

Supporting Information:

High-Efficiency Plasmon-Enhanced Graphene-Supported Semiconductor/Metal Core-Satellite Heteronano-crystal Photocatalysts for Visible-Light Dye Photodegradation and H₂ Production from Water

Jie Zhang, Ping Wang, Jian Sun, and Yongdong Jin*

State Key Laboratory of Electroanalytical Chemistry, Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun, Jilin 130022, P. R. China. E-mail: ydjin@ciac.ac.cn

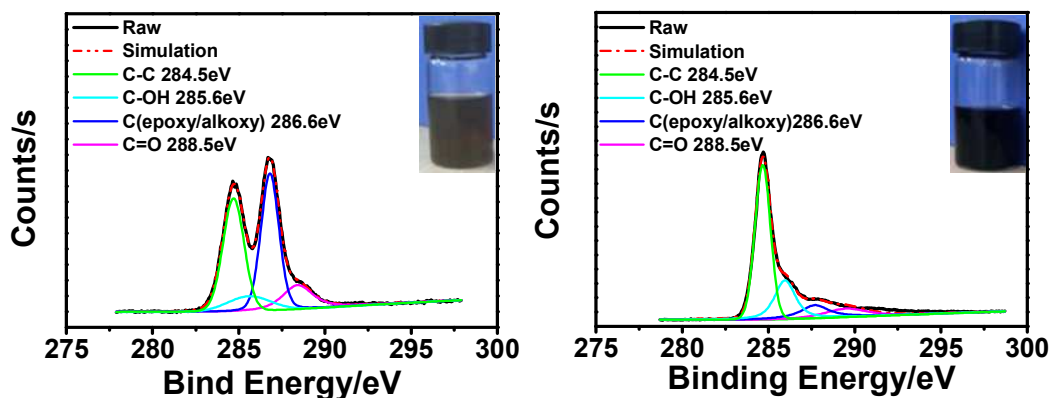


Figure S1. C1s XPS spectra of GO (left) and G (right). For G, the intensities of all C1s peaks of the carbon binding to oxygen, especially the peak of C-O (epoxy and alkoxy), decreased dramatically relative to that of GO, indicating that most of the oxygen-containing functional groups on G were removed after the reduction. Inset: Photograph of GO (left) and G (right) solution in DMF.

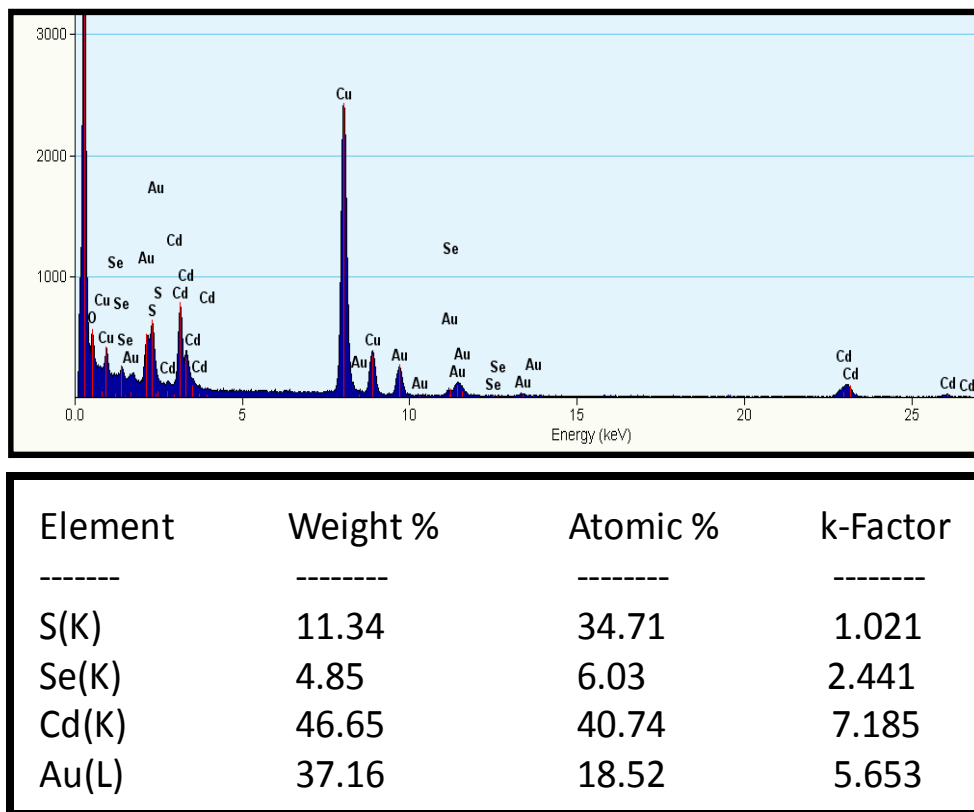


Figure S2. EDS spectra (top) and the calculated atomic ratio (AT) (bottom) of the CdSe/CdS/Au HNCs.

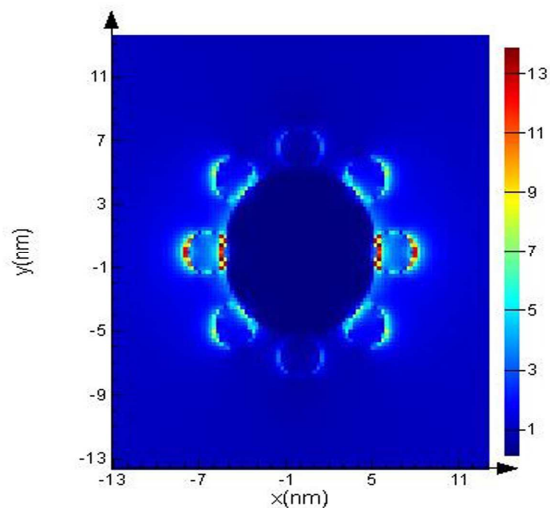


Figure S3. Electric field distributions of the as-prepared CdSe/CdS-Au HNCs calculated using the FDTD method.

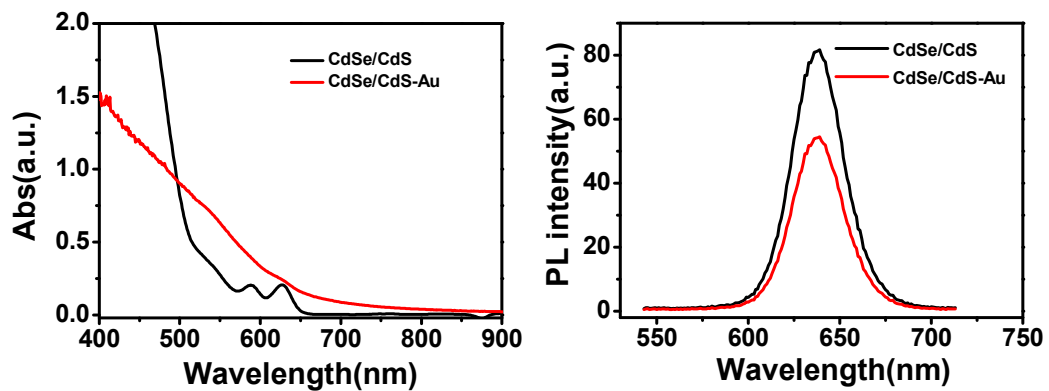


Figure S4. The absorption (left) and PL spectra (right) of the QDs and QD-AuNPs mixture.

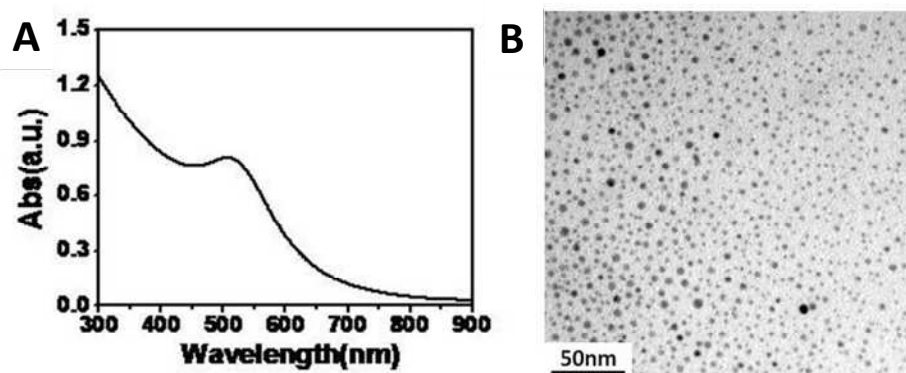


Figure S5. The absorption spectrum (a) and TEM image (b) of the control AuNPs used.

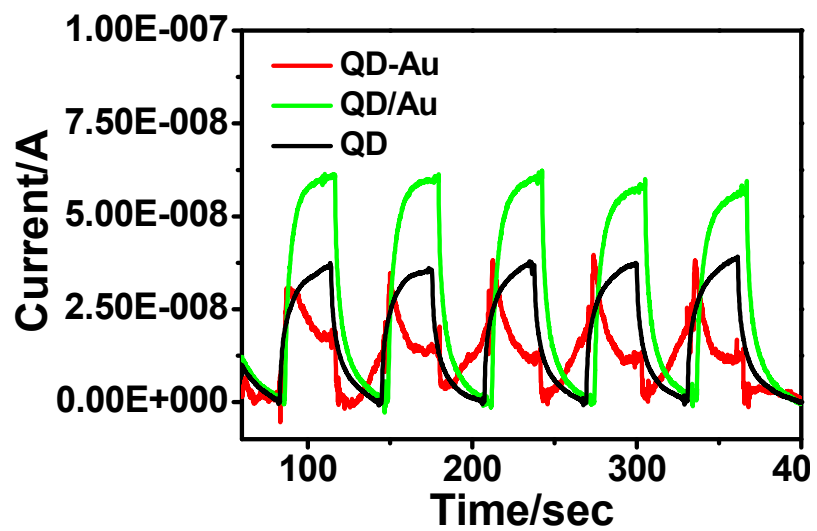


Figure S6. The photocurrent responses of the QD, QD/Au HNC, QD and Au mixed nanoparticles under visible light using NaNO_3 (0.1M) as electrolyte solution.

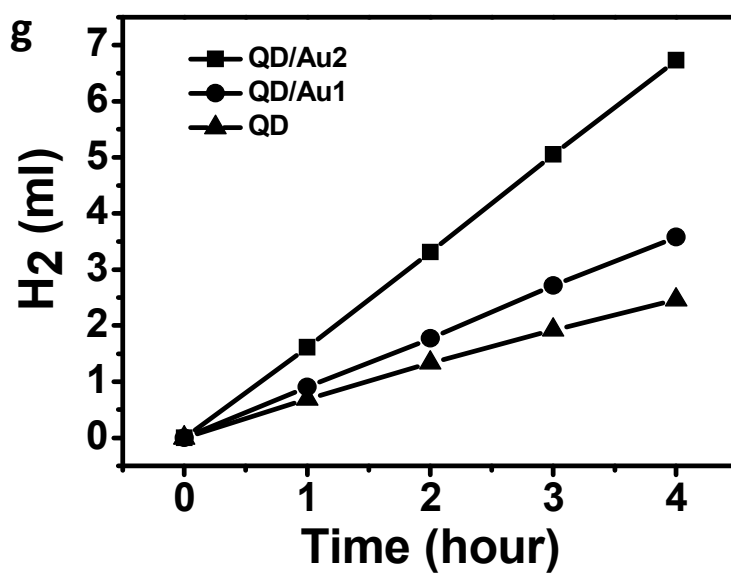
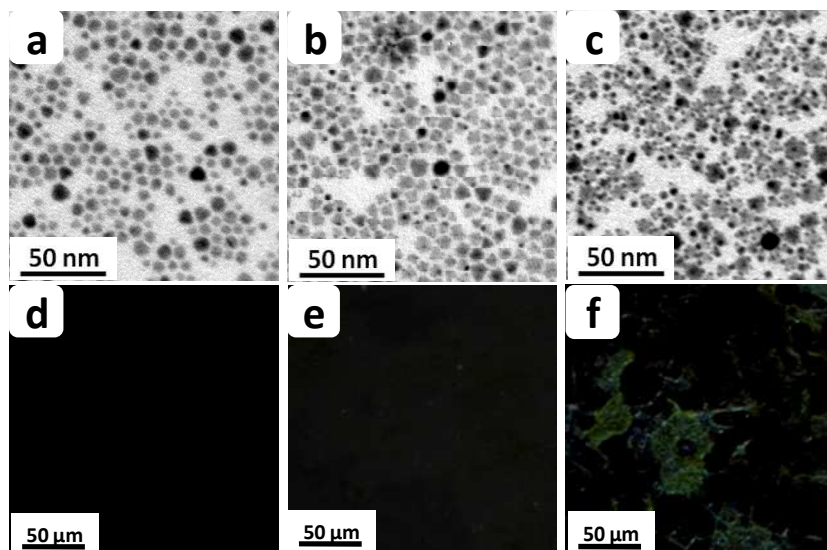


Figure S7. The TEM (a, b, c) and corresponding dark field scattering images (d, e, f) of QD, QD/Au1, QD/Au2, respectively; (g) The H_2 production rate of QD, QD/Au1, QD/Au2, respectively.

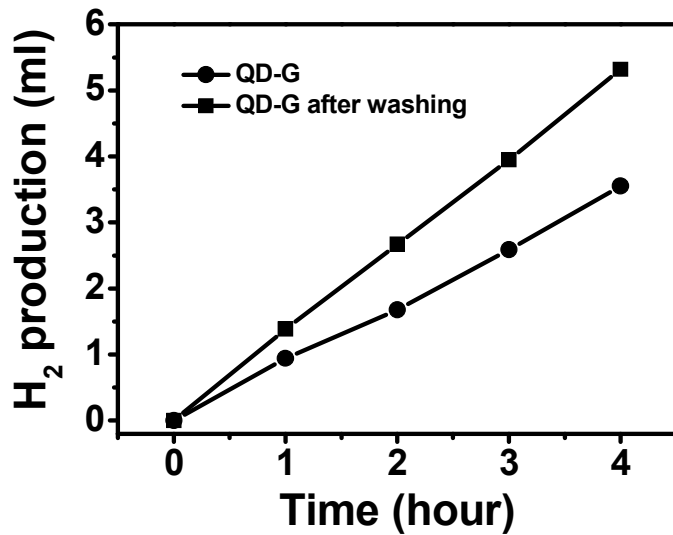


Figure S8. The H₂ production rate of the as-prepared QD-G complexes before and after the washing treatment.

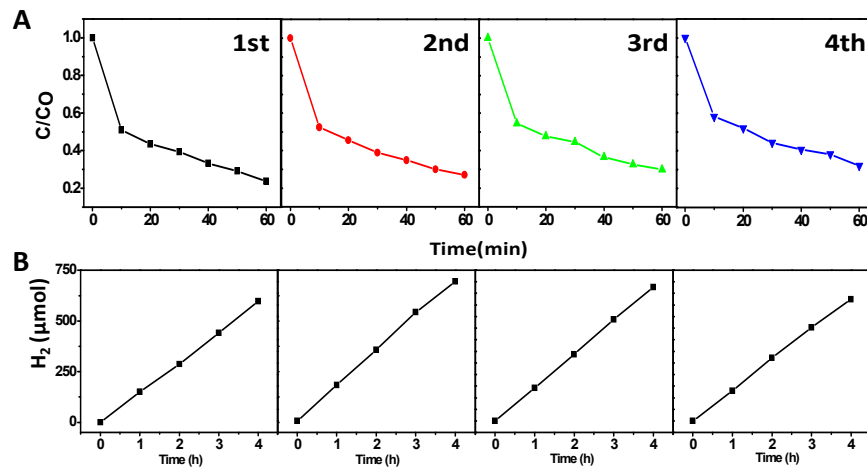


Figure S9. Cycling runs in the photodegradation of methylene blue (A) and photocatalytic H₂ production from water (B) in the presence of QD/Au-G sample under visible light.

The role of sacrificial electron donor (Na₂S and Na₂SO₃):

Under visible light irradiation, hydrogen was evolved from an aqueous solution containing Na₂S and Na₂SO₃, because of the strong reduction capacity of S²⁻ ions, the

photogenerated holes irreversibly oxidize the S^{2-} ions instead of water. Different reactions occurred for the whole procedure can be represented as follows:

