

Supporting Information:

MoS₂ quantum dots decorated g-C₃N₄ composite photocatalyst with enhanced hydrogen evolution performance

Xixiong Jin, Xiangqian Fan, Jianjian Tian, Ruolin Cheng, Mengli Li, Lingxia Zhang*

State Key Laboratory of High Performance Ceramics and Superfine Microstructure, Shanghai Institute of Ceramics, Chinese Academy of Sciences, 1295 Ding-xi Road, Shanghai 200050, People's Republic of China

Corresponding author: zhlingxia@mail.sic.ac.cn Tel: +86-21-52412706; Fax: +86-21-52413122

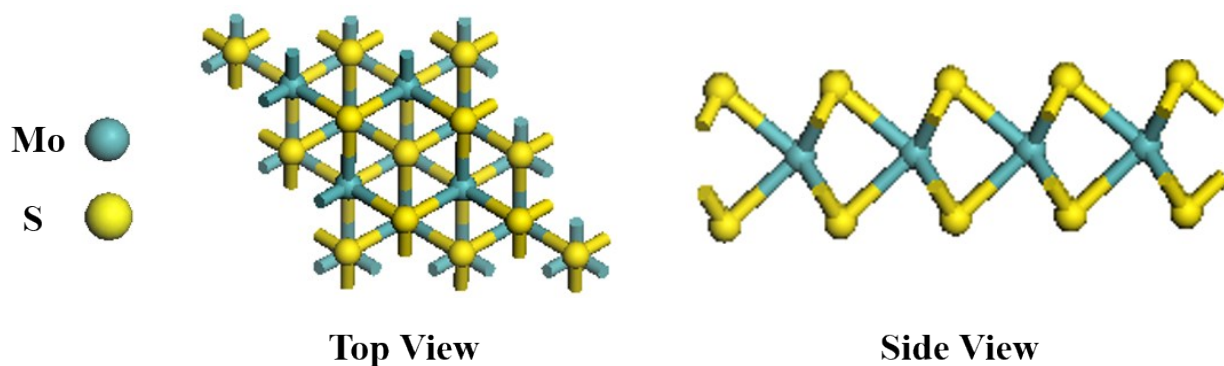


Figure S1. The crystal structure of MoS₂

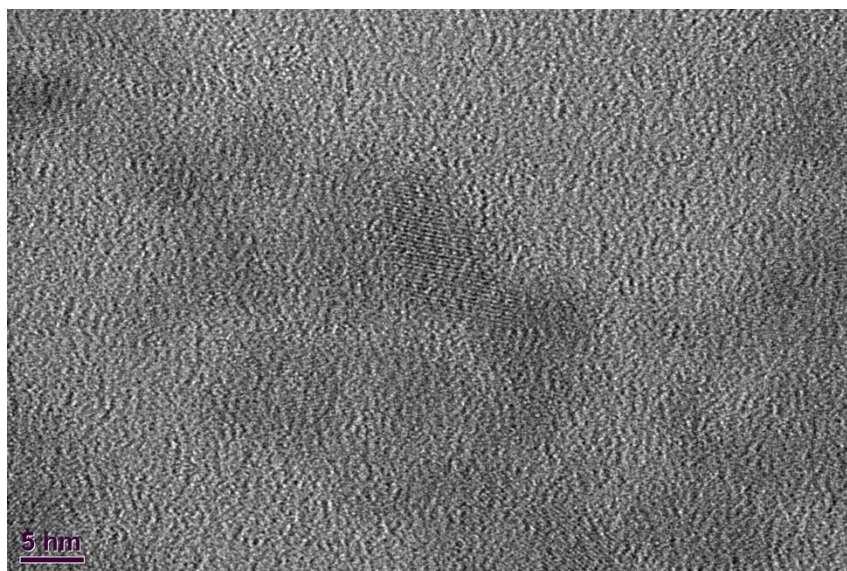


Figure S2. HRTEM images of 7wt% MoS₂-QDs/CN

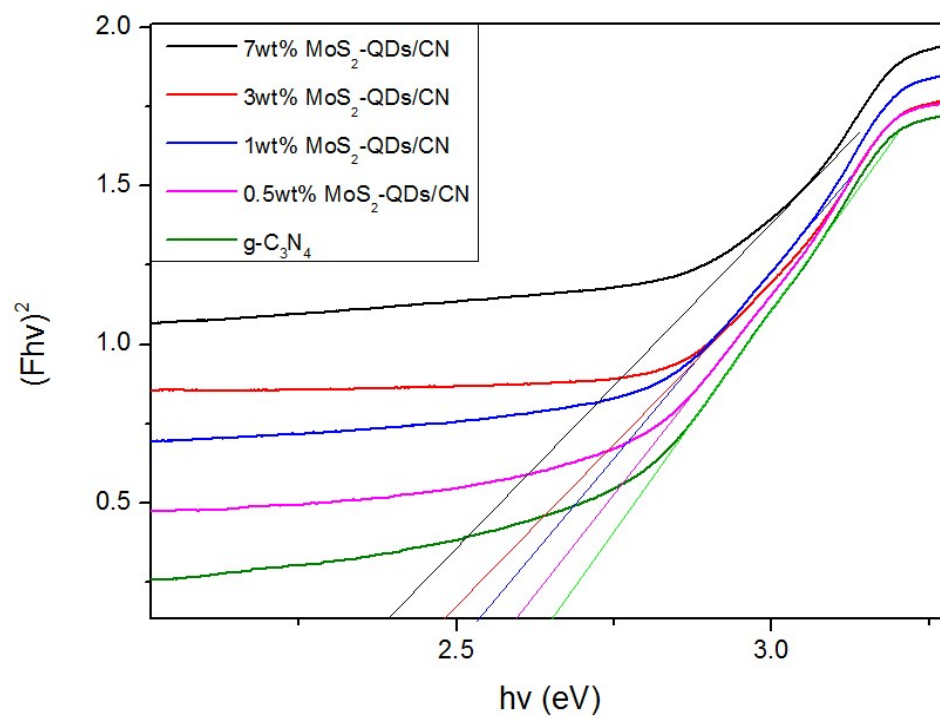


Figure S3. Band-gap calculation spectra of g-C₃N₄ and MoS₂-QDs/CN composite

Table S1. Band-gap of g-C₃N₄ and MoS₂-QDs/CN composite

Sample	Band-gap (eV)
7wt% MoS ₂ -QDs/CN	2.38
3wt% MoS ₂ -QDs/CN	2.48
1wt% MoS ₂ -QDs/CN	2.53
0.5wt% MoS ₂ -QDs/CN	2.59
g-C ₃ N ₄	2.65

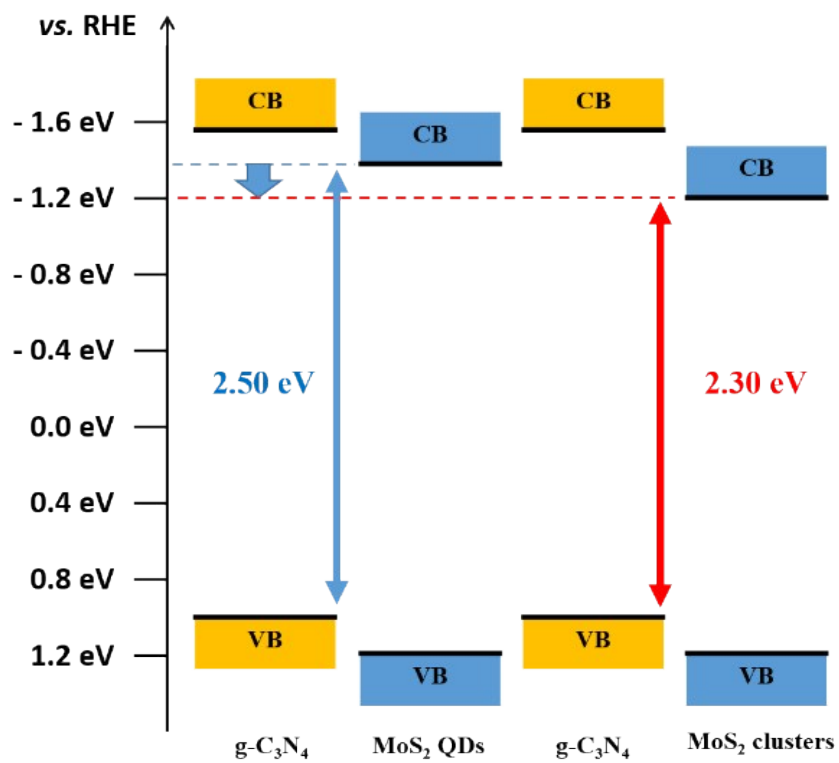


Figure S4. Explanation of the shrinkage of the band gap of the MoS₂-QDs/CN composite: As increased amount of MoS₂-QDs is introduced into g-C₃N₄, MoS₂-QDs are more likely to form nanoclusters, thus narrow the band gap of MoS₂-QDs and even the composite¹⁻⁴.

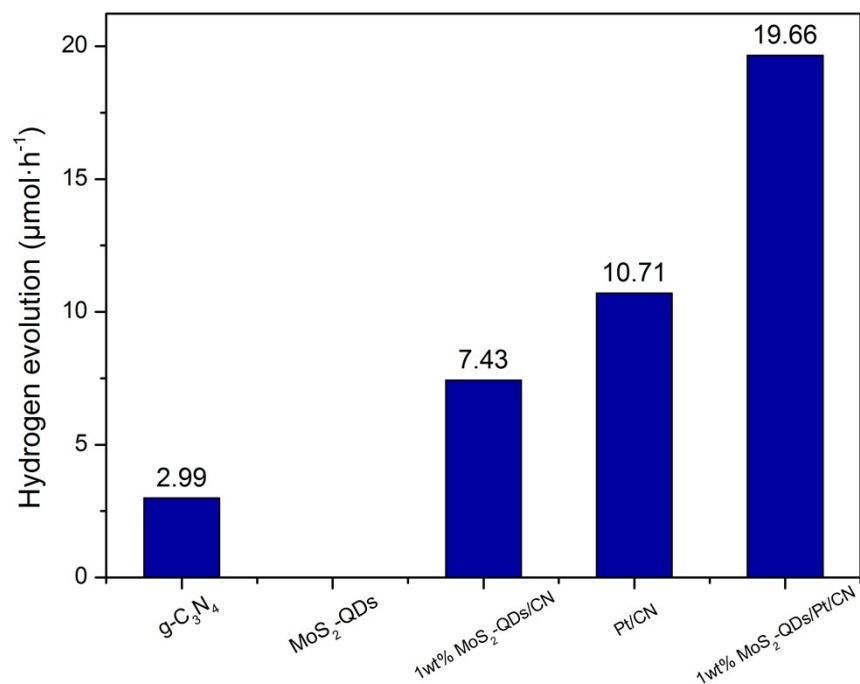


Figure S5. Photocatalytic H₂ evolution on g-C₃N₄ without Pt, MoS₂-QDs without Pt, 1wt% MoS₂-QDs/CN without Pt, g-C₃N₄ loaded with 1 wt% Pt (Pt/CN) and 1wt% MoS₂-QDs/CN loaded with 1 wt% Pt (1wt% MoS₂-QDs/Pt/CN).

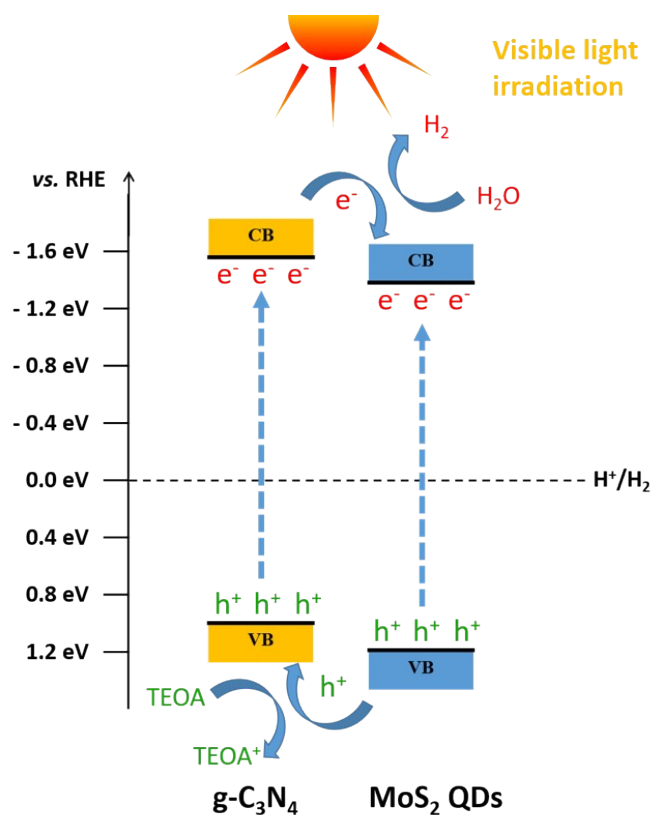


Figure S6. Schematic illustration of the electron-hole pair separation and transfer in the MoS_2 -QDs/CN composite

- 1 H. L. Wang and J. A. Turner, *J. Electrochem. Soc.*, 2010, **157**, F173–F178.
- 2 T. Z. Markus, M. Wu, L. Wang, D. H. Waldeck, D. Oron and R. Naaman, *J. Phys. Chem. C*, 2009, **113**, 14200-14206.
- 3 F. A. Frame, E. C. Carroll, D. S. Larsen, M. Sarahan, N. D. Browning and F. E. Osterloh, *Chem. Commun.*, 2008, **19**, 2206-2208.
- 4 L. Liao, Q. Zhang, Z. Su, Z. Zhao, Y. Wang, Y. Li, X. Lu, D. Wei, G. Feng, Q. Yu, X. Cai, J. Zhao, Z. Ren, H. Fang, F. Robles-Hernandez, S. Baldelli and J. Bao, *Nat. Nanotechnol.*, 2014, **9**, 69–73.