

Supporting Information

Surface Cavities of Ni(OH)₂ Nanowires Can Host Au Nanoparticles as
Supported Catalysts with High Catalytic Activity and Stability

Na Han, Shiyi Cao, Jie Han,* Yimin Hu, Xiaohong Zhang and Rong Guo*

School of Chemistry and Chemical Engineering, Yangzhou University, Yangzhou, Jiangsu,
225002, P. R. China. E-mail: hanjie@yzu.edu.cn

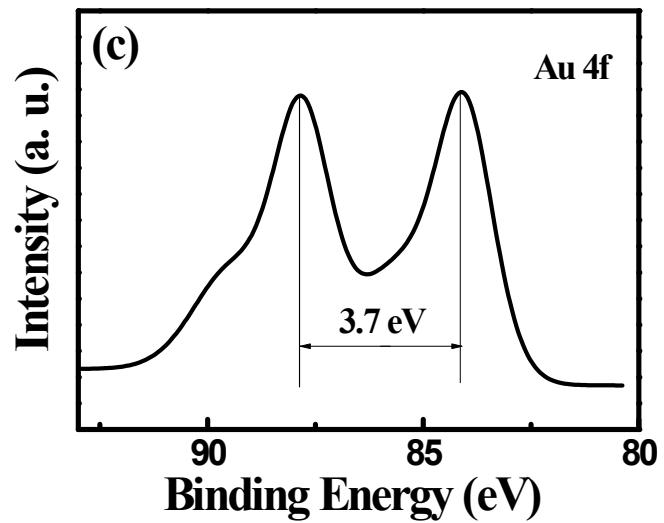


Figure S1 XPS spectrum of Au 4f for Au/*m*-Ni(OH)₂.

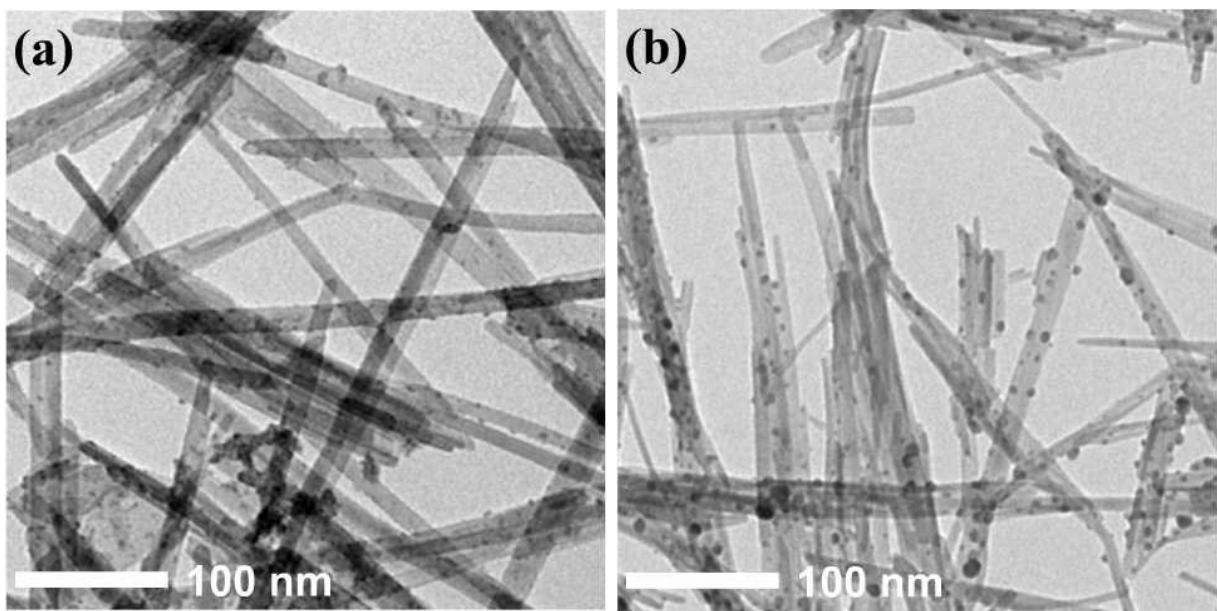


Figure S2 TEM images of (a) Pd/*m*-Ni(OH)₂ and (b) Ag/*m*-Ni(OH)₂ hybrids.

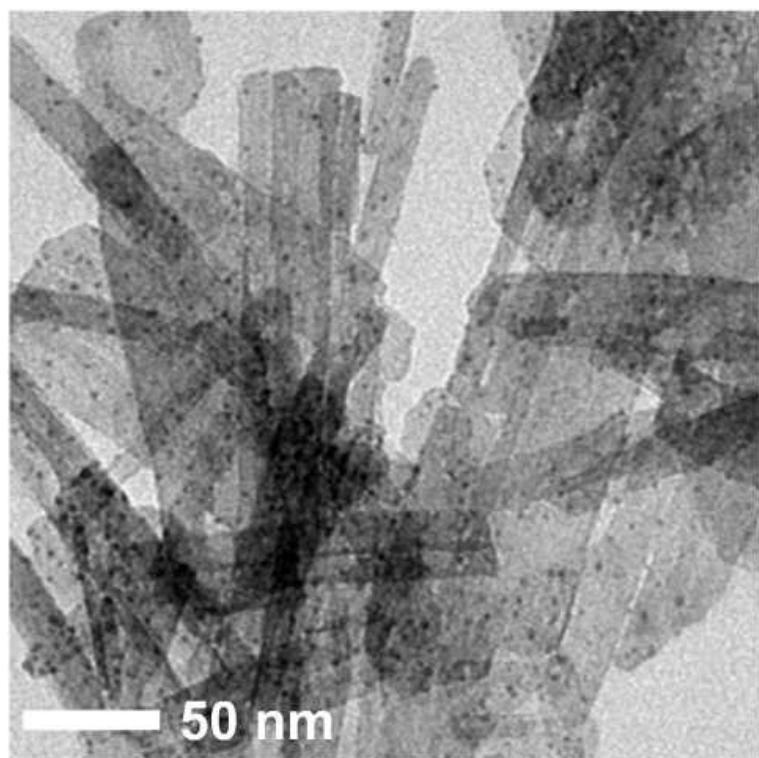


Figure S3 TEM image of Au/*m*-Ni(OH)₂ hybrids after aged for six months.

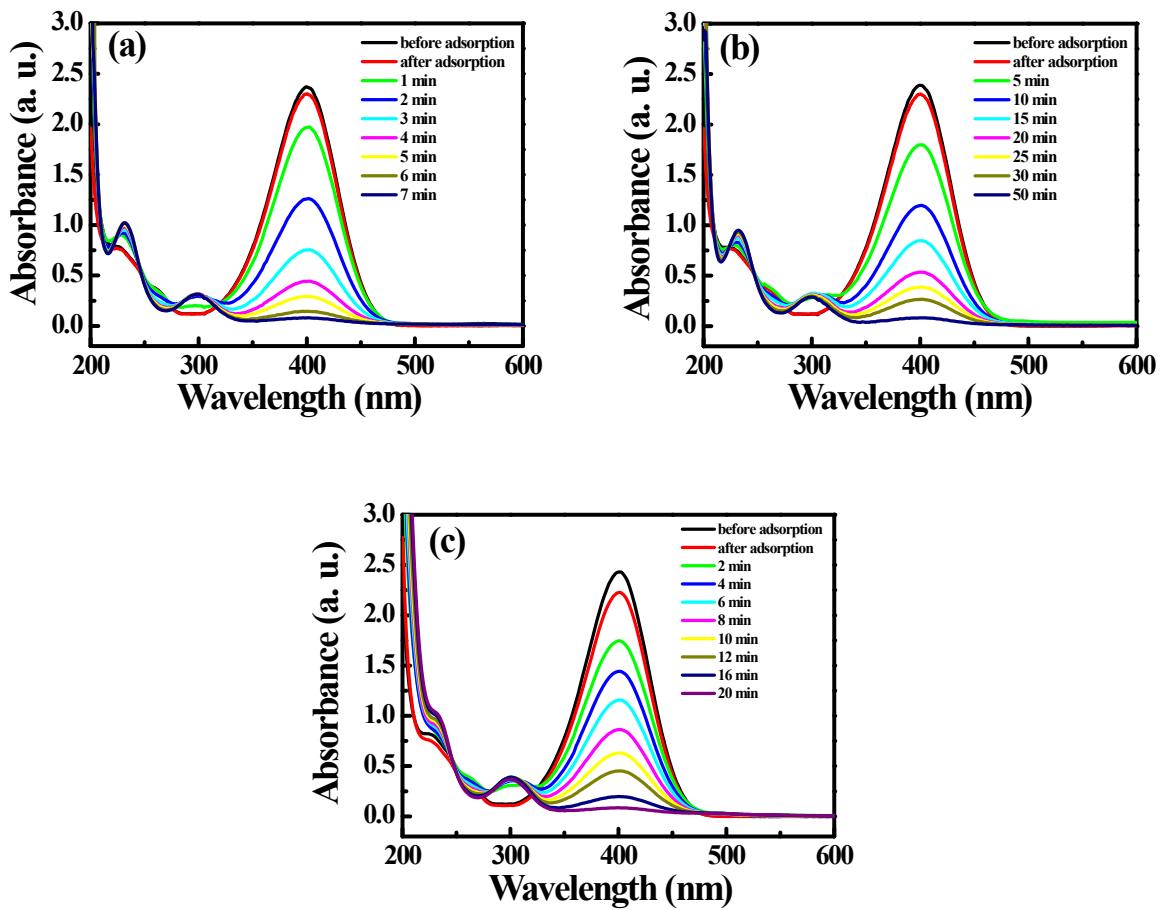


Figure S4 UV-vis spectra showing gradual reduction of 4-NP with different catalysts in the first run: (a) Au/m-Ni(OH)₂, (b) Au/Ni(OH)₂, and (c) Au-PVP/m-Ni(OH)₂.

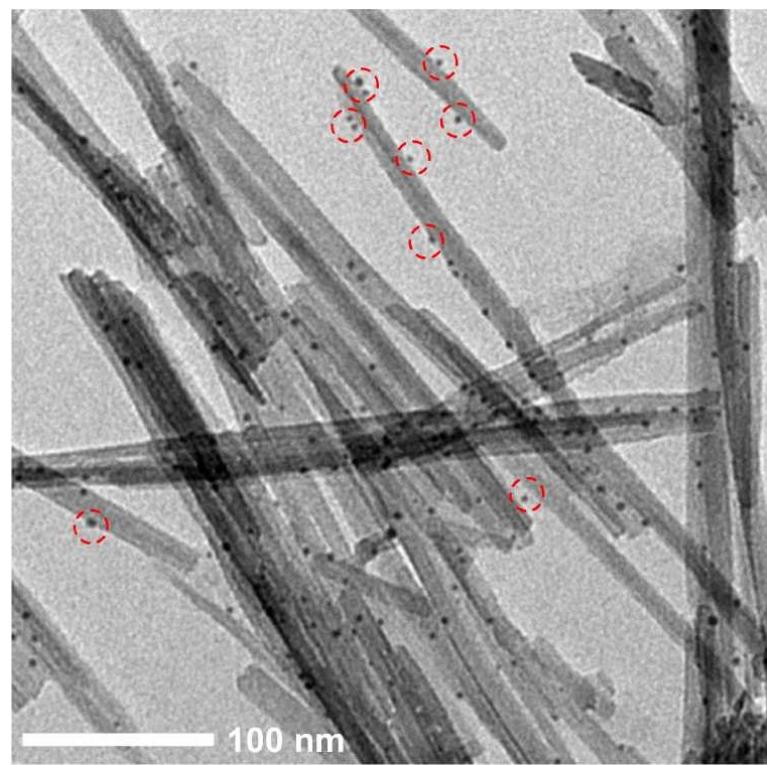


Figure S5 TEM image of Au-PVP/*m*-Ni(OH)₂ hybrids.

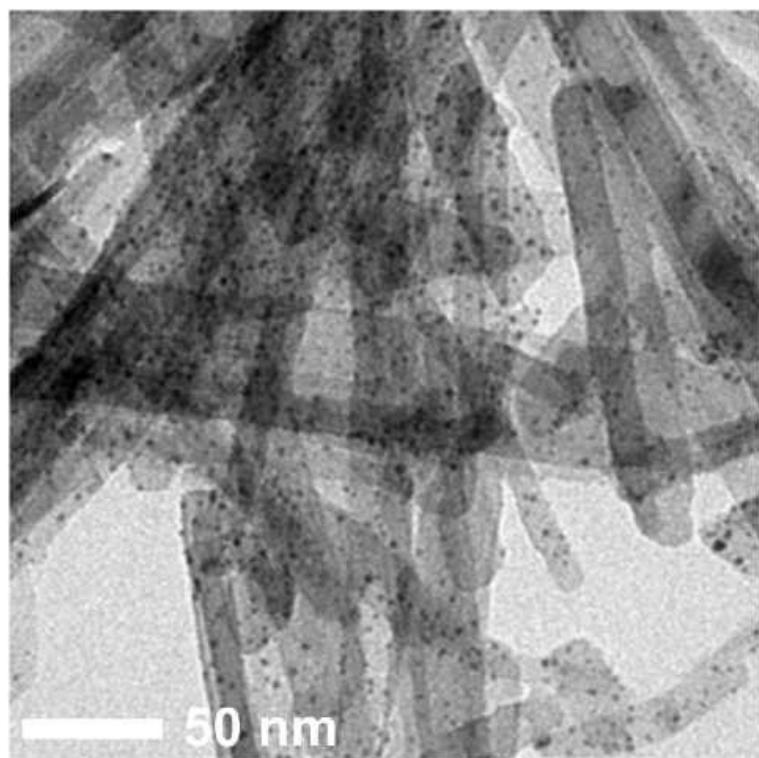


Figure S6 TEM image of Au/*m*-Ni(OH)₂ nanocatalysts after ten runs of catalytic reactions.

Table S1 Comparison of catalytic activities of different mesoporous material-supported noble metal nanoparticles involved in the reduction of 4-nitrophenol in the presence of NaBH₄.

Support	Noble metal	Catalyst size (nm)	k (min ⁻¹)	TON	TOF ^b (s ⁻¹)	Reference
SBA-15	Ag	7.6	0.45	4.4	0.0012	1
SBA-15	Ag	9.9	0.54	5.6	0.0157	2
SBA-15	Pd	8.0	0.72	0.10	0.0002	3
SBA-15	Au	2	0.21	0.10	0.0003	4
m-Al ₂ O ₃	Ag	15	0.31	0.13	0.00003	5
m-Ni(OH) ₂	Au	2	0.49	227	0.54	this work

^aTON = (mole of product)/(mole of catalyst); ^bTOF = TON/(reaction time).

References

- [1] B. Naik, S. Hazra, V. S. Prasad, N. N. Ghosh, *Catal. Commun.* **2011**, *12*, 1104–1108.
- [2] J. Han, P. Fang, W. J Jiang, L.Y. Li, R. Guo, *Langmuir* **2012**, *28*, 4768–4775.
- [3] J. Morère, M. J. Tenorio, M. J. Torralvo, C. Pando, J. A. R. Renuncio, A. Cabanas, *J. Supercrit. Fluids* **2011**, *56*, 213–222.
- [4] L. F. Chen, J. Hu, Z. W. Qi, Y. J. Fang, R. Richards, *Ind. Eng. Chem. Res.* **2011**, *50*, 13642–13649.
- [5] B. Naik, V. S. Prasad, N. N. Ghosh, *Powder Technol.* **2012**, *232*, 1–6.