

Electronic Supplementary Information

Hollow Mesoporous SiO₂ Spheres Catalyst Nanoarchitecture with Encapsulated Silver Nanoparticles for Catalytic Reduction of 4- nitrophenol

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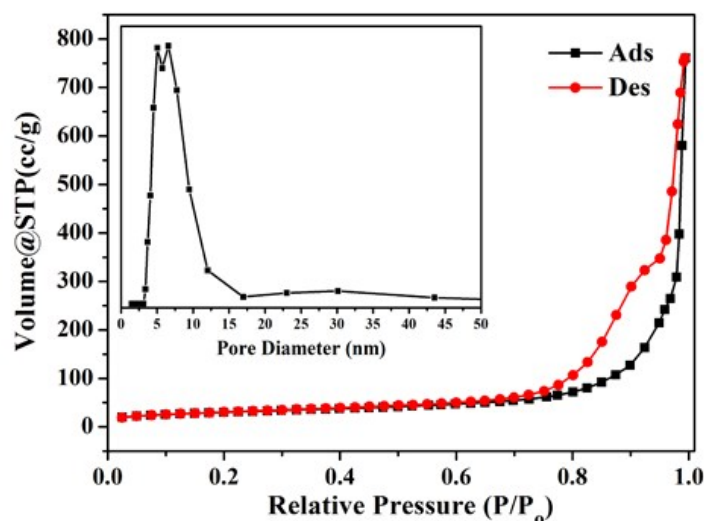


Fig. S1 N₂ adsorption/desorption isotherm of the as-prepared *hm*-SiO₂ spheres using C₁₈TMS as the structural-directing agent. The inset shows the pore size distribution calculated by the Barrett-Joyner-Halenda (BJH) method from the desorption branch of the isotherm.

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† Footnotes relating to the title and/or authors should appear here.

Electronic Supplementary Information (ESI) available: N₂ adsorption/desorption isotherm of the as-prepared *hm*-SiO₂ spheres; SEM image and EDS analysis of the deposition of AgI NPs on *hm*-SiO₂ spheres outer surfaces; Ag NP numbers in an individual Ag@*hm*-SiO₂ sphere; N₂ adsorption/desorption isotherm of the Ag@*hm*-SiO₂ spheres before and after laser ablation treatment. See DOI: 10.1039/x0xx00000x

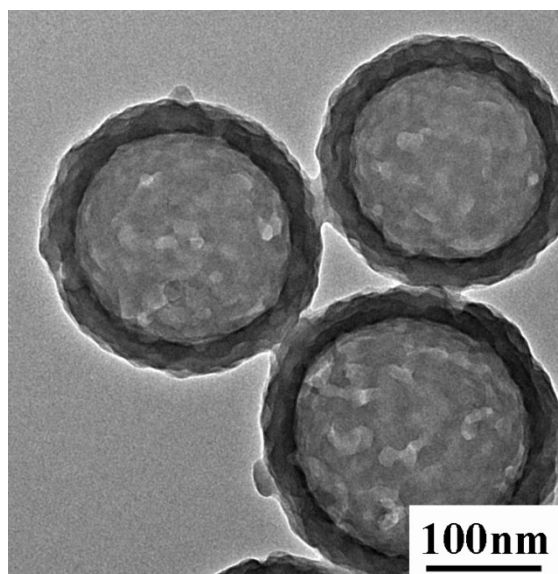


Fig. S2 TEM image of the partial nearly nonporous hollow silica spheres.

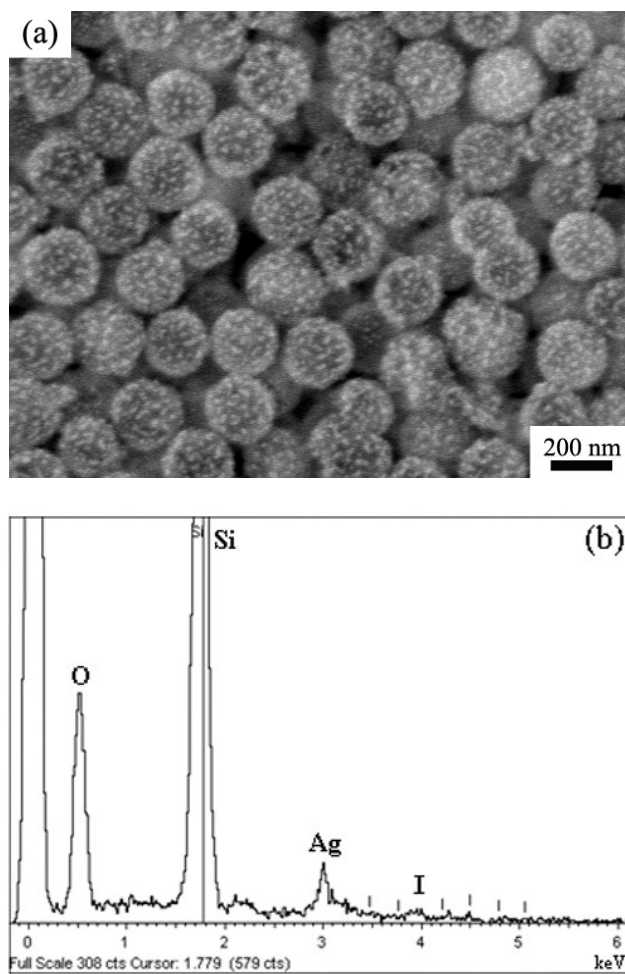


Fig. S3 (a) SEM image and (b) EDS analysis of the deposition of AgI NPs on *hm*-SiO₂ spheres outer surfaces.

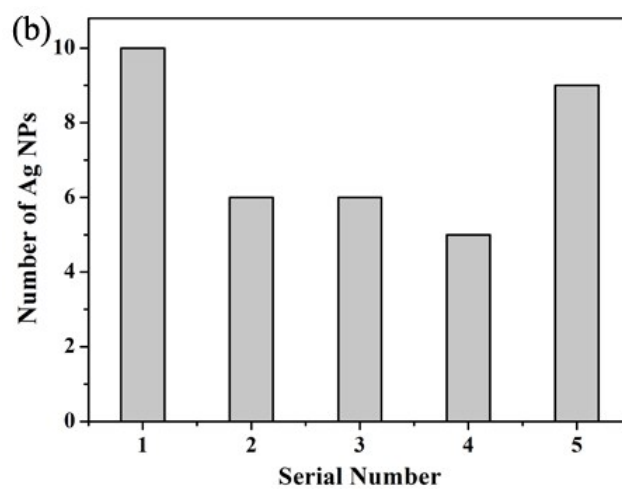
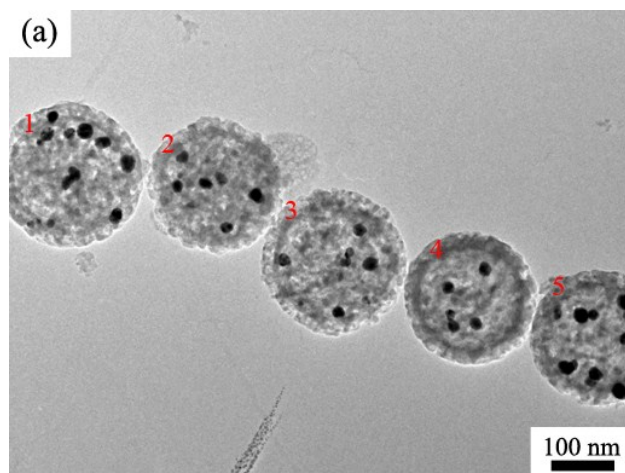


Fig. S4 (a) TEM image and (b) the corresponding Ag NP numbers in an individual $\text{Ag}@hm\text{-SiO}_2$ sphere as marked numbers.

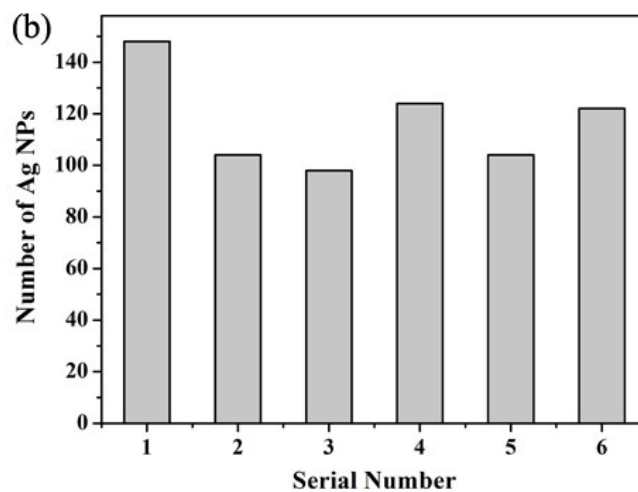
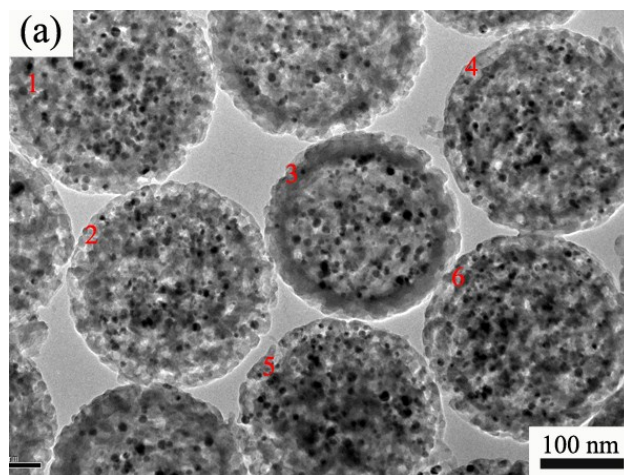


Fig. S5 (a) TEM image and (b) the corresponding number of Ag NPs in an individual Ag@hm-SiO₂ sphere as marked numbers.

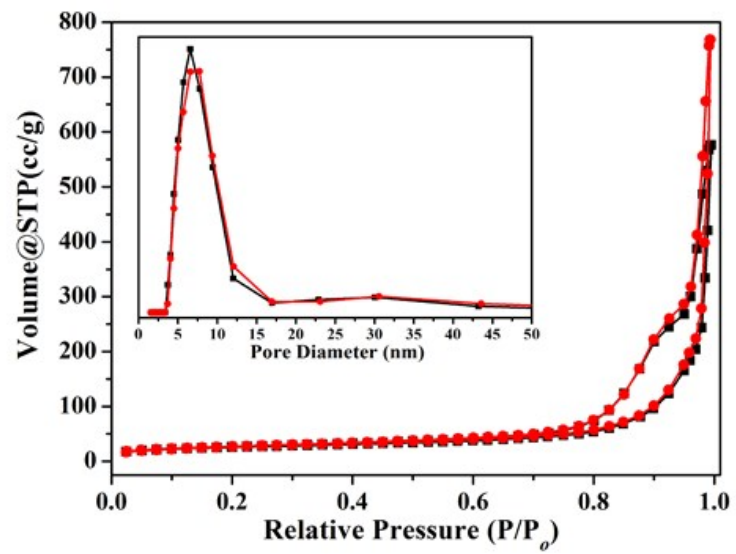


Fig. S6 N₂ adsorption/desorption isotherm of the Ag@hm-SiO₂ spheres before (■) and after (●) laser ablation treatment; the inset showing the corresponding pore size distribution.

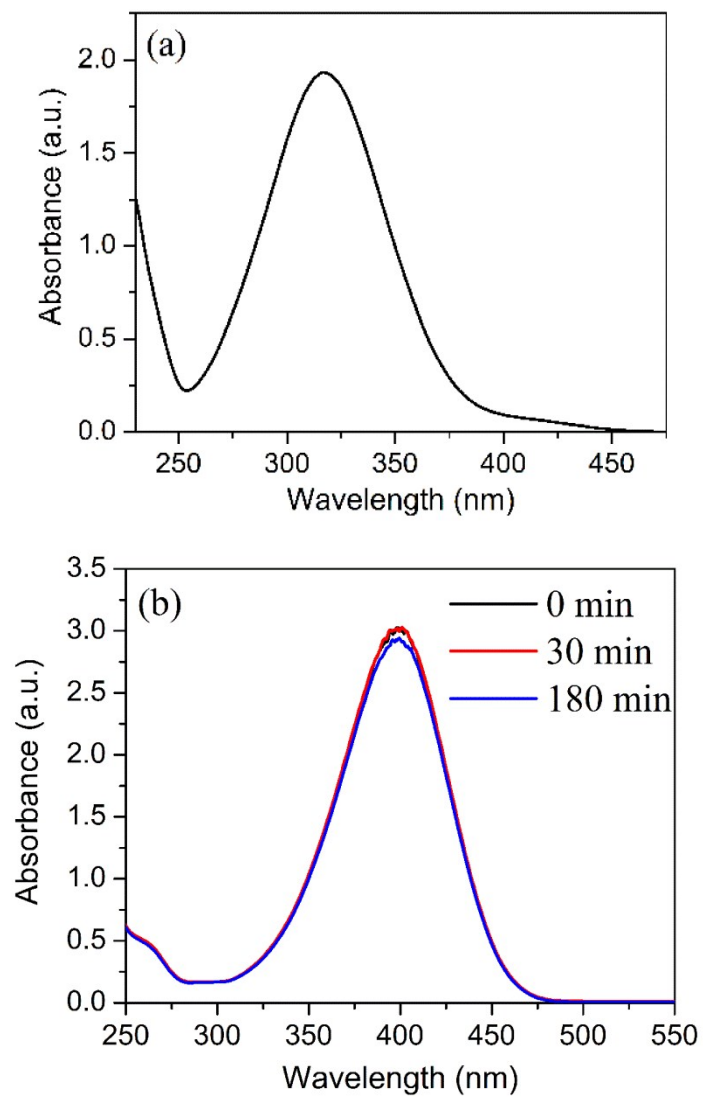


Fig. S7 UV-Vis spectra: (a) the pristine 4-NP aqueous solution; (b) 4-NP solution with NaBH₄ in the absence of any catalyst.

Table. S1 The rate constants of 4-NP reduced by different catalysts

Catalyst	Rate constants [k , min ⁻¹]	References
Au@SiO ₂ -epoxide	0.3	A. K. Ganai ^{25a}
Pd@TiO ₂ /Pd@TiO ₂	0.307	B. C. Liu ^{25b}
SiO ₂ @RGO@AgNP	0.7	W. Xiao ^{25c}
MCM-41 supported Ag nanocomposite	0.26	N. J. Hao ^{25d}
Ag/0.5CeO ₂ -SBA-15	0.41	X. F. Qian ^{25e}
Ag-PCL	0.32	L. L. Shi ^{4a}
Ag-tipped Au nanorods	0.324	X. Guo ^{25f}
Au@mSiO ₂ micelle	0.108	Q. Zhang ^{25g}
Au-POMA hollow hybrids with Au	0.38	J. Han ^{25h}
PDA@Fe ₃ O ₄ @Au@SiO ₂	0.38	L. Huang ²⁵ⁱ
YS-Au@Ph-PMOs	0.3	H. B. Zou ^{25j}
Ag@ <i>hm</i> -SiO ₂	1.08	This Work