

Supporting Information.

Covalent Organic Framework-Functionalized Magnetic CuFe₂O₄/Ag Nanoparticles for the Reduction of 4-Nitrophenol

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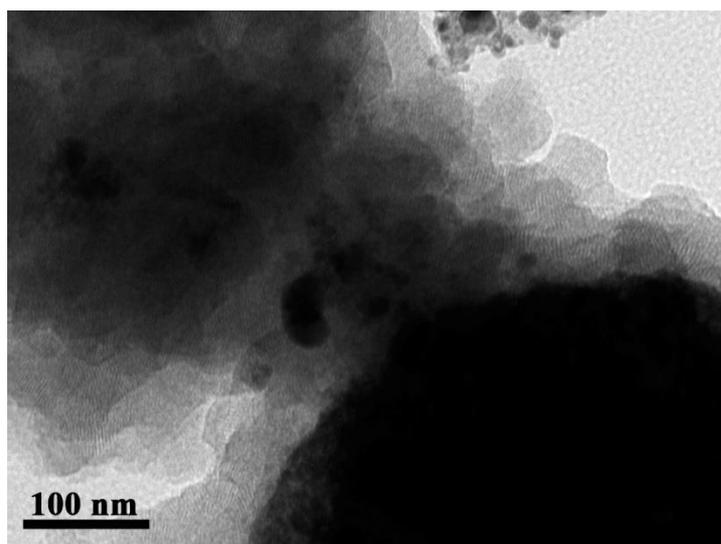


Figure S1 TEM image of the CuFe₂O₄/Ag@COF.

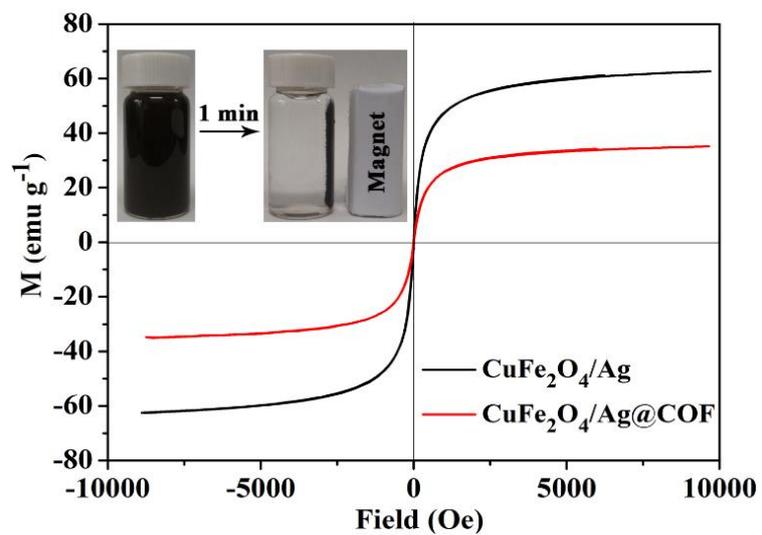


Figure S2. Magnetic hysteresis loops of $\text{CuFe}_2\text{O}_4/\text{Ag}$ and $\text{CuFe}_2\text{O}_4/\text{Ag}@COF$ (the inset shows the magnetic separation behavior of $\text{CuFe}_2\text{O}_4/\text{Ag}@COF$ in aqueous solution).

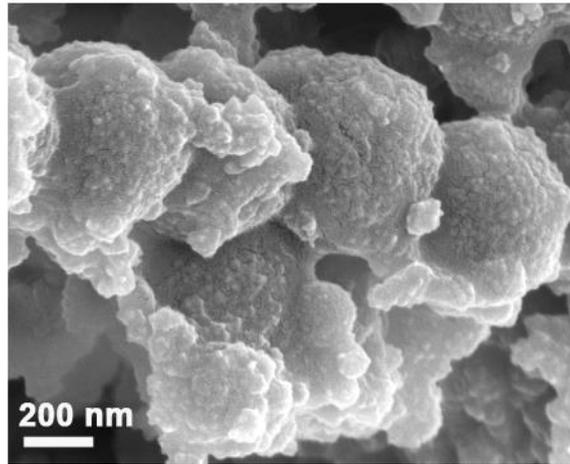


Figure S3. SEM image of the recycled CuFe₂O₄/Ag@COF after six times reuse.

Table S1. Nitrogen adsorption-desorption data of CuFe₂O₄/Ag and CuFe₂O₄/Ag@COF.

| | BET surface area (m ² g ⁻¹) | Pore volume (cm ³ g ⁻¹) | Pore size (nm) |
|--|---|---|-------------------|
| CuFe ₂ O ₄ /Ag | 38.60 | 0.0862 | 8.98 |
| CuFe ₂ O ₄ /Ag@COF | 464.21 | 0.396 | 3.15 |

Table S2. Comparison of k value of different catalytic systems for the reduction of 4-NP (298K).

| Entry | Nanocatalysts | k (min ⁻¹) | Reference |
|-------|--|--------------------------|-----------|
| 1 | Ag/C | 0.33 | [1] |
| 2 | Fe ₃ O ₄ @SiO ₂ @Ag | 0.52 | [2] |
| 3 | Fe ₃ O ₄ @PDA-Pd@[Cu ₃ (btc) ₂] | 0.72 | [3] |
| 4 | Au/TAPB-DMTP-COF | 0.46 | [4] |
| 5 | Au@TpPa-1 | 0.25 | [5] |
| 6 | CuFe ₂ O ₄ /Ag@COF | 0.77 | This work |

References

- [1] Yue, C.; Tu, J.; Wang, M. One-pot synthesis of ordered mesoporous silver nanoparticle/carbon composites for catalytic reduction of 4-nitrophenol. *J. Colloid Interf. Sci* **2014**, *423*, 54-59, DOI 10.1016/j.jcis.2014.02.029.
- [2] Zhang, K.; Wang, C.; Rong, Z.; Xiao, R.; Zhou, Z.; Wang, S. Silver coated magnetic microflowers as an efficient and recyclable catalyst for catalytic reduction. *New J. Chem* **2017**, *41*, 14199-14208, DOI 10.1039/c7nj02802d.
- [3] Ma, R.; Yang, P.; Ma, Y. Facile Synthesis of Magnetic Hierarchical Core-Shell Structured Fe₃O₄@PDA-Pd@MOF Nanocomposites: Highly Integrated Multifunctional Catalysts. *ChemCatChem* **2018**, *10*, 1446-1454, DOI 10.1002/cctc.201701693.
- [4] Shi, X.F.; Yao, Y.J.; Xu, Y.L.; Liu, K.; Zhu, G.S.; Chi, L.F.; Lu, G. Imparting Catalytic Activity to a Covalent Organic Framework Material by Nanoparticle Encapsulation. *ACS Appl. Mater. Interfaces* **2017**, *9*, 7481-7488, DOI 10.1021/acsami.6b16267.
- [5] Pachfule, P.; Kandambeth, S.; Díaz, D.D. Highly stable covalent organic framework-Au nanoparticles hybrids for enhanced activity for nitrophenol reduction. *Chem. Commun* **2014**, *50*, 3169-3172, DOI 10.1039/c3cc49176e.