

Au-SnS Hetero Nanostructures: Size of Au Matters

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Supporting Information

Supporting Figures:

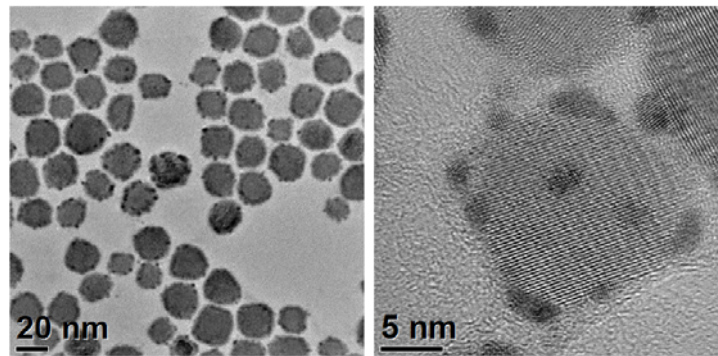


Figure S1. TEM images of Au decorated SnS cubes of $\sim 22\pm 5$ nm. This sample is obtained from a different reaction than the images shown in Figure 1 of main text.

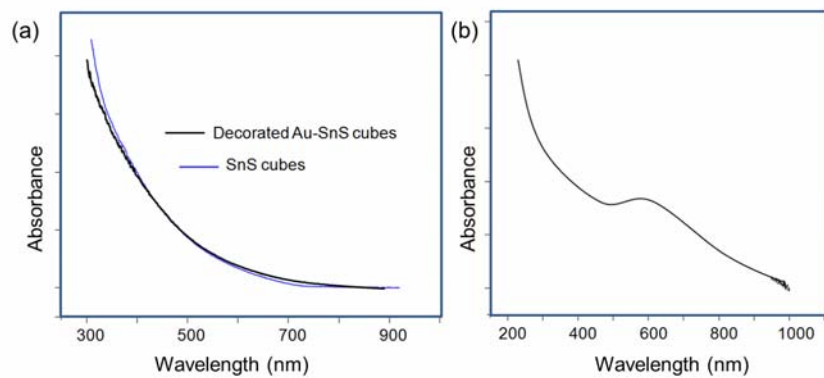


Figure S2. (a) Optical absorption spectra of SnS nanocubes and decorated Au-SnS nanocubes. Gold plasmon absorption has not been seen here. (b) Absorption spectra obtained from the samples having coupled Au-SnS nanocubes.

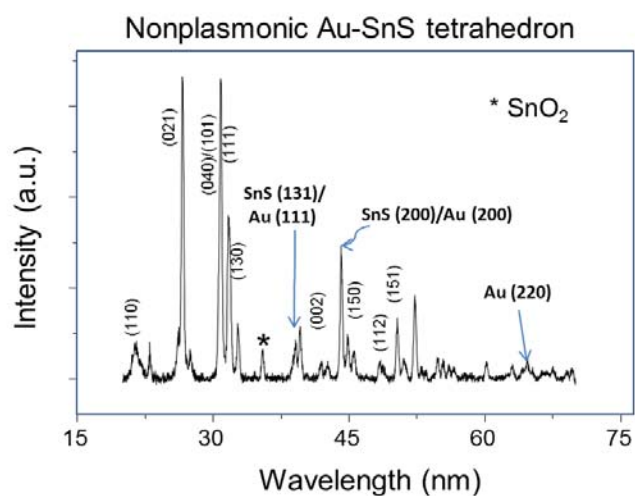


Figure S3. Powder XRD Pattern of Au-SnS tetrahedron. All SnS peaks are not labeled as this has been already reported in our previous work.

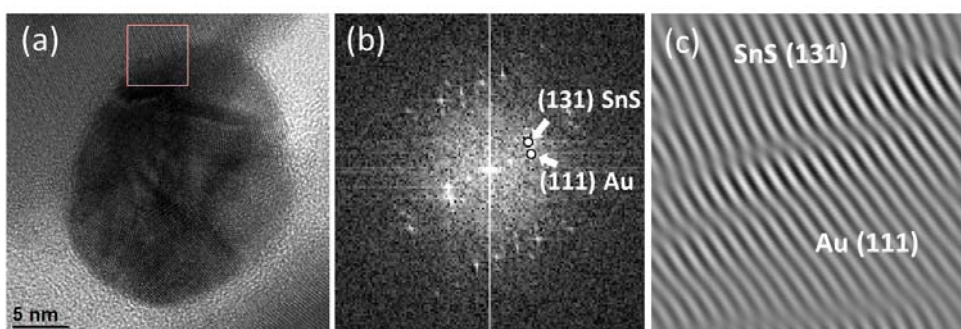


Figure S4. (a) HRTEM image of Au-SnS showing the heterojunction. (b) Selected area FFT pattern where planes of SnS and Au are marked. (c) Simulated HRTEM showing the planes of Au and SnS. The total area is equal to the marked area in panel (a).

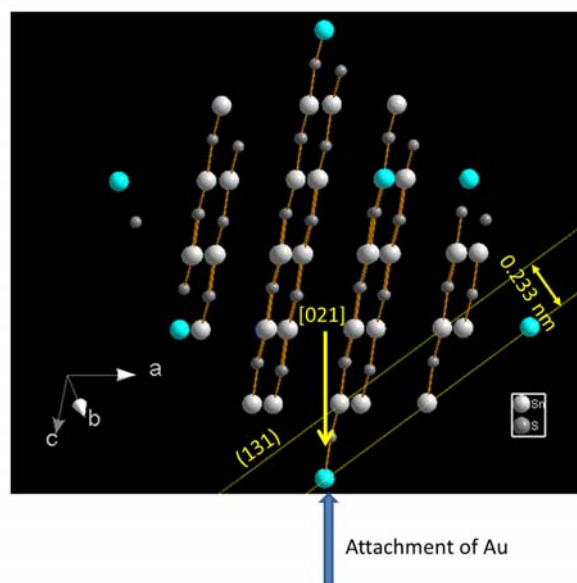


Figure S5. An atomic model showing the polar direction and the (131) plane of SnS which has zero lattice mismatch with (111) of Au.

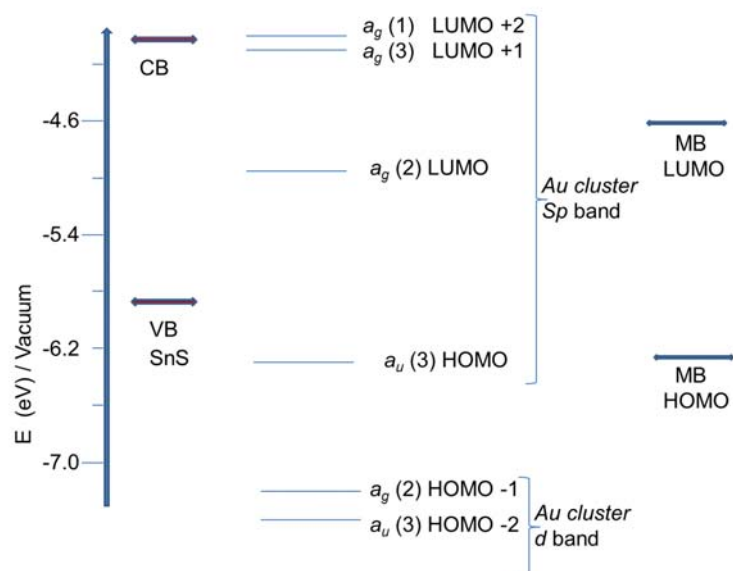


Figure S6. Schematic presentation of band positions of SnS,¹ Au cluster² and Methylene Blue (MB).³

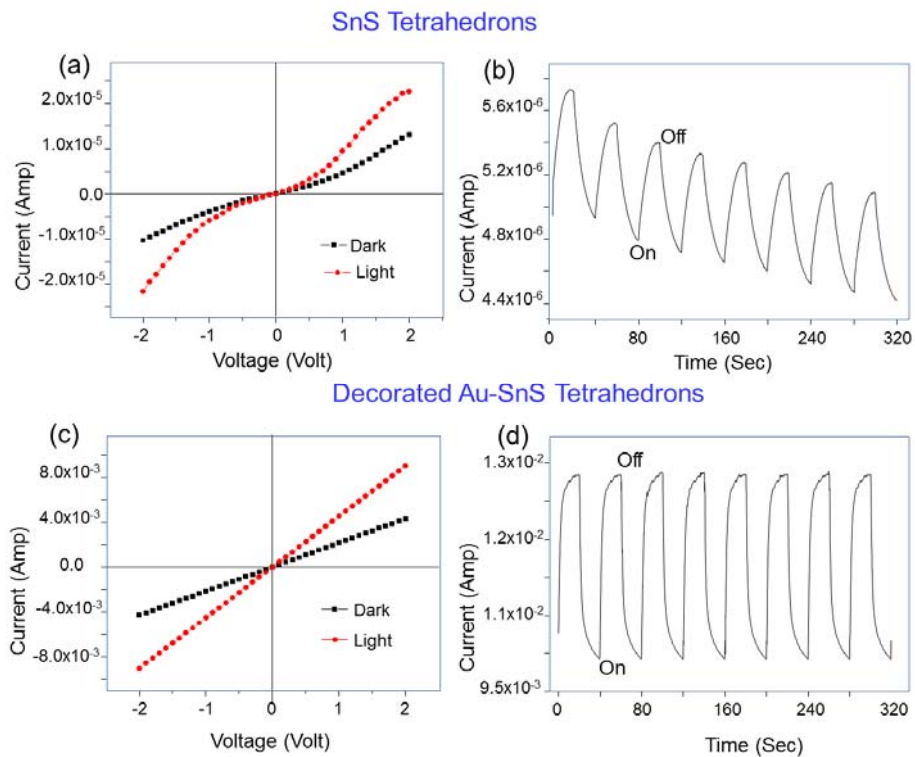


Figure S7. (a) and (c) current versus voltage plots in dark and light for SnS and Au-SnS tetrahedron shapes respectively. (b) and (d) photoresponse study of SnS and Au-SnS tetrahedron shapes respectively at 2V bias under ON/OFF switching.

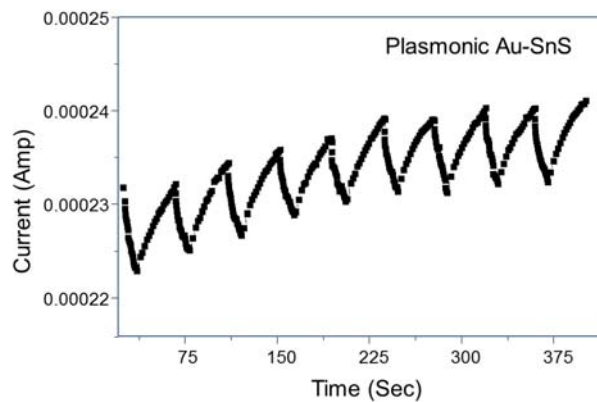


Figure S8. Photoresponse study of plasmonic Au-SnS cube shaped nanostructures at 2V bias under ON/OFF switching.

References

- (1) Reeja-Jayan, B.; Manthiram, A. *RSC Advances* **2013**, *3*, 5412.
- (2) Zheng, J.; Zhou, C.; Yu, M.; Liu, J. *Nanoscale* **2012**, *4*, 4073.
- (3) Shen, J.-S.; Yu, T.; Xie, J.-W.; Jiang, Y.-B. *Phys. Chemi. Chem. Phys.* **2009**, *11*, 5062.