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Supporting Information

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Au₂₅@SiO₂: Quantum Clusters of Gold Embedded in Silica

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Supporting Information

$\text{Au}_{25}@\text{SiO}_2$: Quantum Clusters of Gold Embedded in Silica

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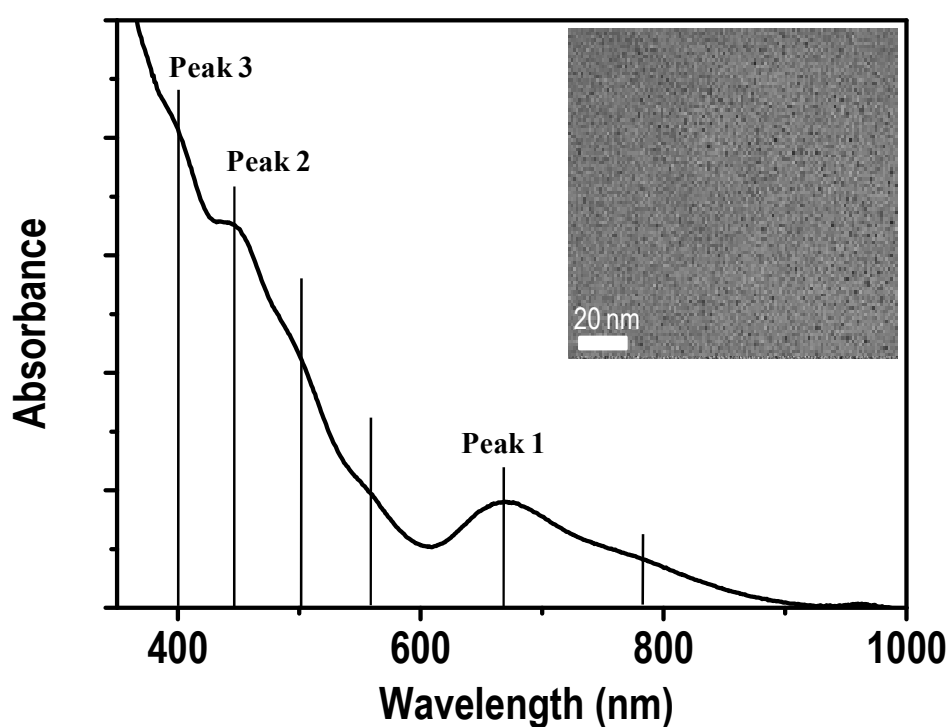


Figure S1. Optical absorption spectrum and TEM image (inset) of $\text{Au}_{25}\text{SG}_{18}$. Uniform particles are seen. Peak 1 appears at 670 nm.

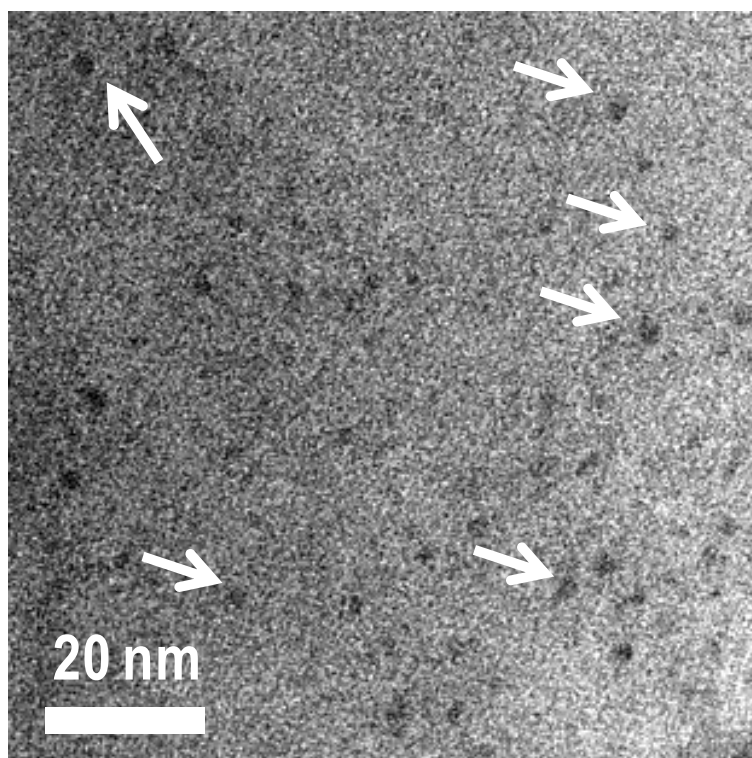


Figure S2. TEM image of Au_mSG_n clusters showing polydispersity. Some of the clusters are marked with arrows.

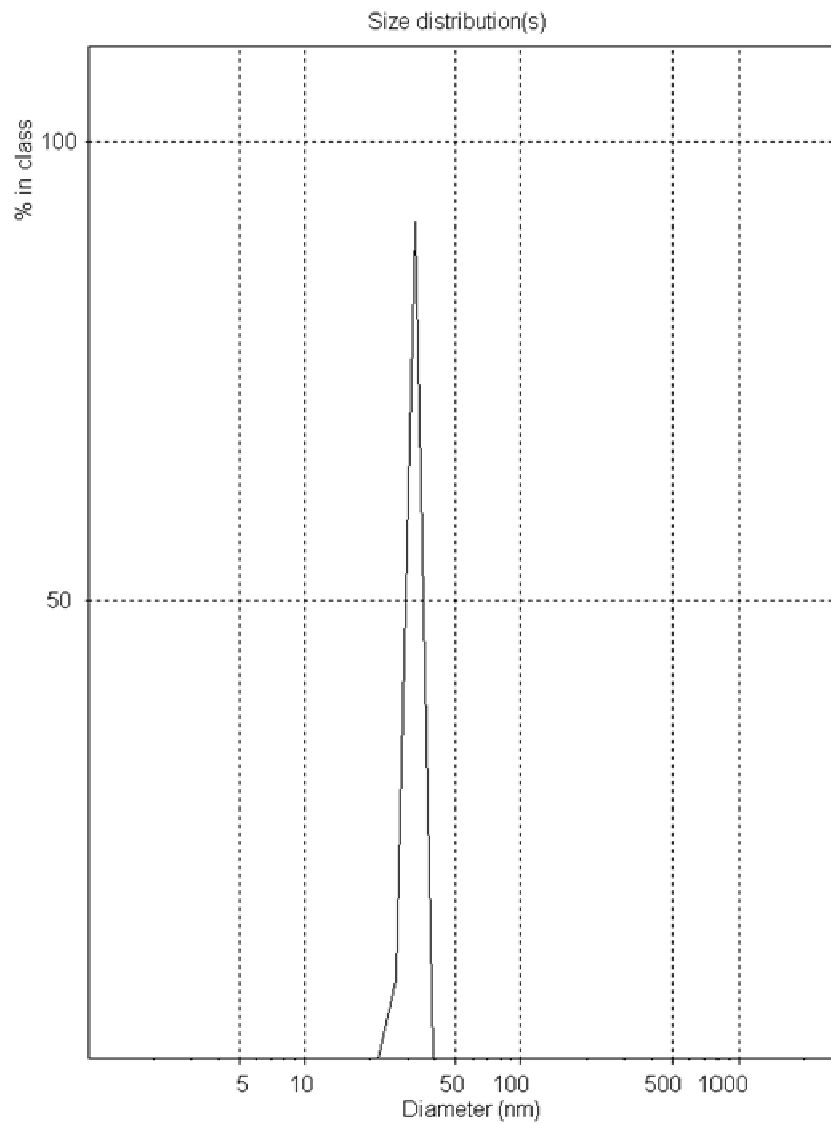


Figure S3. Dynamic light scattering data of Au₂₅@MPS showing an average hydrodynamic diameter of 35 nm.

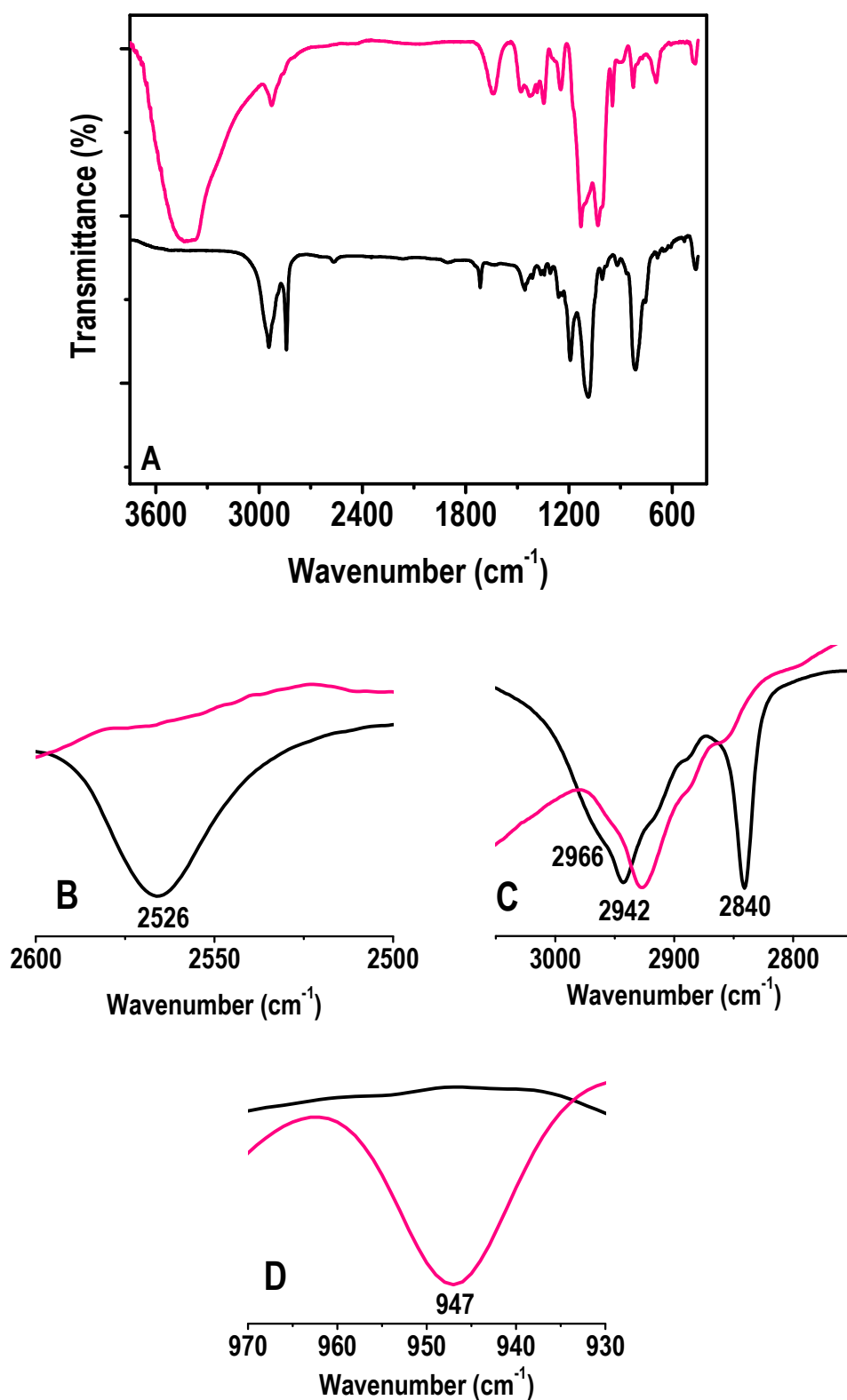


Figure S4. (A) FTIR full spectra of MPTS (black trace) and Au₂₅@MPS (pink trace). (B), (C) and (D) are the expanded view showing -S-H stretching, features of -O-CH₃ and -CH₂ and features of Si-O-H, respectively.

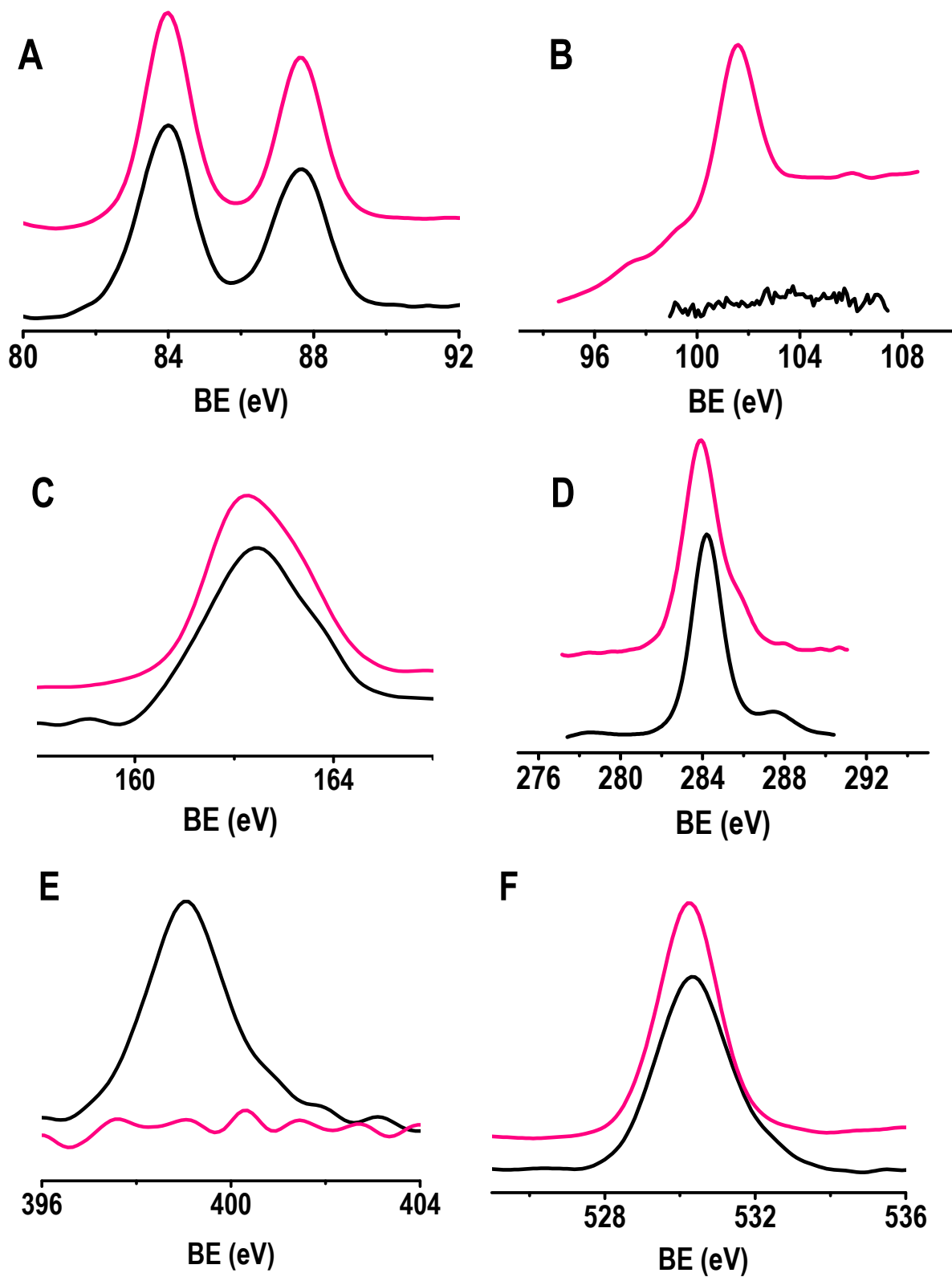


Figure S5. XPS spectrum of Au4f (A), Si2p (B), S2p(C), C1s (D), N1s (E) and O1s (F) of Au_mSG_n (black trace) and $Au_{25}@MPS$ (pink trace).

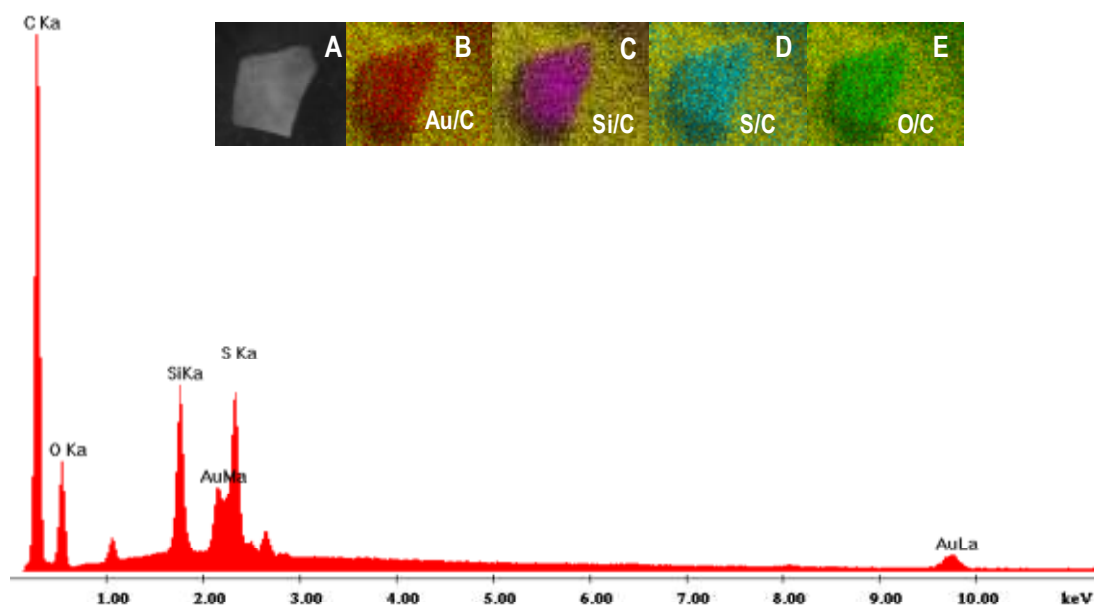


Figure S6. EDAX spectrum and the corresponding elemental mapping (A-SEM image, B-Au, C-Si, D-S, E-O) of Au₂₅@MPS. Au/C corresponds to the elemental mapping of gold overlapped on the elemental mapping of carbon for clarity.

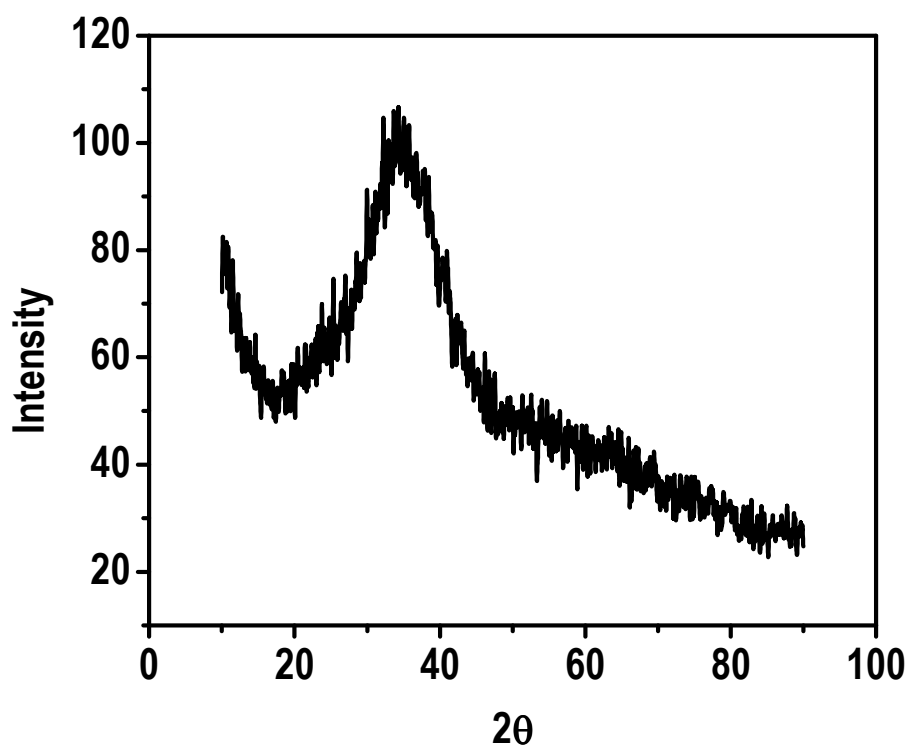


Figure S7. XRD of Au₂₅@MPS.

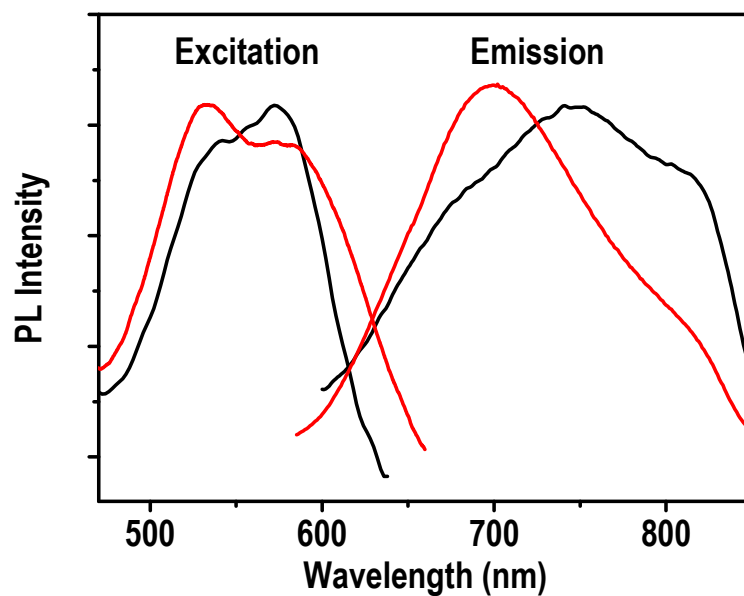


Figure S8. Photoluminescence profile of Au₂₅@MPS (black trace) is compared with that of Au₂₅SG₁₈ (red trace).

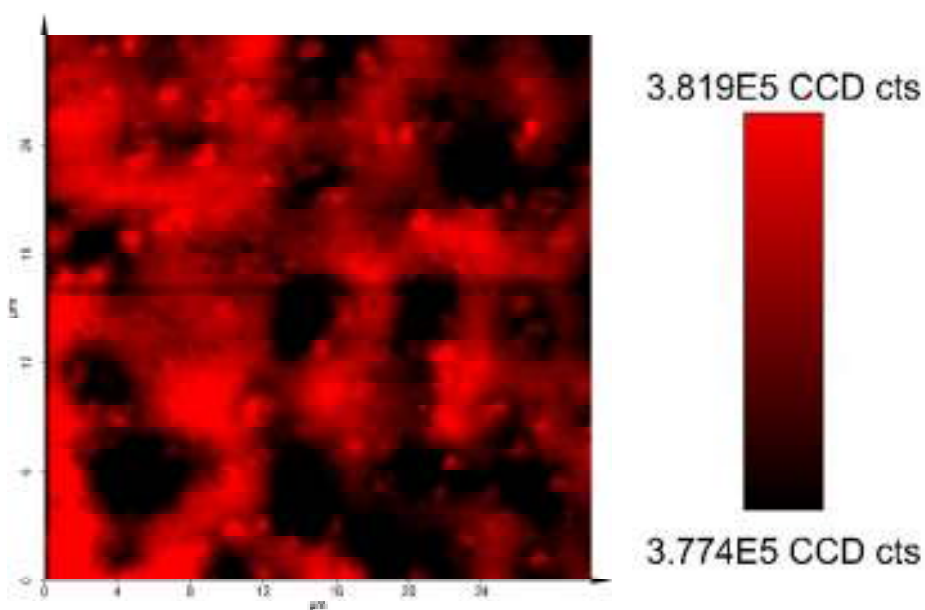


Figure S9. Inherent solid state luminescence image of Au₂₅@MPS collected by the spectroscopic mapping at an excitation wavelength of 532 nm. Regions coded red represent the pixels where the signal (used for mapping) is a maximum, the minima being represented with black. The scan area was 30 μm x 30 μm .

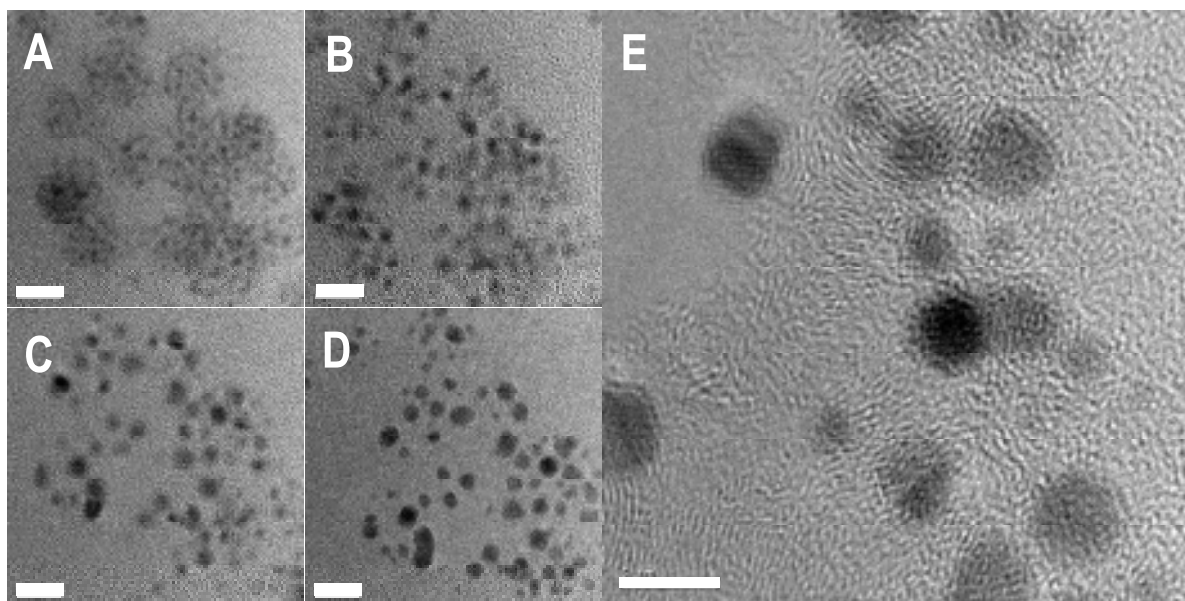


Figure S10. (A) to (D) TEM images of spherical aggregates of Au₂₅@MPS clusters as a function of electron beam irradiation (A-0 min., B-1 min., C-3 min., and D-5 min.). (E) High magnification TEM image of nanoparticles formed after the irradiation for 5 min. The scale bars corresponds to 10 nm for figures A to D and 5 nm for figure E.