Supplementary Information

Co-assembled thin films of Ag nanowires and functional nanoparticles at liquid-liquid interface by shaking

Shao-Yi Zhang,[†] Jian-Wei Liu,[†] Chuan-Ling Zhang, Shu-Hong Yu*

[†] These two authors contributed equally to this work.

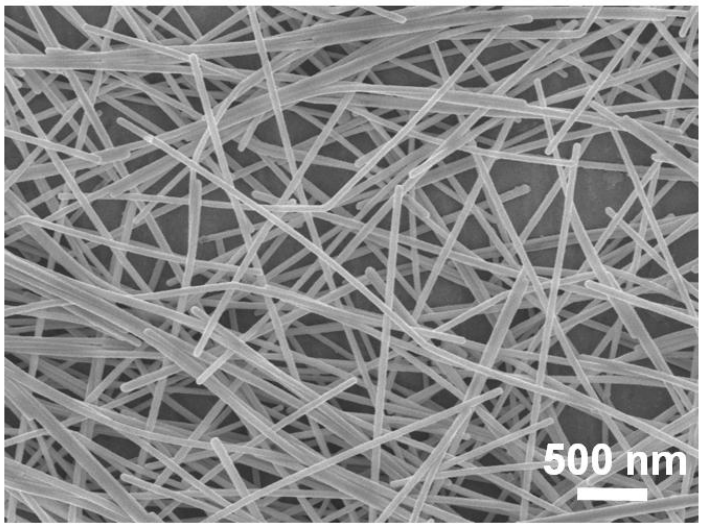

Fig. S1 SEM image of Ag nanowires.

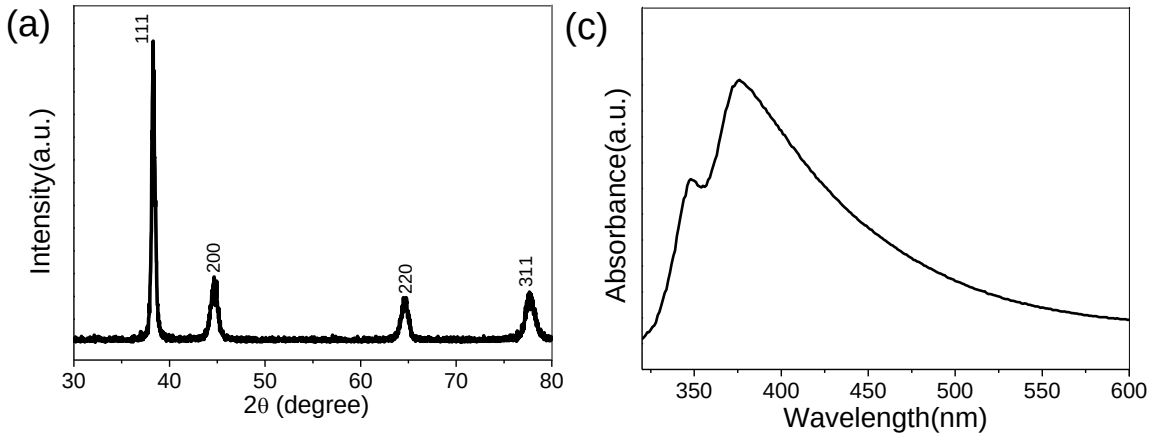

Fig. S2 (a, b) X-Ray diffraction (XRD) pattern and UV/Vis absorption spectra of Ag nanowires.

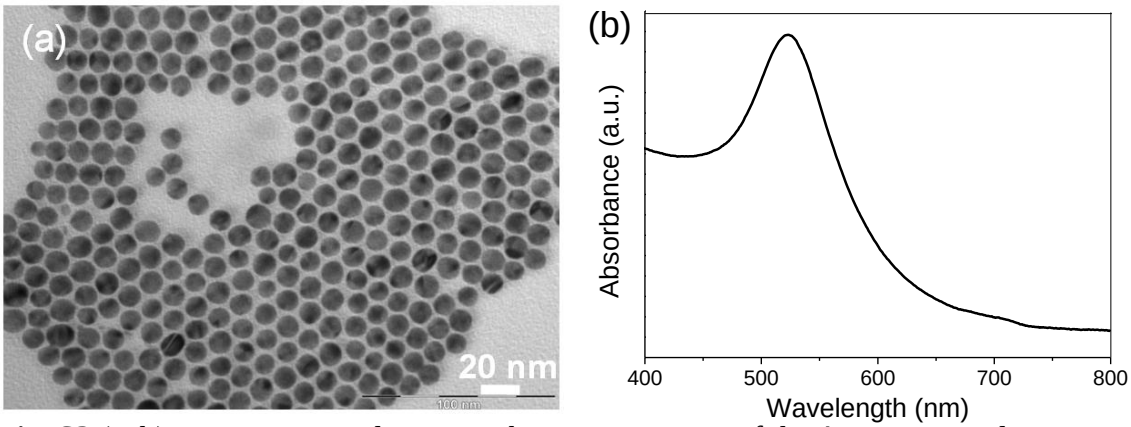

Fig. S3 (a, b) TEM image and UV-Vis absorption spectra of the Au nanoparticles.

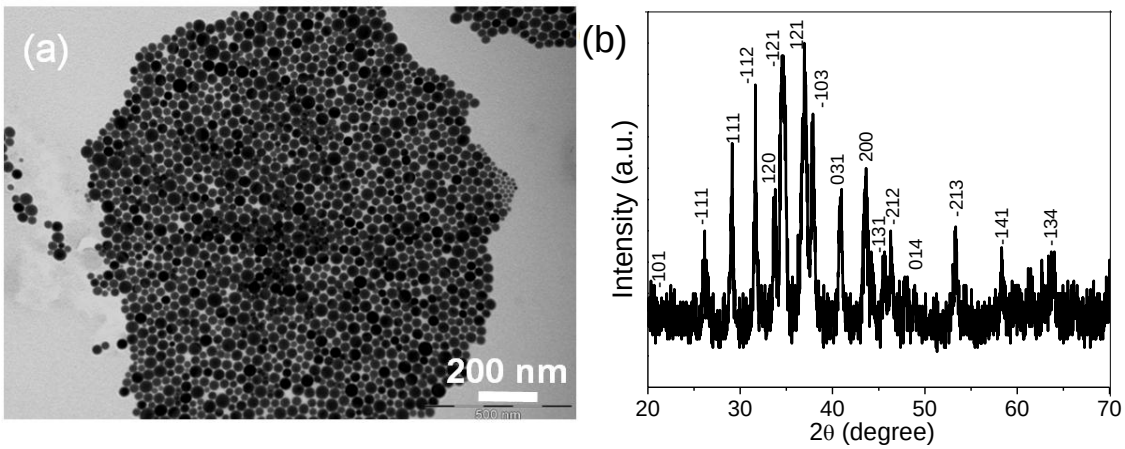

Fig. S4 (a, b) TEM image and X-ray diffraction (XRD) pattern of Ag_2S nanoparticles.

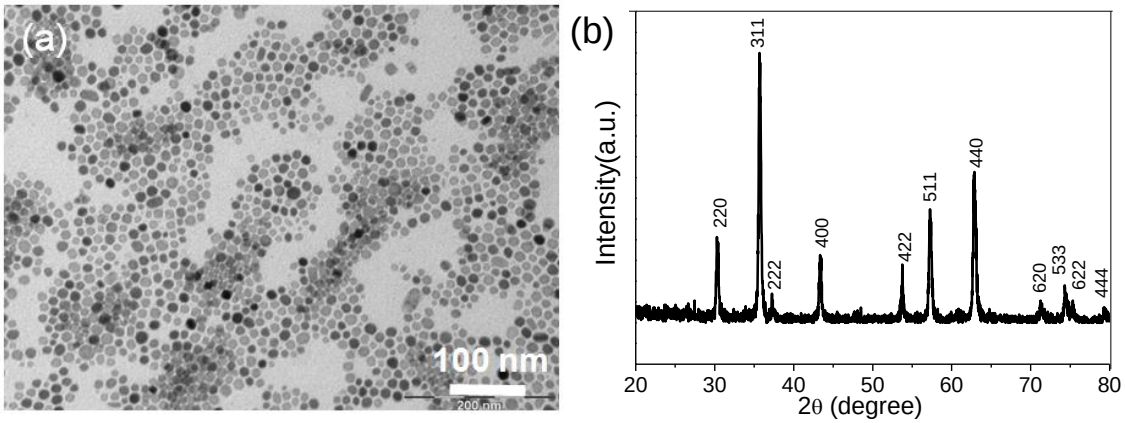

Figure S5. (a, b) TEM image and X-ray diffraction (XRD) pattern of Fe_3O_4 nanoparticles.

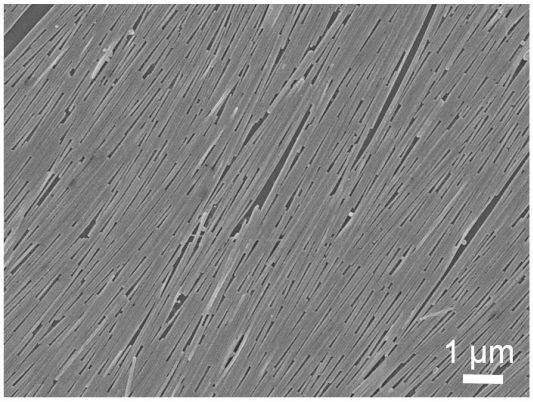

Figure S6. SEM images of co-assembled film formed by shaking the system of 2.5 mL of Ag nanowires solution (3 mM) and 2.5 mL of Au nanoparticles solution (0.8 mM) in a 7 mL centrifuge tube.

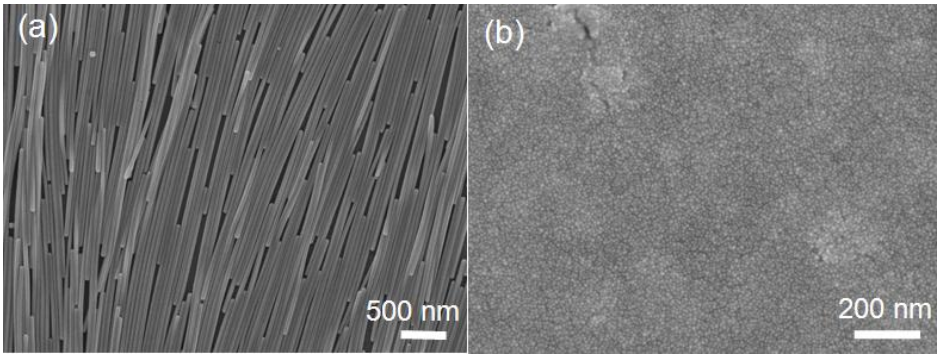

Fig. S7 (a) SEM image of assembled film of Ag nanowires. The assembled film was formed by shaking the system of 2.5 mL of Ag nanowires solution (3 mM) and 2.5 mL of chloroform in a 7 mL centrifuge tube. (b) SEM image of assembled film of Au nanoparticles. The assembled film was formed by shaking the system of 2.5 mL of water and 2.5 mL of Au nanoparticles (0.2 mM) in a 7 mL centrifuge tube.

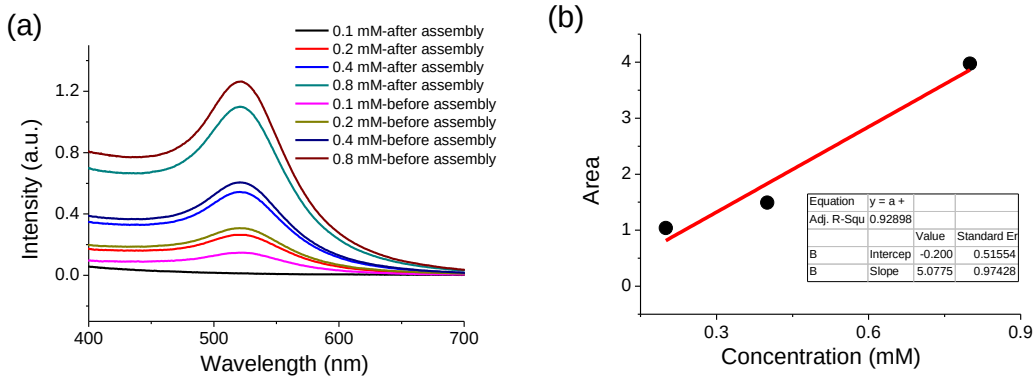

Fig. S8 (a) UV/Vis absorption spectra of the nano building-blocks before and after the assembly process to monitor the mole ratio of Ag NWs and Au nanoparticles. 2.5 mL of aqueous suspension of Ag NWs (3 mM) and 2.5 mL of chloroform suspension of Au NPs with increasing concentration about 0.1 mM, 0.2 mM, 0.4 mM, 0.8 mM, respectively. (b) Linear relationship of particle concentration and UV-vis absorption.

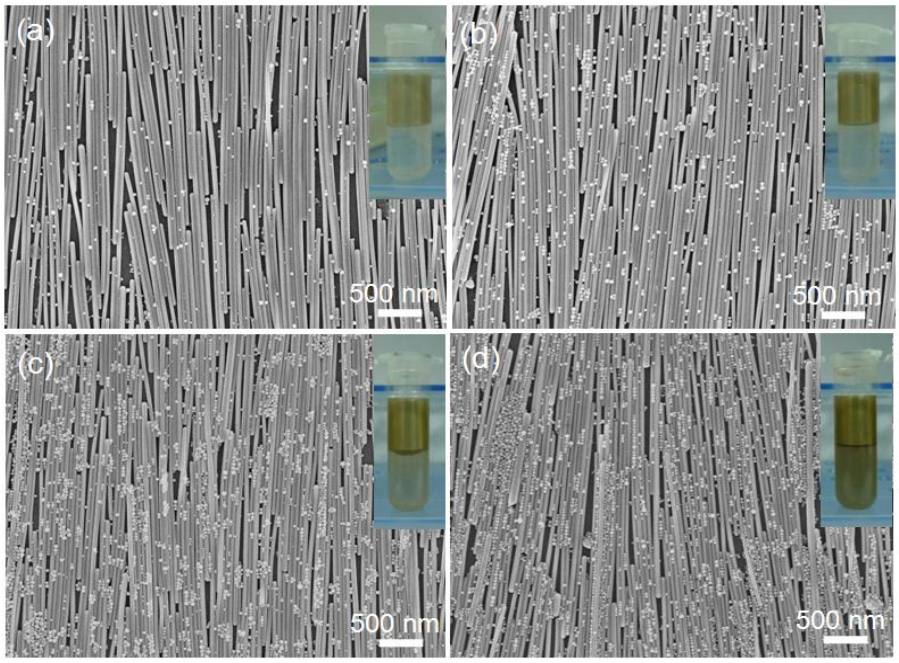

Fig. S9 (a-d) SEM images of compositional control of the co-assembly of 2.5 mL of aqueous suspension of Ag nanowires (3 mM) and 2.5 mL of chloroform suspension of Ag_2S nanoparticles with increasing concentration about 5 mM, 10 mM, 20 mM and 40 mM, respectively. The insets are digital photographs of co-assembled films in (a-d), respectively, the films were formed in 7 mL centrifuge tube.

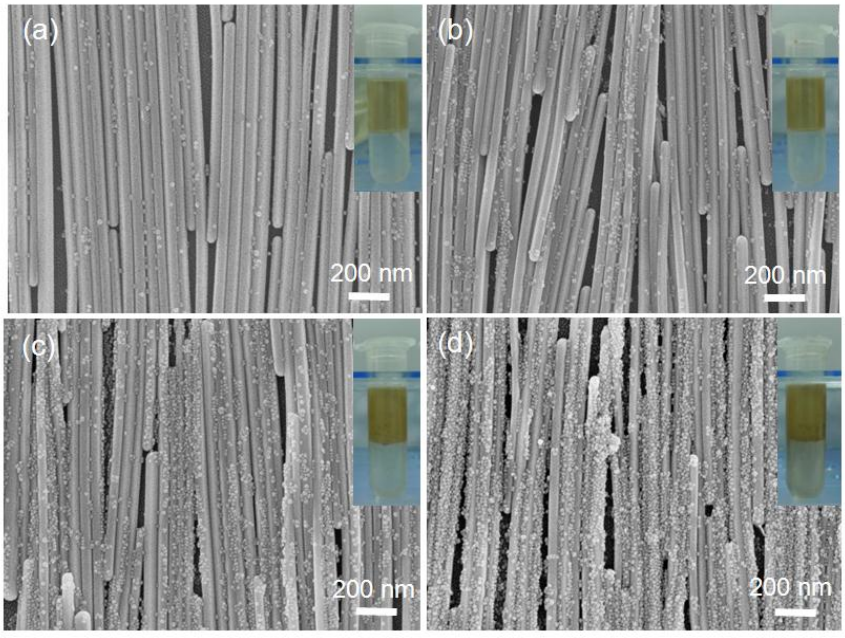

Fig. S10 (a-d)SEM images of compositional control of the co-assembly of 2.5 mL of aqueous suspension of Ag nanowires (3 mM) and 2.5 mL of chloroform suspension of Fe_3O_4 nanoparticles with increasing concentration about 0.15 mM, 0.3 mM, 0.6 mM, 1.2 mM, respectively. The insets are digital photographs of co-assembled films in (a-d), respectively, the films were formed in 7 mL centrifuge tube.

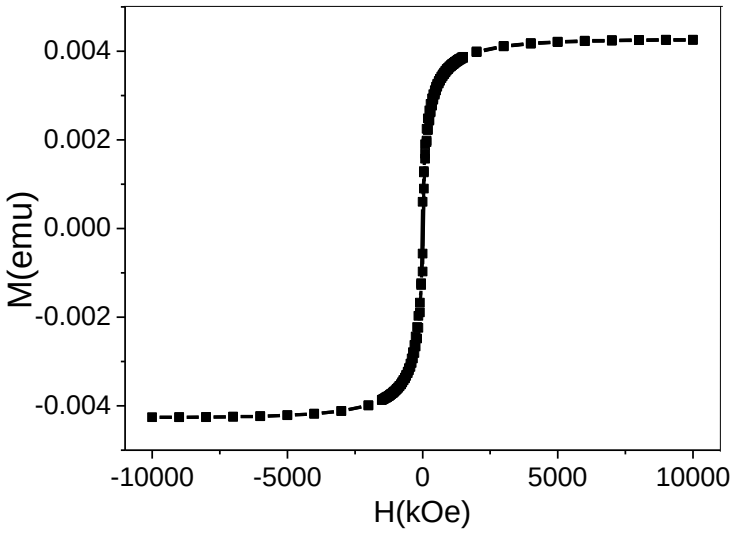

Fig. S11 Magnetization curve measured at 300 K for co-assembled film formed by shaking the system of 2.5 mL of Ag nanowires solution (3 mM) and 2.5 mL of Fe_3O_4 nanoparticles solution (1.2 mM) in a 7 mL centrifuge tube.

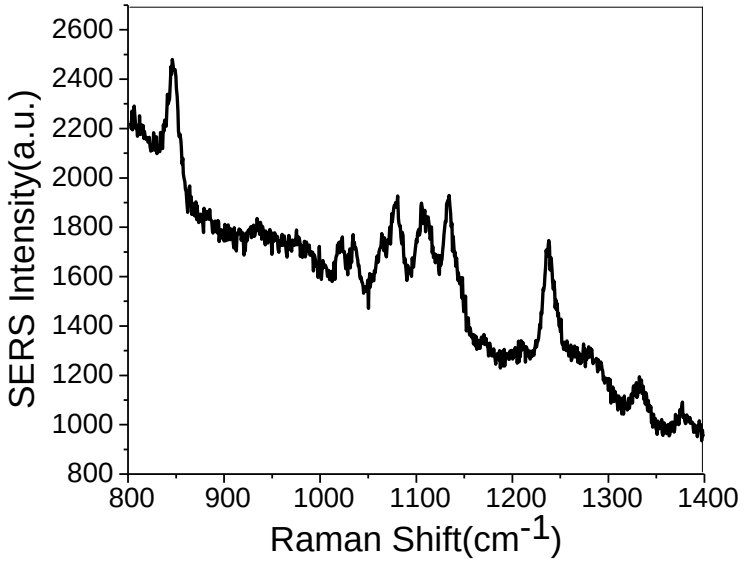

Fig. S12 SERS spectra of 10^{-7} M DTTCI molecules adsorbed on co-assembled film formed by shaking the system of 2.5 mL of Ag nanowires solution (3 mM) and 2.5 mL of Au nanoparticles solution (0.8 mM) in a 7 mL centrifuge tube. The acquisition time is 3 s.

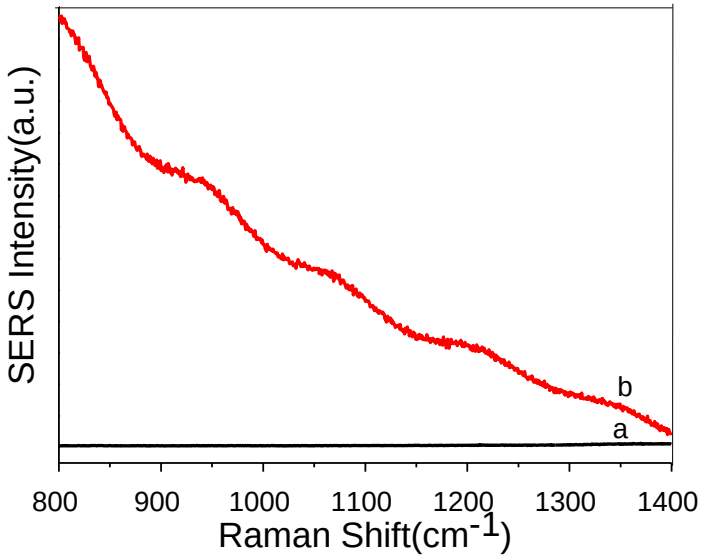

Fig. S13 (a)SERS spectra of co-assembled film without immersing in DTTCI solution, the film was formed by shaking the system of 2.5 mL of Ag nanowires solution (3 mM) and 2.5 mL of Au nanoparticles solution (0.8 mM) in a 7 mL centrifuge tube. (b) SERS spectra of 10^{-5} M DTTCI ethanolic solution. The acquisition time is 3 s.

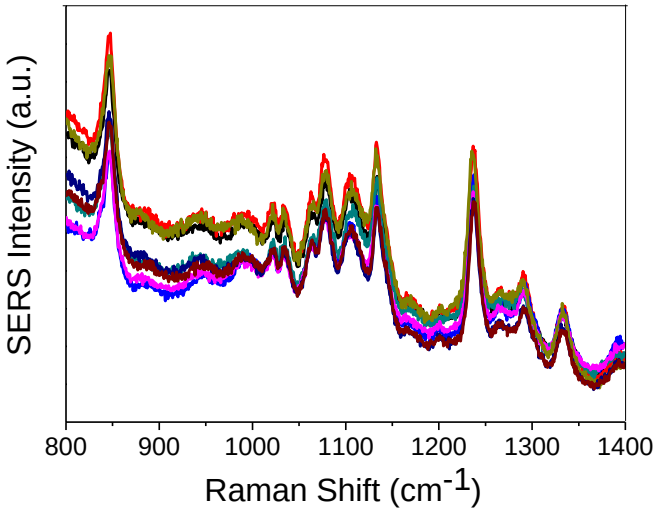

Fig. S14 SERS spectra of 10^{-5} M DTTCI molecules collected on the randomly selected eight places of the co-assembled film, the film was formed by shaking the system of 2.5 mL of Ag nanowires solution (3 mM) and 2.5 mL of Au nanoparticles solution (0.8 mM) in a 7 mL centrifuge tube. The acquisition time is 3 s.