

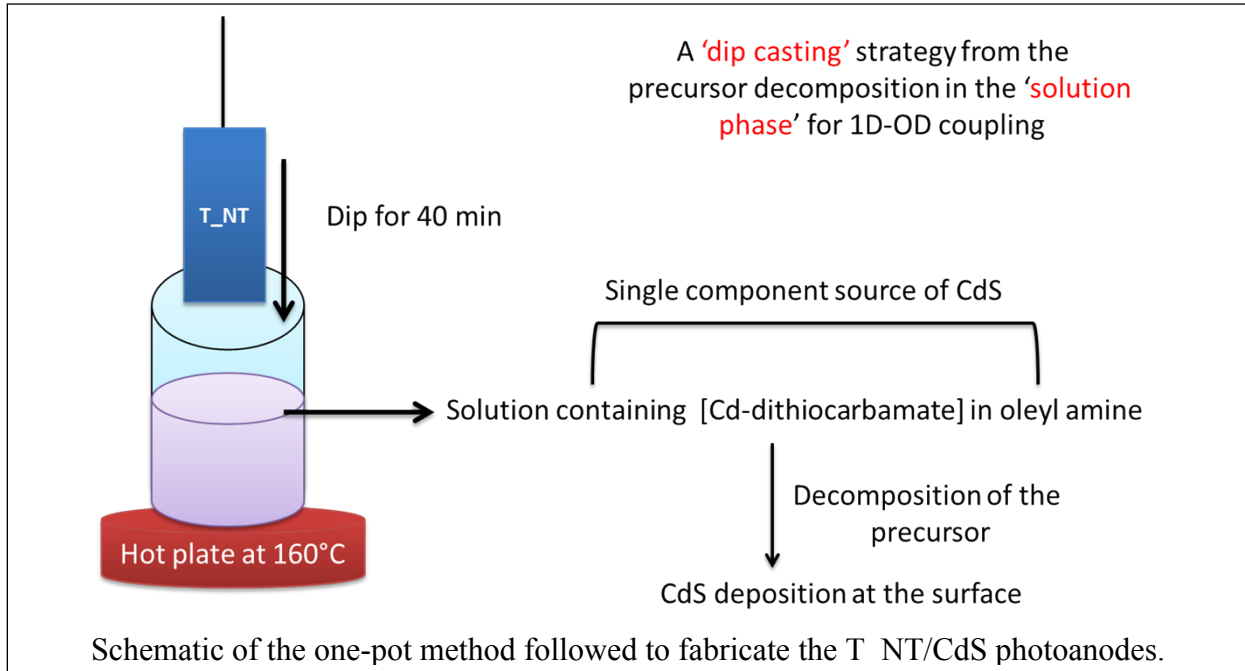
Supporting Information

A One-Pot Strategy for Coupling Chalcogenide Nanocrystals with 1D Oxides for Solar-driven Processes

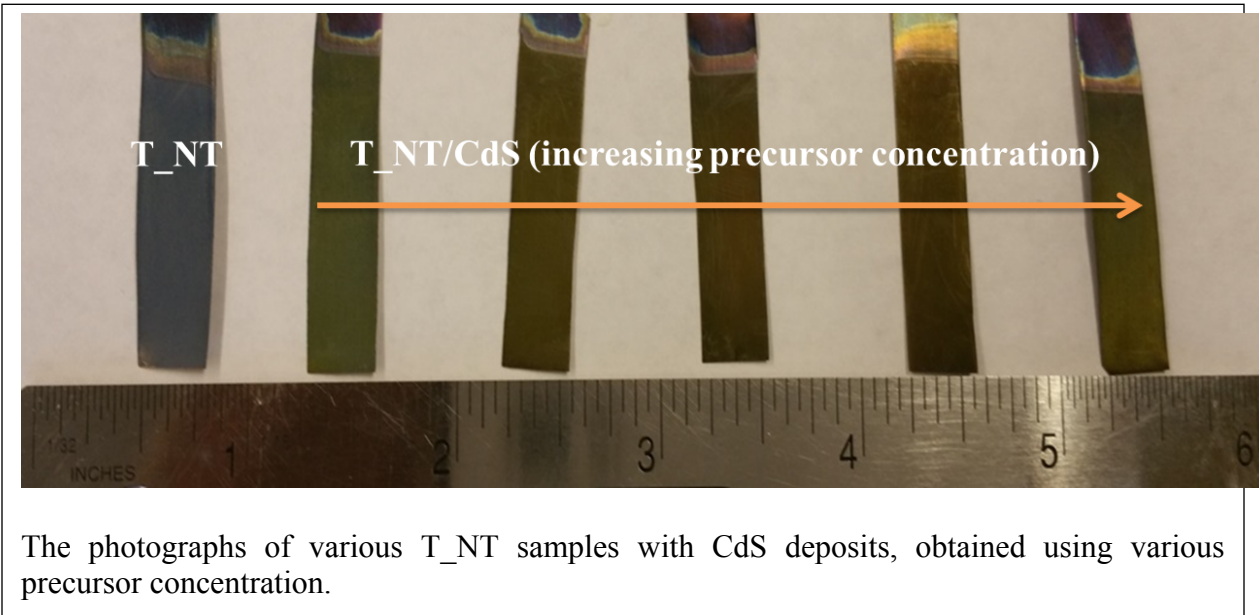
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Experimental Section

Schematic illustrating the deposition of the CdS nanocrystals on the TiO₂ nanotubes.



The photographs of the as-synthesized samples are shown below.



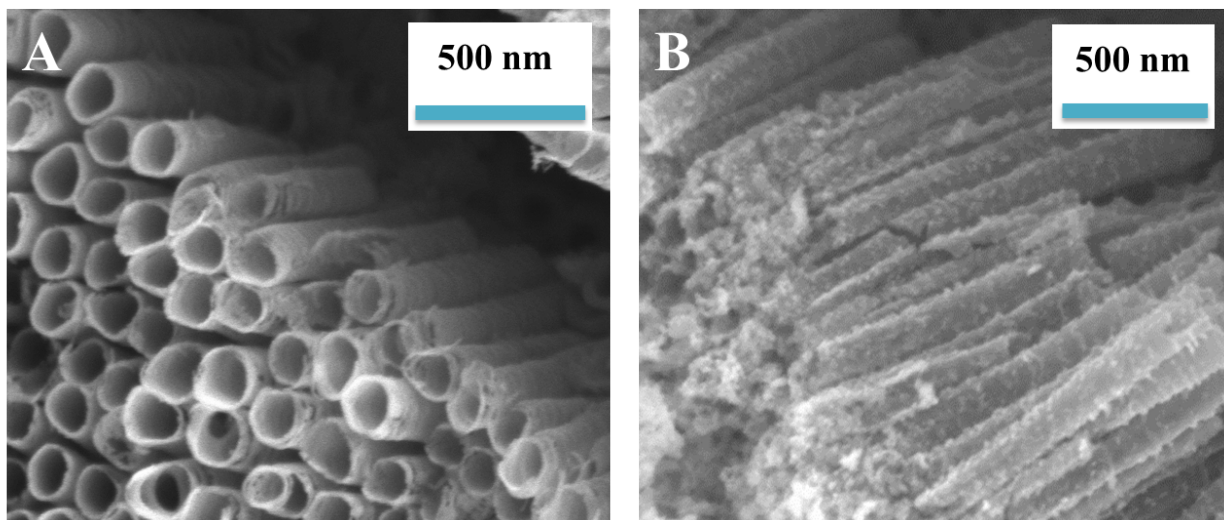


Figure S1. SEM images of the cross-sectional surface of (A) bare T_{NT} and (B) T_{NT}/CdS. [The CdS was prepared using a 2 mM precursor].

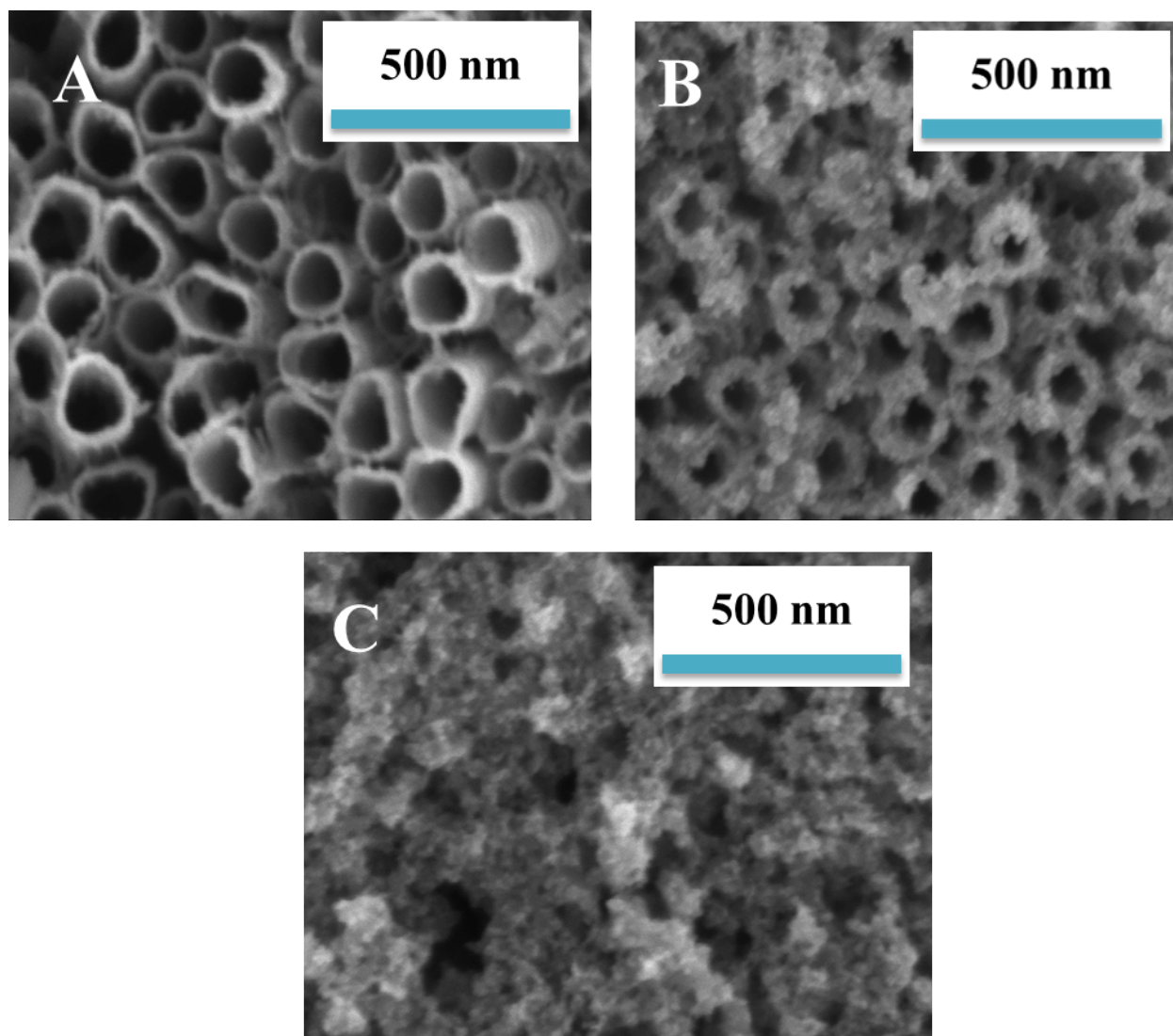


Figure S2. SEM images of T_{NT} samples with CdS deposits at various Cd- and S-precursor concentration of (A) 0.1 mM, (B) 1 mM, and (C) 3 mM.

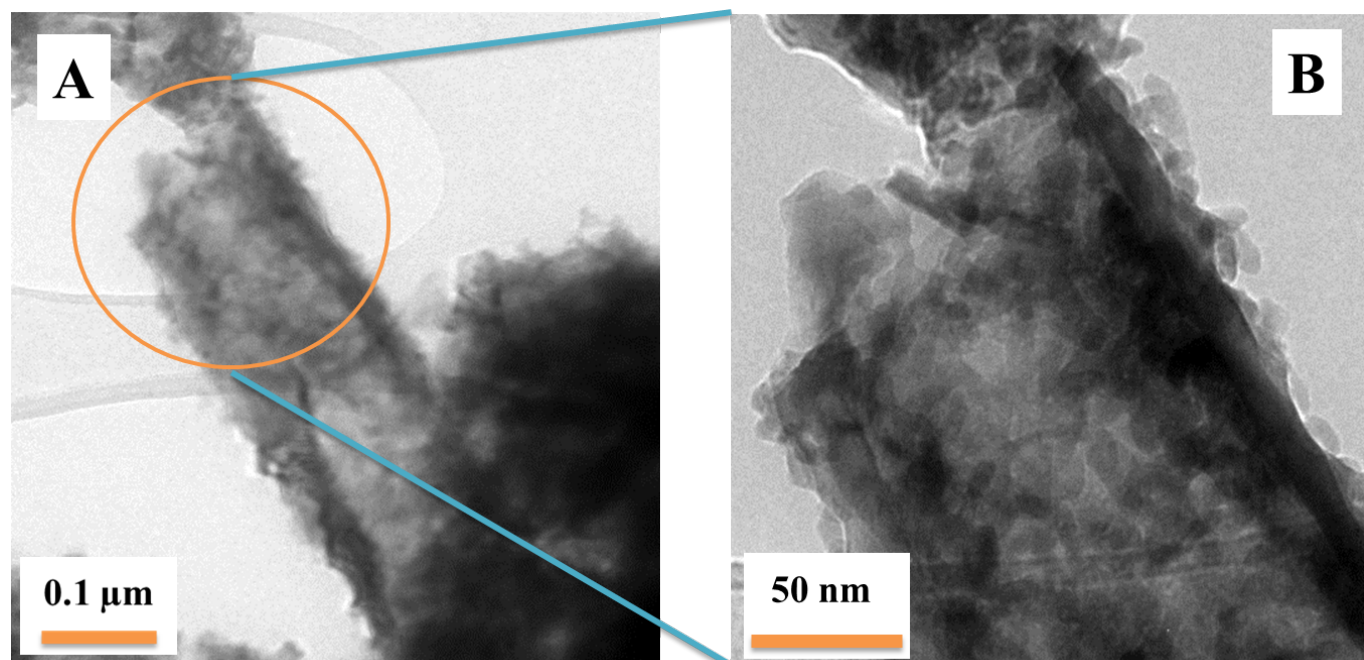


Figure S3. TEM images of T_NT/CdS samples at various magnifications.

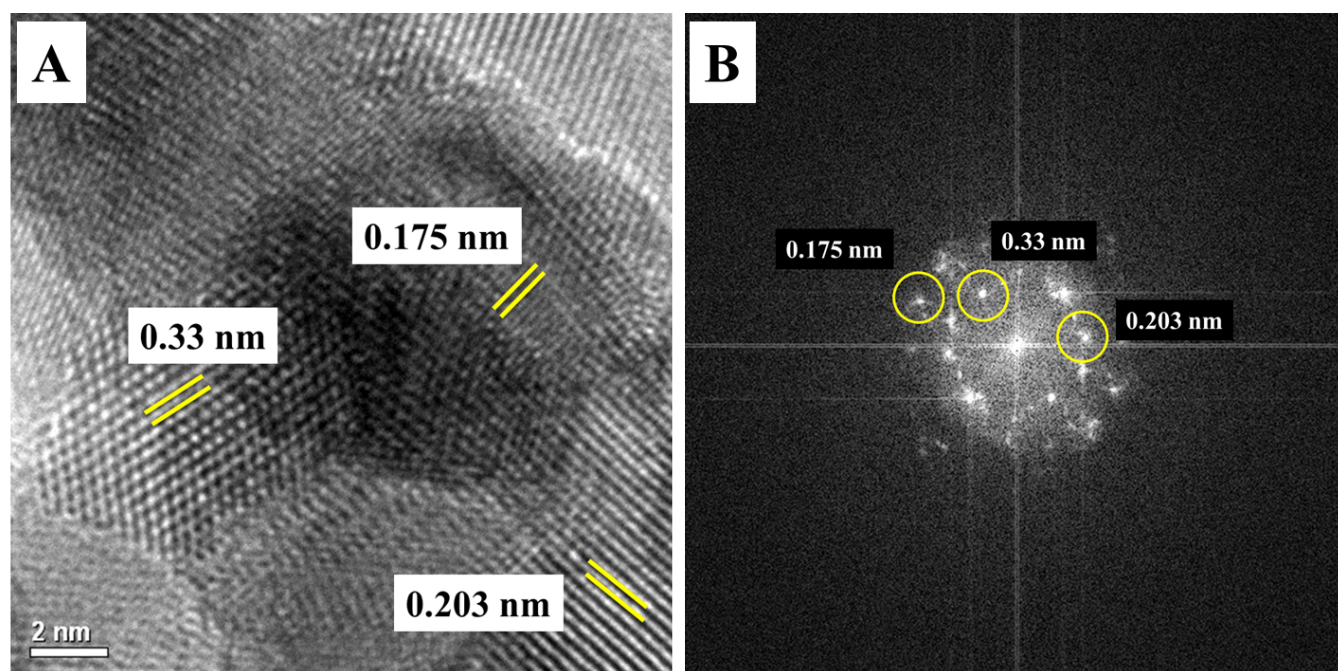


Figure S4. The (A) TEM image of T_NT/CdS with (B) high resolution FFT pattern, showing the '*d-spacing*' values. The 0.33 nm corresponds to $\langle 002 \rangle$ plane, 0.203 nm corresponds to $\langle 110 \rangle$ plane and 0.175 nm corresponds to $\langle 112 \rangle$ plane.

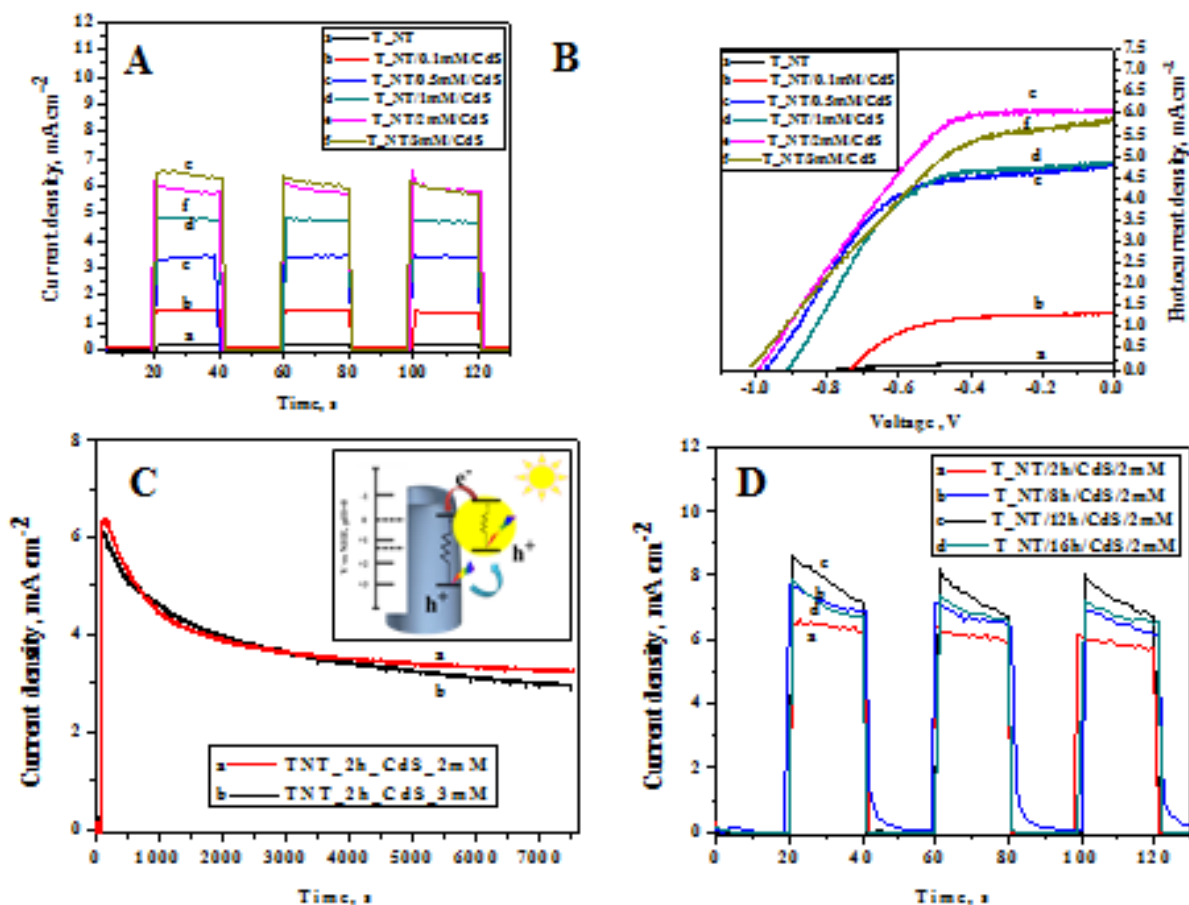


Figure S5. (A) J/t , and (B) J/V plot of CdS (prepared using various precursor concentrations) deposited on T_NT (prepared by anodization for 2h). The measurements were performed in a three-electrode quartz cell system with Pt mesh as a counter electrode and a leak-free Ag/AgCl (in 3M KCl) as the reference electrode, and 0.1 M Na₂S in water was used as the electrolyte. The working electrode was illuminated with a 500W Newport Xenon lamp equipped with 0.5 M CuSO₄ solution as a far UV cutoff filter, (C) Long term stability of the electrode over the duration of ~2 h under continuous AM 1.5 illumination (Inset) the energy band diagram with charge transportation mechanism. (D) J/t plot of CdS (2mM concentration) over T_NT (2, 8,12, and16h anodization time).

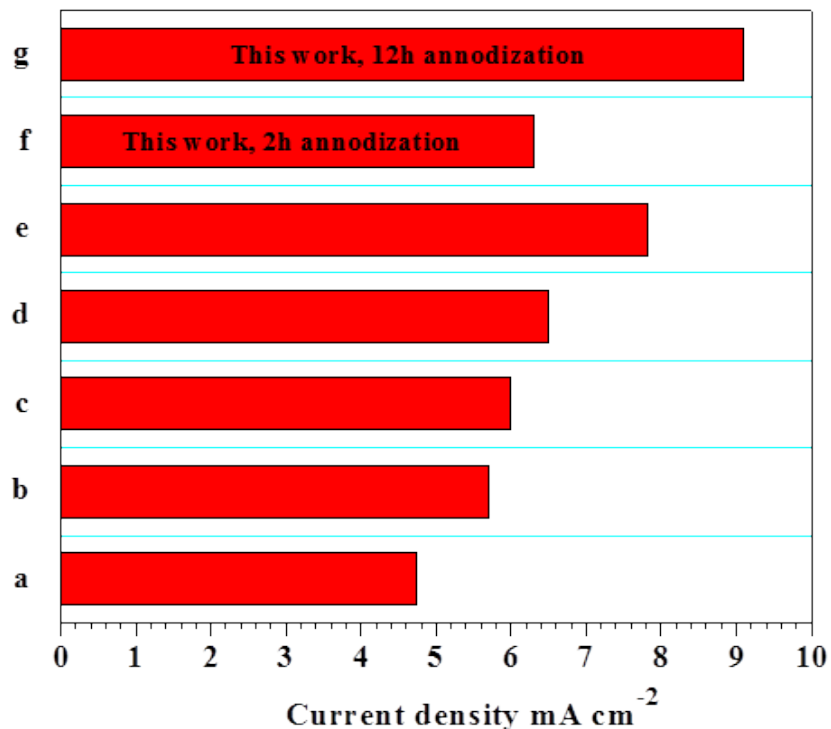


Figure S6. Comparison of photocurrent values obtained using various other TiO₂/CdS systems under photo illuminated condition. [The values reported are obtained from references a-e]

(a) S. Gao, J. Yang, M. Liu, H. Yan, W. Li, J. Zhang, Y. Luo, *J. Power Sources* **2014**, *250*, 174-180.

(b) X. Wang, J. Zheng, X. Sui, H. Xie, B. Liua, X. Zhao, *Dalton Trans.*, **2013**, *42*, 14726–14732.

(c) D. R. Baker, P. V. Kamat, *Adv. Funct. Mater.* **2009**, *19*, 805–811.

(d) J. Luo, L. Ma, T. He, C. F. Ng, S. Wang, H. Sun, H. J. Fan, *J. Phys. Chem. C*, **2012**, *116*, 11956–11963.

(e) W. T. Sun, Y. Yu, H. Y. Pan, X. F. Gao, Q. Chen, L. M. Peng, *J. Am. Chem. Soc.* **2008**, *130*, 1124-1125.

Ref. c and e uses T_{NT}/CdS, Na₂S electrolyte, and Ag/AgCl reference electrode.

Comparison limits: It is to be noted that the comparative information provided in the figure S6 is only meant as an indicator. This is because the test conditions in our experiments and those reported in the cited publications can vary. Therefore, to truly compare, the material should be i) synthesized under the same laboratory conditions and ii) tested with the same measurement system. Further, the electrolyte and surrounding environment should be maintained same.