Supporting Information

A Novel Hierachically-nanostructured $Pt/SiO_2/Fe_3O_4$ Catalyst with High Activity and Recyclability towards the Hydrosilylation

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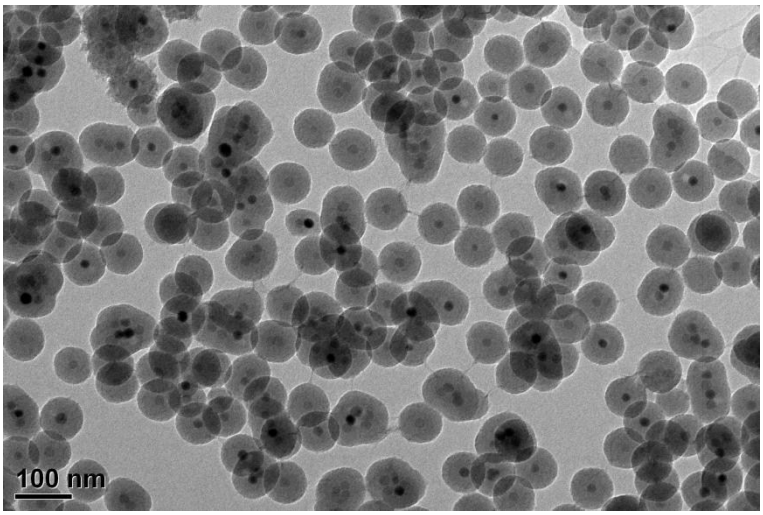
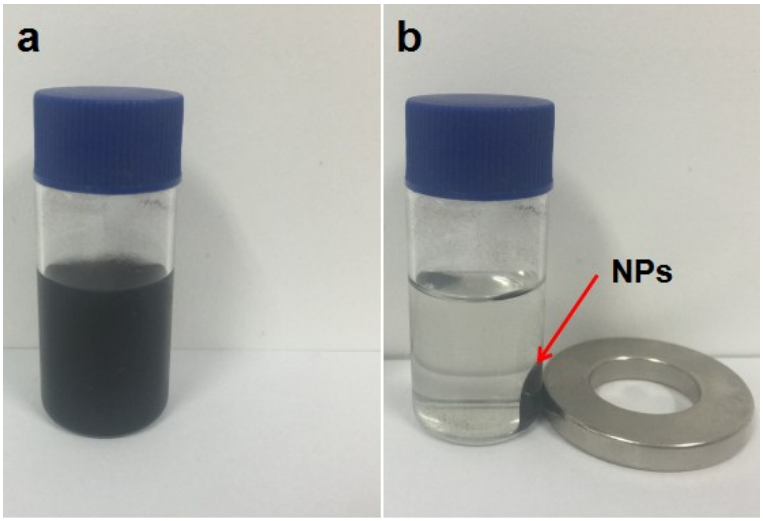
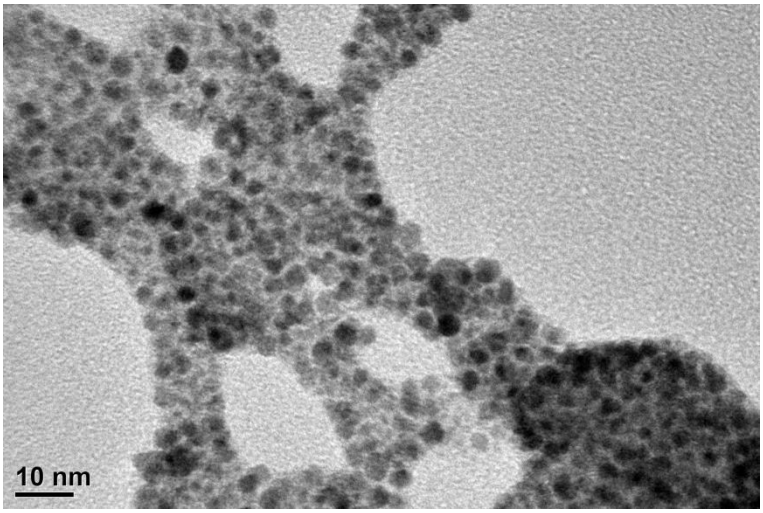


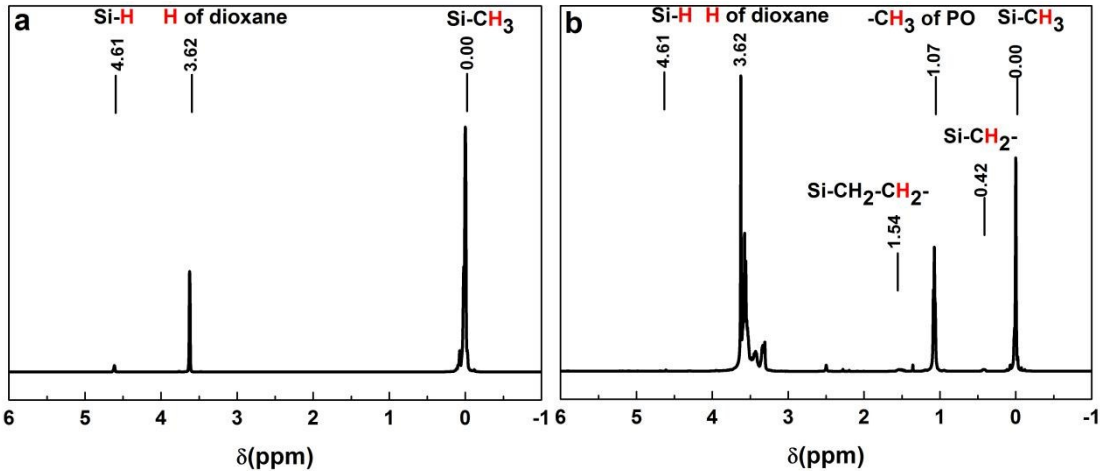
SI 1 The shell thickness increased with increasing TEOS content from 20 μL to 50 μL.



SI 2 Photographs of the nanoparticle solutions (a) before and (b) after magnetic separation by an external magnetic field.



SI 3 TEM image of Pt NPs without SiO_2/Fe_3O_4 support.



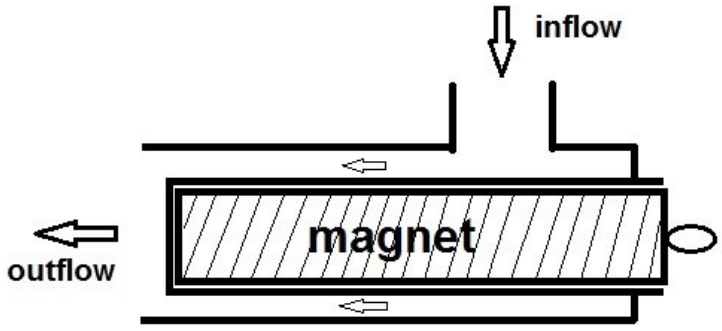
SI 4 ^1H NMR spectra of (a) low-hydro silicone oil, (b) the hydrosilylation product with dioxane as the internal standard.

$$\frac{S_A}{S_B} = \frac{W_1 \times wt\%_{Si\text{-}H}}{\frac{W_0}{88} \times 8}$$

$$\Rightarrow wt\%_{Si\text{-}H} = \frac{S_A \times W_0}{S_B \times W_1 \times 11} \times 100\%$$

The $wt\%_{Si\text{-}H}$ means the amount of Si-H in sample. S_A and S_B mean the integral area of H peak corresponding to the Si-H and dioxane respectively. W_0 and W_1 mean the weight of standard dioxane and sample respectively.

SI 5 The calculation equation of the amount of Si-H.



SI 6 The simplified model of magnetic separation devices.

Time (h)	n_t (mmol)	Yield (%)	TON	TOF (h^{-1})
1	9.7978	56.26	1006.01	1006.01
2	5.7837	74.18	1326.45	663.22
4	2.9344	86.90	1553.90	388.48
6	2.8336	87.35	1561.95	260.32
8	2.5312	88.70	1586.09	198.26

$Yield = \frac{n_0 - n_t}{n_0} \times 100\%$, n_0 = 22.4 mmol means the mole of original Si-H and n_t means the mole of Si-H after the reaction.

$TON = \frac{n_0 - n_t}{n_c}$, $TOF = \frac{TON}{t}$, $n_c = \frac{104mg \times 2.35\%}{195.1g/mol}$, n_c means the mole of Pt and t means reaction time.

SI 7 The TON and TOF analyses.

Reuse cycles	low-hydrogen-content silicone oil (g)	allyl polyether (g)	Toluene (mL)	2,6-Di-tert-butyl-4-methylphenol (g)	Catalyst (mg)	Catalyst collection (mg)	Recovery (wt%)
1	16	41	28	0.2	104.00	103.60	99.62
2	16	41	28	0.2	103.60	102.76	99.19
3	16	41	28	0.2	102.76	102.11	99.37
4	16	41	28	0.2	102.11		
5	16	41	28	0.2			
6	16	41	28	0.2			
7	16	41	28	0.2			

SI 8 The amount of reactants and the recovery of catalyst.