

Light-triggered Reversible Self-assembly of Gold Nanoparticle Oligomers for Tuneable SERS

Lei Zhang, Liwei Dai, Yun Rong, Zhenzhong Liu, Dingyi Tong, Youju Huang* and Tao Chen*

Division of Polymer and Composite Materials, Ningbo Institute of Material Technology and Engineering, Chinese Academy of Science, Ningbo, 315211, China

*Corresponding author: e-mail: yjhuang@nimte.ac.cn; tao.chen@nimte.ac.cn

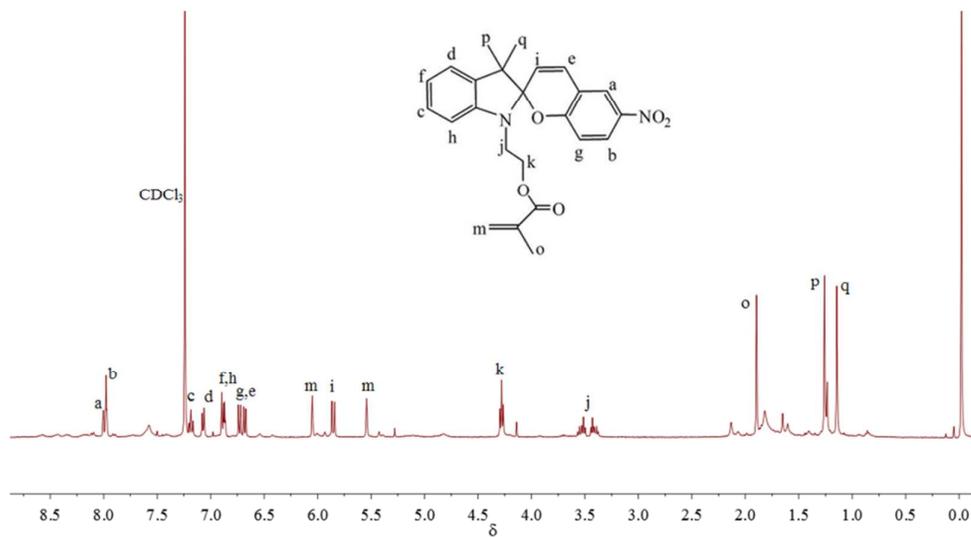


Figure S1. The ¹H-NMR spectrum of spiropyran-containing methacrylate monomer (SPMA).

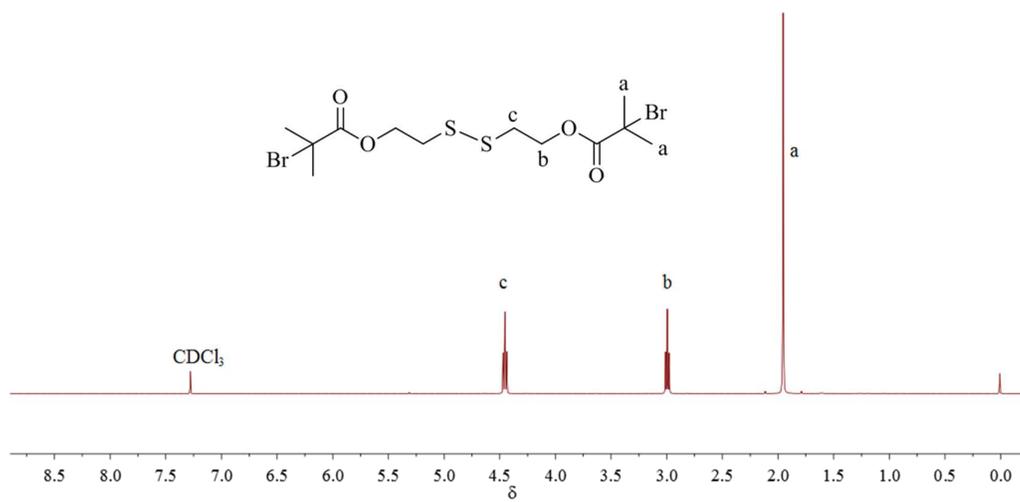


Figure S2. The ¹H-NMR spectrum of initiator 2, 2'-dithiobis [1-(2-bromo-2-methylpropionyloxy)] ethane (DTBE).

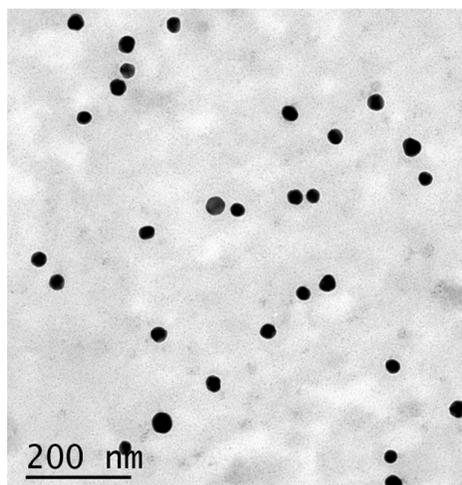


Figure S3. The TEM image of synthesized AuNPs.

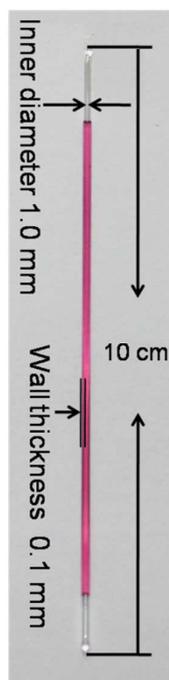


Figure S4. The Au@PEG/PSPMA NPs solution held in a capillary and the size of capillary.

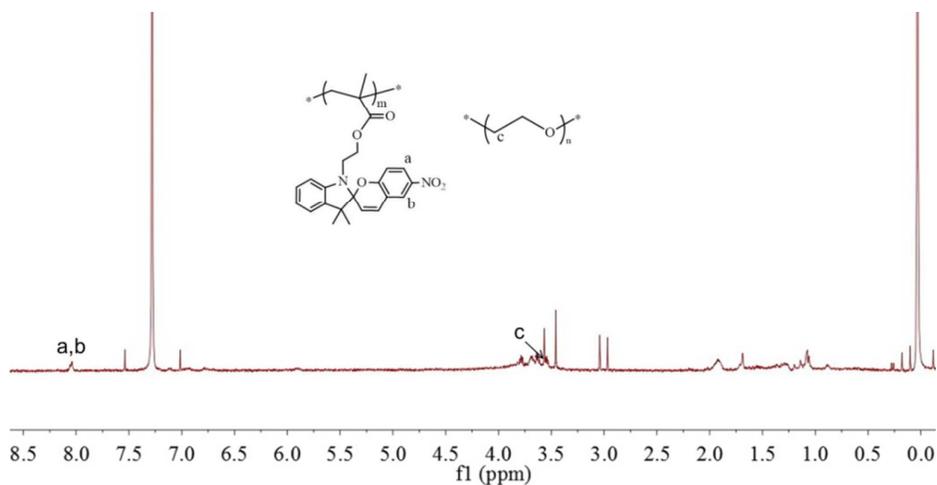


Figure S5. The $^1\text{H-NMR}$ spectrum of Au@PEG/PSPMA solution in CDCl_3 .

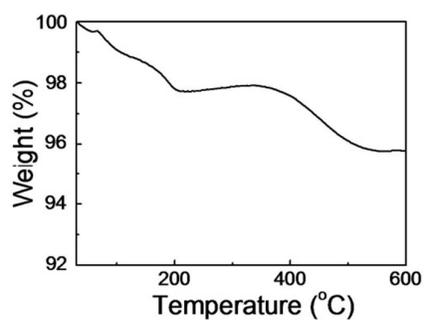


Figure S6. The TGA curve of Au@PEG/PSPMA nanoparticles in nitrogen.

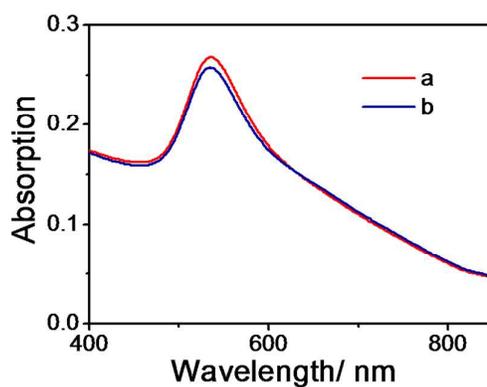


Figure S7. The UV/Vis absorption spectra of Au@PEG/PSPMA solution (a) and its mixed solution containing small amount of water after being kept in dark for three days (b).

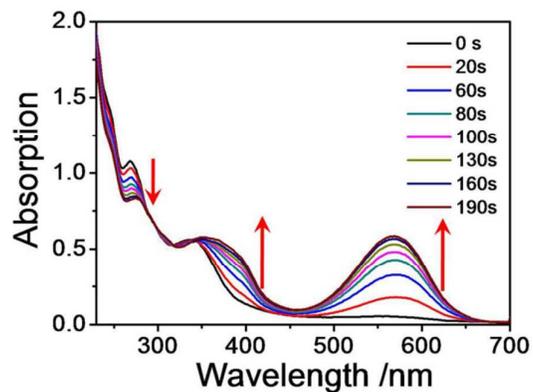
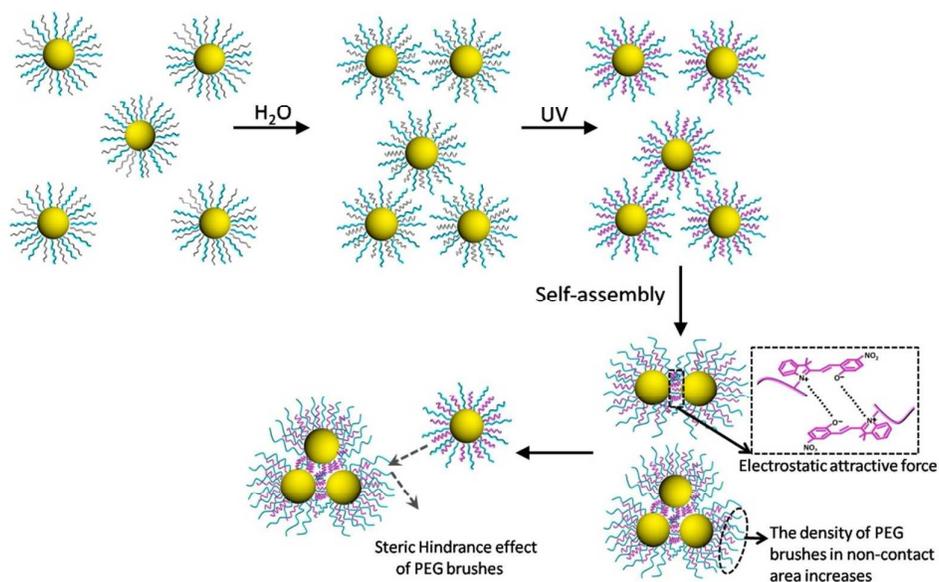


Figure S8. The UV/Vis absorption spectra of polymer PSPMA in THF solution under UV irradiation for different time.



Scheme S1. The schematic illustration of the mechanism of self-assembled AuNPs oligomers.

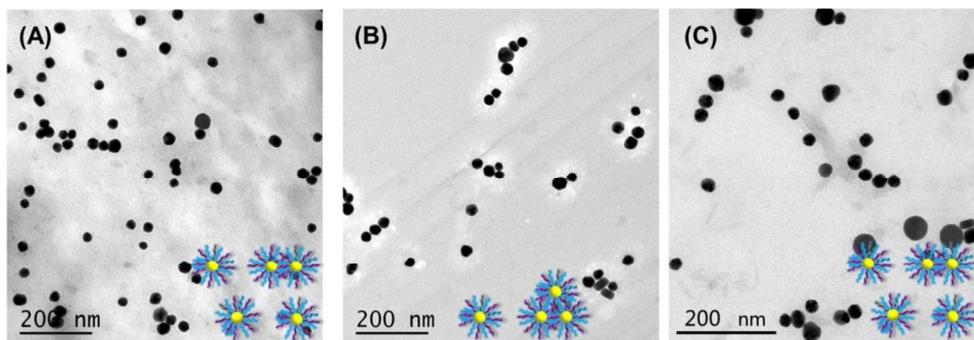


Figure S9. The TEM images of Au@PEG/PSPMA after UV irradiation for 1h (A), 3h (B) and subsequently exposed to visible light irradiation for 7h (C).

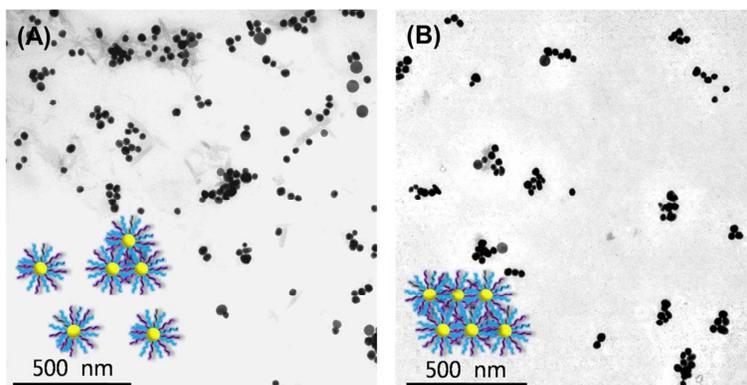


Figure S10. The TEM images of Au@PEG/PSPMA NPs with PEG density of 0.2 (A) and 0.1 (B) chains/nm² (B) upon 4h UV irradiation.

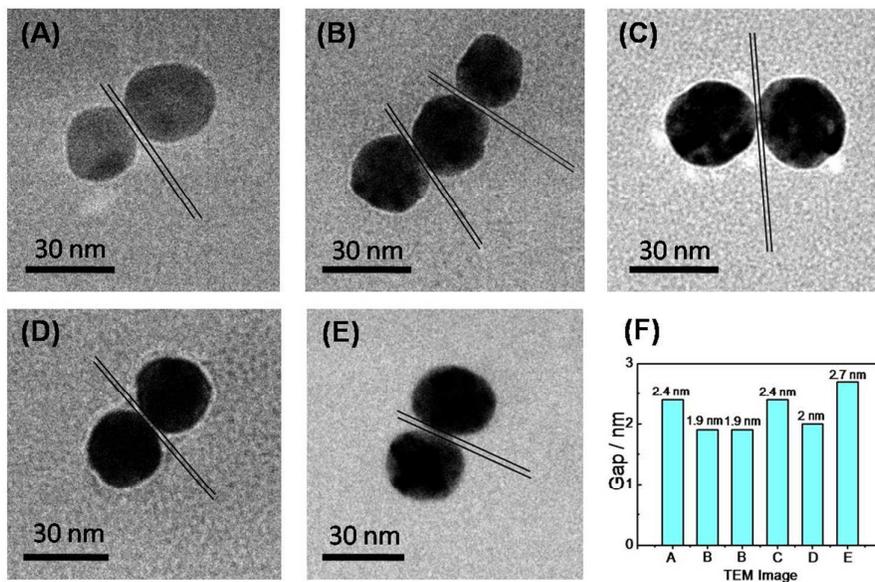


Figure S11. The TEM images of AuNP dimer or trimer structures (A, B, C, D, E). The graph (F) shows the interparticle gap distances in TEM images (A, B, C, D, E). The inset double lines in each TEM image highlight the interparticle gap.

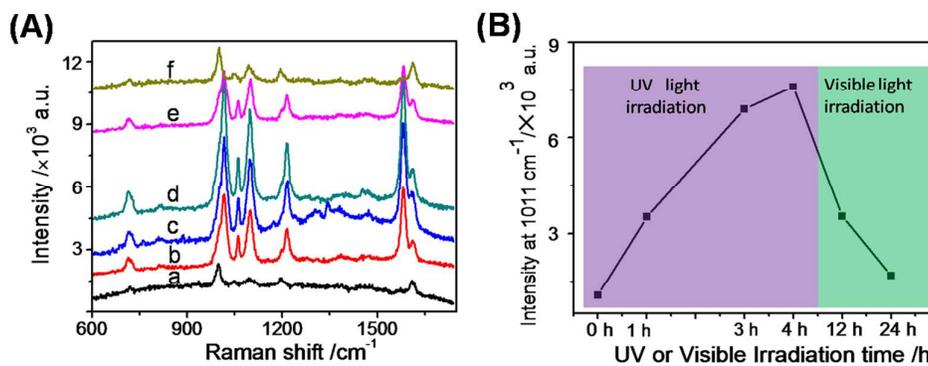


Figure S12. (A) The Raman spectra of MPy/Au@PEG/PSPMA after UV irradiation for 0 h (a), 1 h (b), 3 h (c), 4 h (d), subsequent visible light irradiation 8 h (e) and 20 h (f). (B) The Raman peak intensity at 1011 cm^{-1} upon UV irradiation for different time.