

Supporting Information

In Situ Formation of Gold Nanoparticles on Magnetic Halloysite Nanotubes via Polydopamine Chemistry for Highly Effective and Recyclable Catalysis

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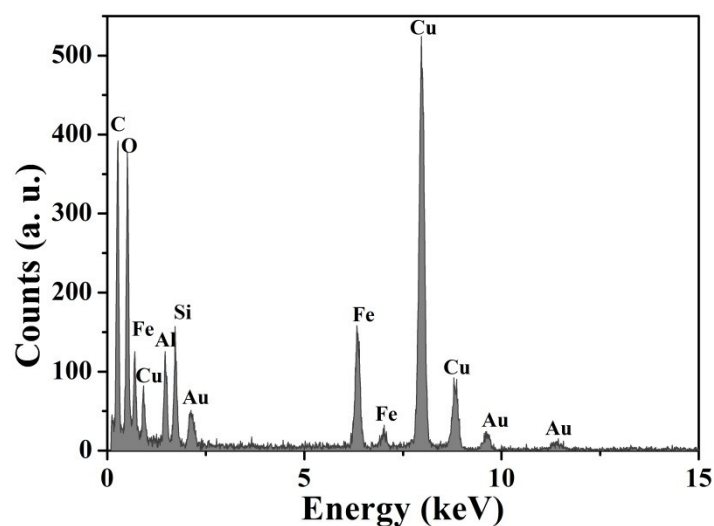


Figure S1. EDX spectrum of MHNTs-PDA-Au composite

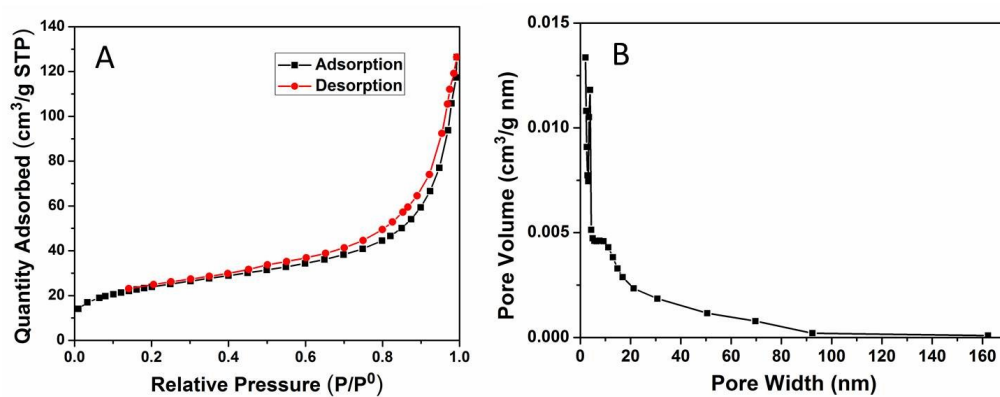
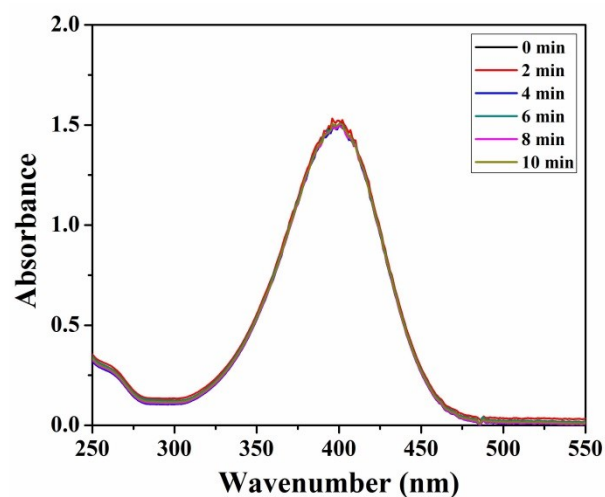


Figure S2. N₂ adsorption-desorption isotherms (A) and the pore width distribution curve obtained from the desorption data through the BJH method (B).



FigureS3. Time-dependent of UV-vis spectra changes of 4-NP in the presence of MHNTs-PDA

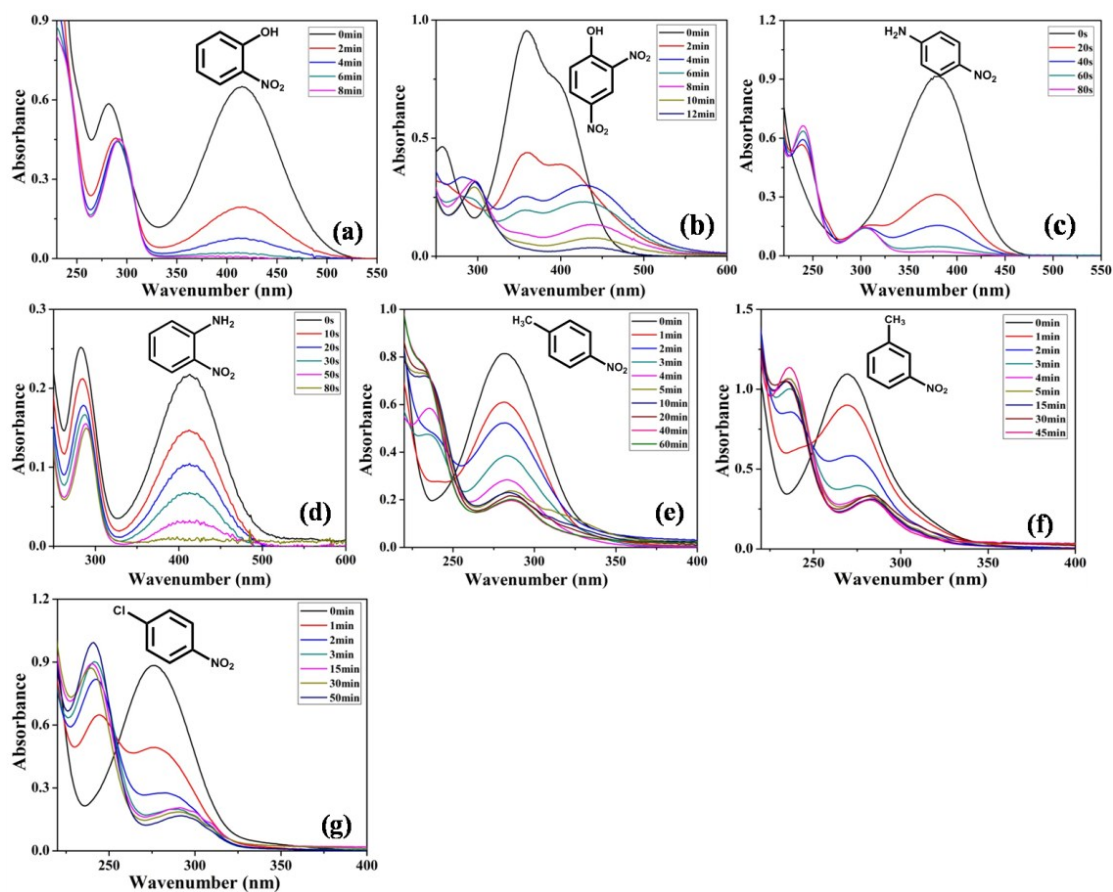


Figure S4. Time-dependent of UV-vis spectra changes of various nitrobenzene derivatives in the presence of MHNTs-PDA-Au.

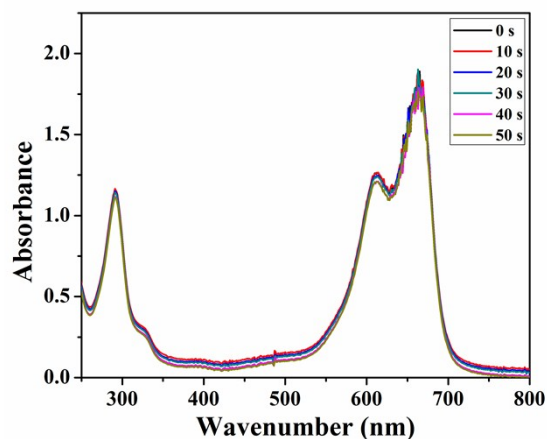


Figure S5. Time-dependent of UV-vis spectra changes of MB in the presence of MHNTs-PDA

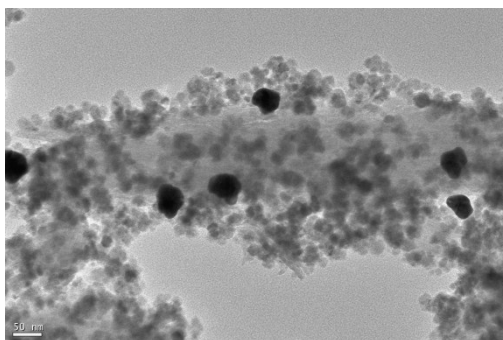


Figure S6. TEM image of MHNTs-PDA-Au after recycling for eight cycles in the reduction of 4-nitrophenol.

Table S1. Comparison of rate constant for nitrophenol reduction of supported Au nanocatalysts.

Catalyst	Moles of nitrophenol	Content of Supported Au /g	Required time	k /s^{-1}	Ref.
MHNTs-PDA-Au	1.5×10^{-7} mol	5.8×10^{-6}	10 min	7.4×10^{-3}	This work
Au@SiO ₂ NPs	2.0×10^{-7} mol	2.7×10^{-5}	33 min	1.9×10^{-3}	1
Au/graphene hydrogel	2.8×10^{-7} mol	2.4×10^{-5}	12 min	3.1×10^{-3}	2
Fe ₃ O ₄ @P(EGDMA-co-MAA)/Au	7.5×10^{-7} mol	4.5×10^{-5}	3 min	5.9×10^{-3}	3
dumbbell-like Fe ₃ O ₄ -Au	4.0×10^{-7} mol	$3.8-9.6 \times 10^{-4}$	10 min	10.5×10^{-3}	4

Table S2. Comparison of rate constant for methylene blue (MB) reduction of supported Au nanocatalysts.

Catalyst	Mass of MB/g	Content of Supported Au /g	Required time	k /s^{-1}	Ref.
MHNTs-PDA-Au	6.0×10^{-5}	1.16×10^{-5}	50 s	8.0×10^{-2}	This work
Au@ppy/Fe ₃ O ₄	6.0×10^{-5}	4.6×10^{-5}	42 min	4.4×10^{-3}	5
Au@TA-GH	20.0×10^{-5}	3.2×10^{-5}	9 min	5.16×10^{-3}	6

References:

1. Z. Wang, H. Fu, D. Han and F. Gu, *J. Mater. Chem. A*, 2014, 2, 20374-20381.
2. J. Li, C. Y. Liu and Y. Liu, *J. Mater. Chem.*, 2012, 22, 8426-8430
3. H. Woo and K. H. Park, *Catal. Commun.*, 2014, 46, 133-137.
4. F. H. Lin and R. A. Doong, *J. Phys. Chem. C*, 2011, 115, 6591-6598.
5. T. Yao, T. Cui, H. Wang, L. Xu, F. Cui and J. Wu, *Nanoscale*, 2014, 6, 7666-7674.
6. J. Luo, N. Zhang, J. Lai, R. Liu and X. Liu, *J. Hazard. Mater.*, 2015, 300, 615-623.