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Supporting Information

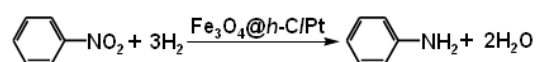
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Fabrication of Magnetic Yolk-Shell Nanocatalyst with Spatially Resolved Functionalities and High Activity for Nitrobenzene Hydrogenation

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Calculation of hydrogen consumption during the catalytic test. The hydrogenation of nitrobenzene follows the reaction below:



The stoichiometry of nitrobenzene and H_2 is 1:3 according to the above reaction formula. So the amount of consumed H_2 are estimated 0.162 mmol ($0.6 \text{ mmol} \times 9\% \times 3 = 0.162 \text{ mmol}$) in first run under H_2 .

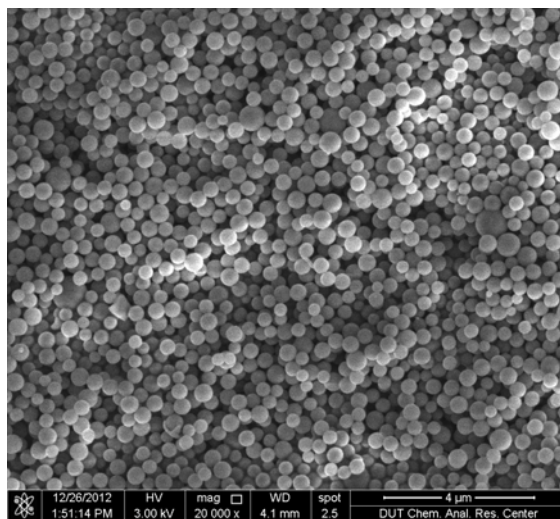


Figure S1. SEM image of $\text{Fe}_3\text{O}_4@h\text{-C}/\text{noble metal}$.

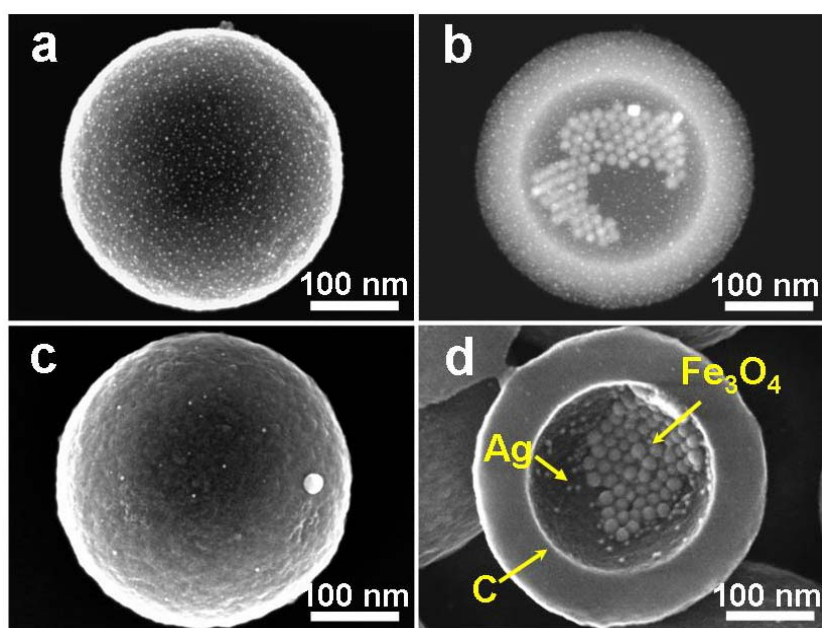


Figure S2. SEM and HAADF-STEM images of a, b) $\text{Fe}_3\text{O}_4@h\text{-C}/\text{Pd}$; SEM images of c) $\text{Fe}_3\text{O}_4@h\text{-C}/\text{Ag}$ and d) $\text{Fe}_3\text{O}_4@h\text{-C}/\text{Ag}$ after cutting the hollow carbon spheres into hemisphere.

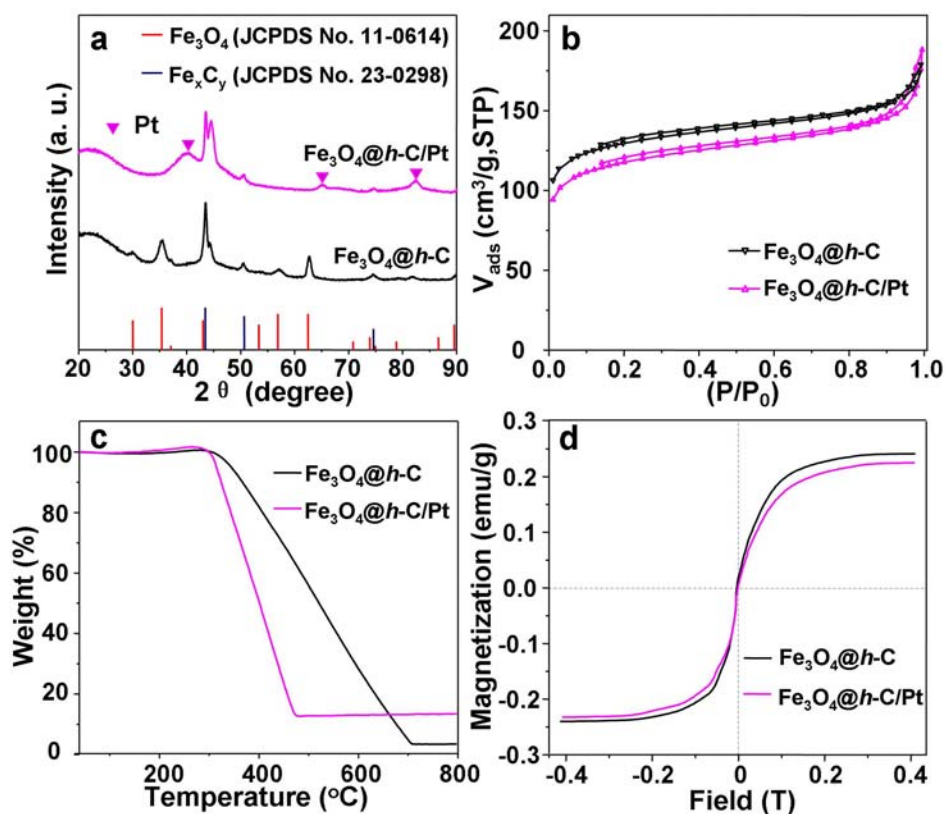


Figure S3. a) XRD patterns, b) N₂ sorption isotherms, c) TG curves, and d) magnetic hysteresis curves of Fe₃O₄@h-C and Fe₃O₄@h-C/Pt.

Table S1. Textural parameters of Fe₃O₄@h-C and Fe₃O₄@h-C/Pt.

No	$S_{\text{BET}}(\text{m}^2 \cdot \text{g}^{-1})$	$S_{\text{mic}}(\text{m}^2 \cdot \text{g}^{-1})$	$V_{\text{total}}(\text{cm}^3 \cdot \text{g}^{-1})$	$V_{\text{mic}}(\text{cm}^3 \cdot \text{g}^{-1})$
Fe ₃ O ₄ @h-C	440	312	0.25	0.14
Fe ₃ O ₄ @h-C/Pt	401	270	0.24	0.12

Table S2. A comparative list of the nitrobenzene hydrogenation at atmospheric pressure.

Catalyst	Weight of catalyst	Loading quantity	nitrobenzene	Temperature	Reaction time	Conversion	TOF (h ⁻¹)*	Ref.
Fe ₃ O ₄ @h-C/Pt	25 mg	1.59 wt%	0.6 mmol	30 °C	2 h	38 %	285	This study
Pt/CNTs	25 mg	3.1 wt%	0.25 ml (2.5 mmol)	50 °C	3 h	100 %	213	[1]
Pd/H ₂ N-SiO ₂ /Fe ₂ O ₃	2.2 mg (2 mmol Pd)	—	2 mmol	Room temperature	90 min (1.5 h)	100 %	0.67	[2]

* TOF values were calculated on the basis of the total metal using the molar ratio of the converted substrate over the catalyst divided by the reaction time.

[2] D. K. Yi, S. S. Lee, and J. Y. Ying, *Chem. Mater.* **2006**, *18*, 2459-2461.