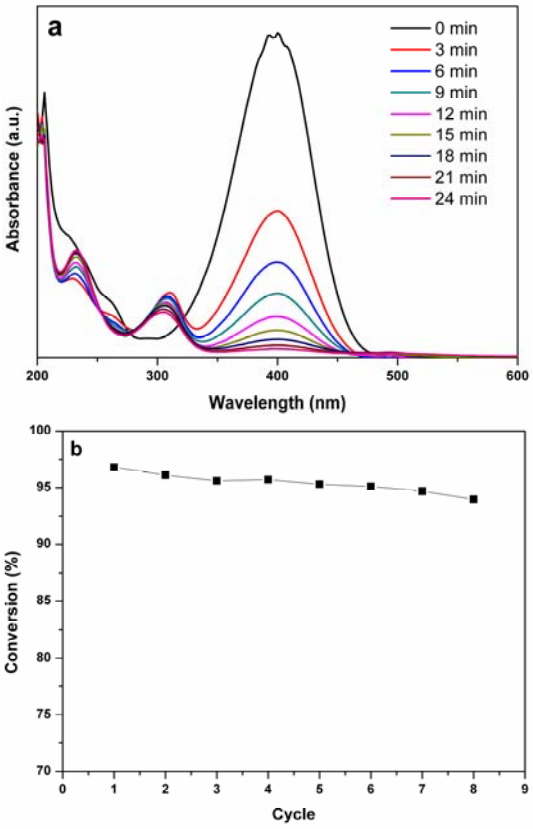
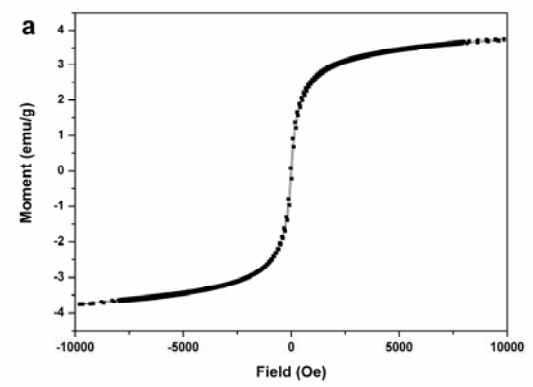


Figure S8. (a) Time-dependent UV-vis spectra of the solution catalyzed by Pt@SiO_2 HMNSs. (b) Reusability of Pt@SiO_2 HMNSs as catalysts for the reduction of 4-nitrophenol with $NaBH_4$. 1 mg of Pt@SiO_2 composites spheres were used, containing Pt $2.3*10^{-7}$ mol. Other reaction conditions were the same with the process of Au@SiO_2 as catalysis.



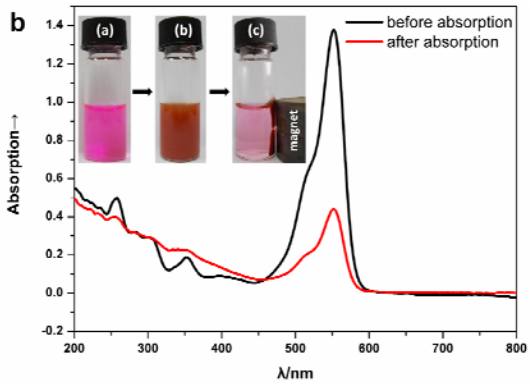


Figure S9. (a) The magnetic hysteresis loops of the Fe_3O_4@SiO_2 HMNSs. (b) UV-vis absorption spectra of 10 mg/L Rhodamine solution before and after absorption by the Fe_3O_4@SiO_2 HMNSs. Inset is the corresponding digital cameral images: (a) 2 mL of 10 mg/L Rhodamine B solution, (b) mixture with 10 mg Fe_3O_4@SiO_2 HMNSs, (c) magnetic separation of the Fe_3O_4@SiO_2 HMNSs from the Rhodamine B solution under an external magnetic field.