Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A

Facile and Controllable Fabrication of Gold Nanoparticles-Immobilized Hollow Silica Particles and their High Catalytic Activity

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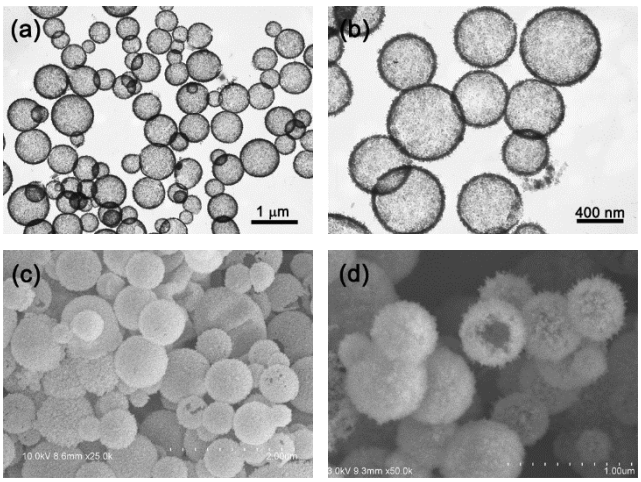

Figure S1 TEM (a, b) and SEM (c, d) images of SiO_2HPs prepared using TEOS as single precursor (i.e., w_a=0 wt%)

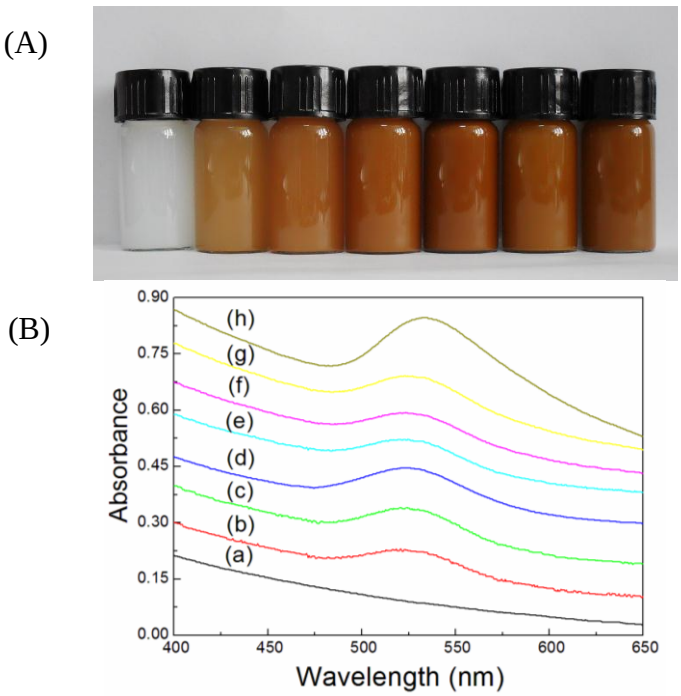

Figure S2 (A) digital photos (left to right) and (B) UV–vis absorption spectra (a to h) of SiO_2HP/AuNPs composite particles synthesized by in situ reduction of $HAuCl_4$ on the SiO_2HPs prepared using w_a of 0, 5, 10, 20, 30, 40, and 50 wt% respectively

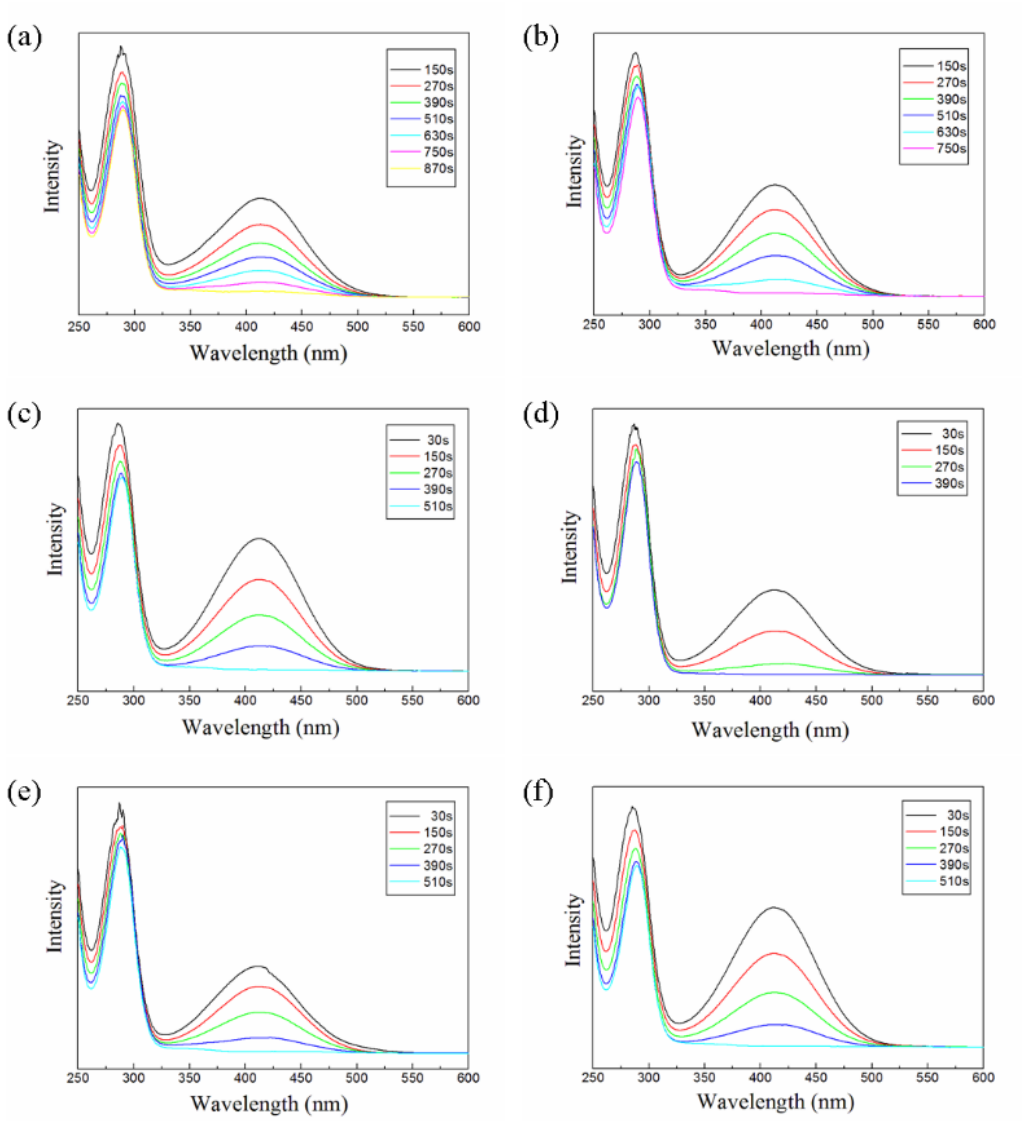

Figure S3 Time-dependent UV-vis absorption spectral changes of the reaction mixture of 2NA/$NaBH_4$ 5 catalyzed by SiO_2HP/AuNPs composite particles (SiO_2HP sprepared using w_a of 5 (a), 10 (b), 20 (c), 30 (d), 40 (e) and 50 wt% (f), respectively)

Table S1 Catalytic activity of SiO_2HP/AuNPs with different w_a

w_a of SiO2HP/AuNPs (wt%)	k_{app}($s^{-1}\times10^{-3}$)
5	3.91
10	5.39
20	7.50
30	11.28
40	8.66
50	7.60

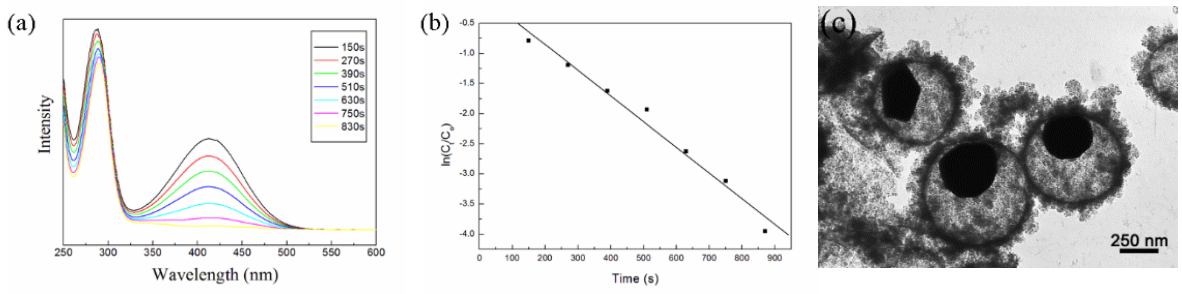

Figure S4 Time-dependent UV-vis absorption spectral changes (a) and plot (▪) of $\ln(C_t/C_0)$ versus reaction time (b) of the reaction mixture of 2NA/NaBH4 catalyzed by SiO_2HP/AuNPs composite particles and TEM images (c) of the composite particles(w_a=50 wt%)

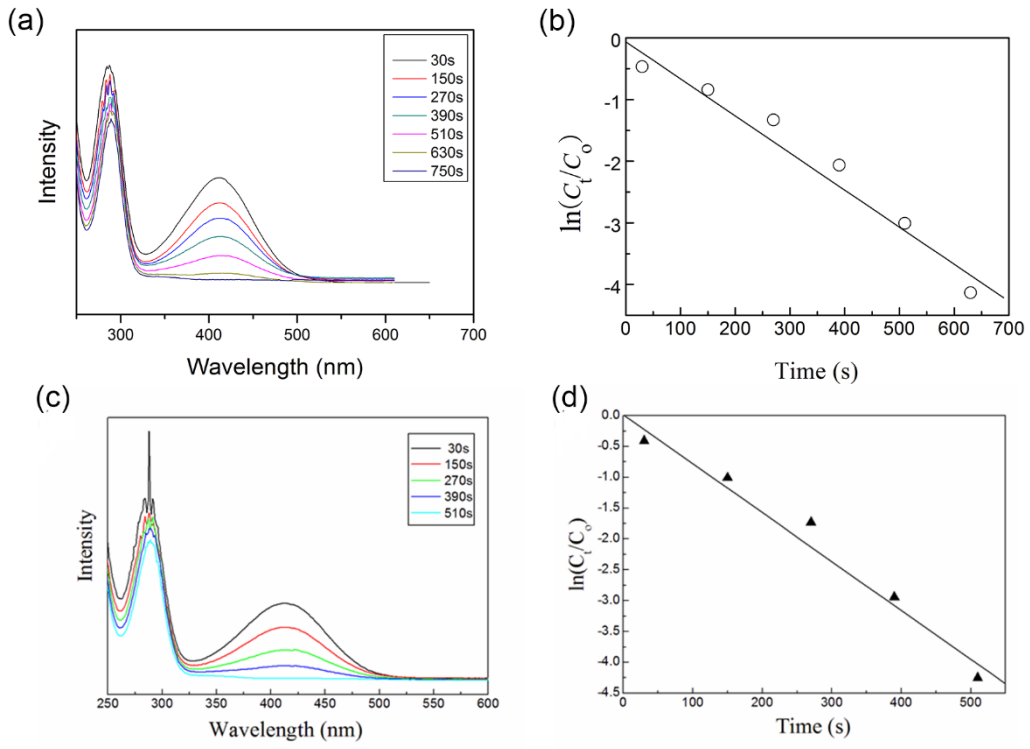

Figure S5 Time-dependent UV-vis absorption spectral changes (a, c) and plot of $\ln(C_t/C_0)$ versus reaction time (b, d) of the reaction mixture of 2NA/$NaBH_4$ after recycling the SiO_2HP/AuNPs composite particles with w_a=20 wt% (a, b) and w_a=30 wt% (c, d) for five times

Table S2 Catalytic activities compared with references

No.*	**Catalyst**	**Concentration mg/mL**	**2NA mM**	**$NaBH_4$ mM**	**K_{app} 10^{-3} s^{-1}**
1	$Au@SiO_2$	0.500	3.0	50	1.69
2	$AAMO/Au/mSiO_2$	0.133	4.0	33	1.27
3	$Au–NH_2$-HMSNs	0.200	2.4	12	6.7
4	Au@HSNs	0.118	3.0	15	2.45
p	SiO_2HP/AuNPs (30 wt%)	0.133	2.4	66.7	11.3

* REF: [1] L. Tan, D. Chen, H. Liu and F. Tang, *Adv. Mater.* **2010**, 22, 4885; [2] L. Wang, J. Shi, Y. Zhu, Q. He, H. Xing, J. Zhou, F. Chen, Y. Chen, *Langmuir*. **2012**, 28, 4920; [3] X. Du, J. He, *Nanoscale*. **2012**, 4, 852; [4] X. Du, L. Yao, J. He, *Chem. Eur. J.* **2012**, 18, 7878; [p] Our result in this article

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