

## Electronic Supplementary Information

### Corundum-type $\text{In}_2\text{O}_3$ tubular and rod-like nanostructures: Synthesis from designed $\text{InOOH}$ and application in photocatalysis

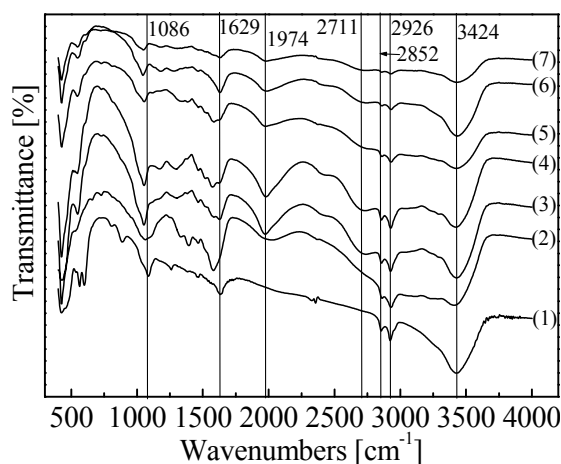
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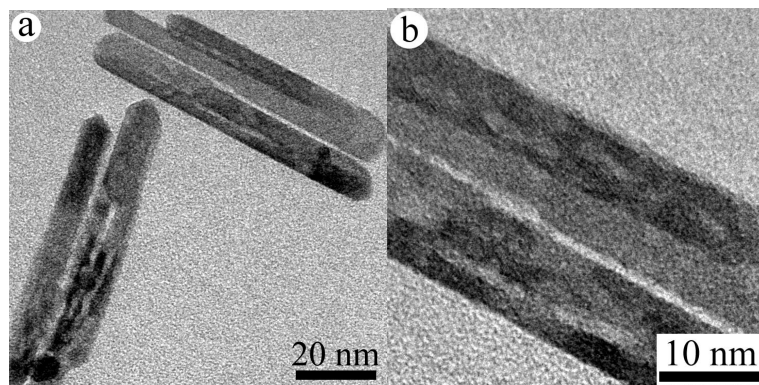
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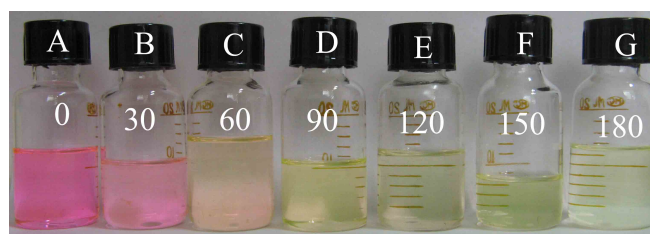


**Figure S1.** FTIR spectra of (1) pure HMDA, and intermediate samples prepared in the solvent of PEG-400 at different reaction stages: (2) 0.5 h, (3) 1 h, (4) 2 h, (5) 3 h, (6) 4 h, and (7) 48 h.

Two peaks at 2922 and 2852  $\text{cm}^{-1}$  are attributed to the  $-\text{CH}_2$  stretching vibration of HMDA, the band around 1629  $\text{cm}^{-1}$  results from the  $-\text{NH}$  deformation vibration, and the peak at 1086  $\text{cm}^{-1}$  is assigned to the C–N stretching vibration.<sup>1</sup> Compared with pure HMDA, the characteristic vibration peaks of HMDA adsorbed on the surface of  $\text{InOOH}$  nanocrystals, such as  $-\text{CH}_2$  stretching vibration,  $-\text{NH}$  deformation vibration, and C–N stretching vibration, are slightly shifted. Also, the IR spectra show the absorption peaks of  $\text{InOOH}$ . In addition to the strong absorption at 3424  $\text{cm}^{-1}$ , the O–H vibration of  $\text{InOOH}$  can also be confirmed by the broad peak at 1974  $\text{cm}^{-1}$  and the weak one at 2711  $\text{cm}^{-1}$ .<sup>2</sup>



**Figure S2.** (a) Low- and (b) high-magnification TEM images of final products.



**Figure S3.** The photograph of RhB solution with different irradiation time in the presence of H-In<sub>2</sub>O<sub>3</sub> 1D tubular and rod-like nanocrystals.

## References

- 1 (a) Z. X. Deng, C. Wang, X. M. Sun and Y. D. Li, *Inorg. Chem.*, 2002, **41**, 869; (b) S. Gorai, D. Ganguli and S. Chaudhuri, *Cryst. Growth Des.*, 2005 **5**, 875; (c) X. Jing, S. Chen and E. Me, *The Workable Index of Infrared Spectra (in Chinese)* Tianjin Science and Technology Press, Tianjin, 1992.
- 2 (a) H. Zhu, K. Yao, H. Zhang and D. Yang, *J. Phys. Chem. B*, 2005, **109**, 20676; (b) V. C. Farmer, (Trans: Y. Ying, S. Wang, C. Li, X. Han, Z. Li and Y. Li,) *The infrared spectra of minerals (in Chinese)* Science Press, Beijing, 1982.