

Supplementary Materials

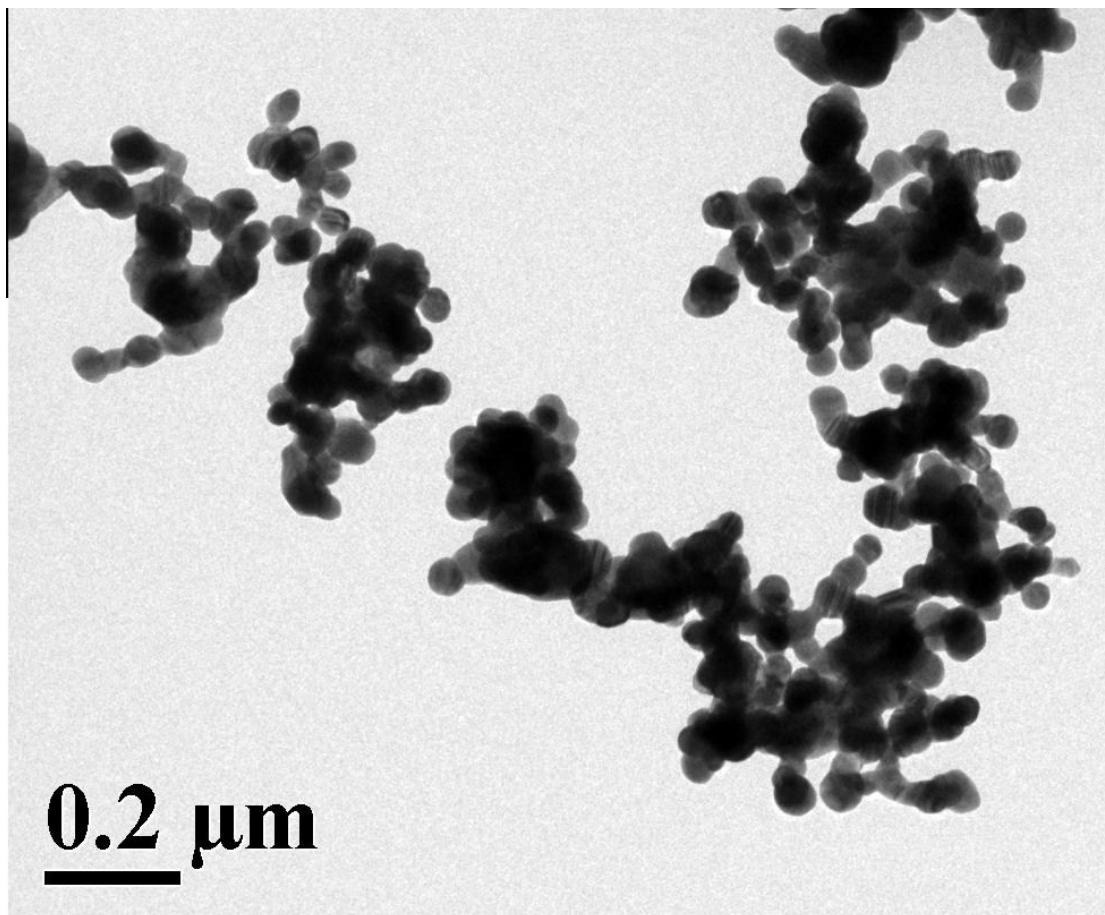
**Room-temperature mechanochemical synthesis of silver nanoparticle homojunction
assemblies for the surface-enhanced Raman scattering substrate**

Bo Lu[†], Fangyi Zhan[†], Guodong Gong[†], Yali Cao[§], Qiang Zhen[‡] and Pengfei Hu^{*†}

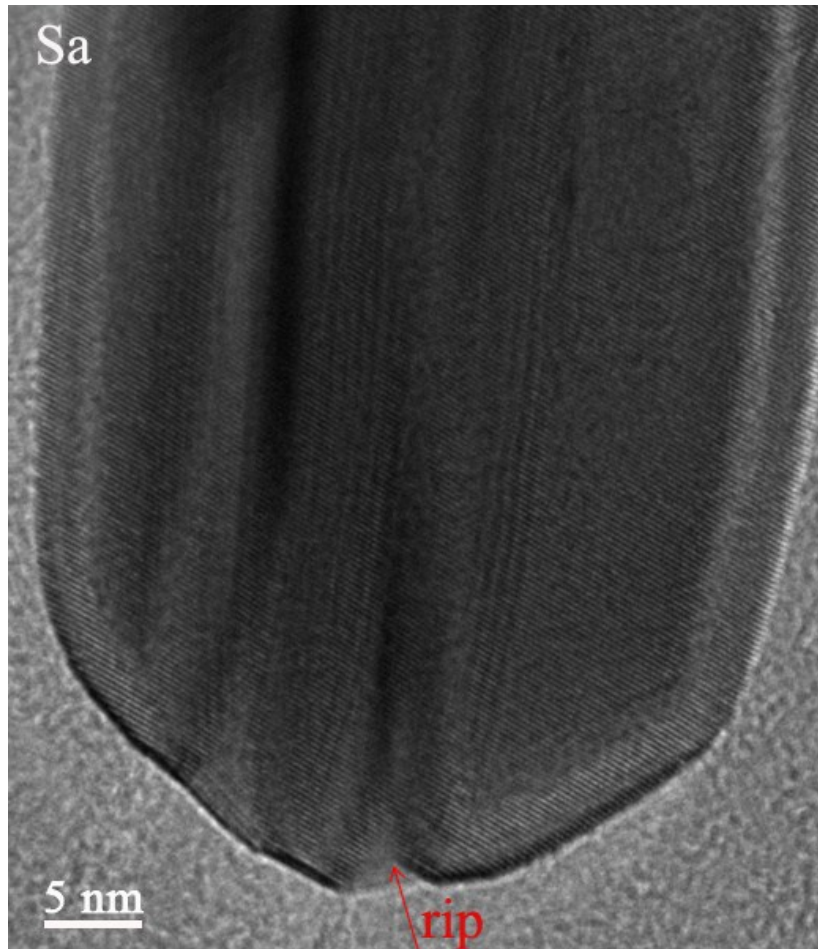
[†]Laboratory for Microstructures, [‡]Nanoscience & technology research center, Shanghai University,
Shanghai 200444, P. R. China, and [§]Institute of Applied Chemistry, Xinjiang University, Urumqi,
Xinjiang 830046, P. R. China.

* Corresponding author: Tel/Fax : +86-21-66135030; E-mail: hpf-hqx@shu.edu.cn; Postal address: Shangda Road 99#, 129 P. O. B., Shanghai, China; Postal code: 200444.

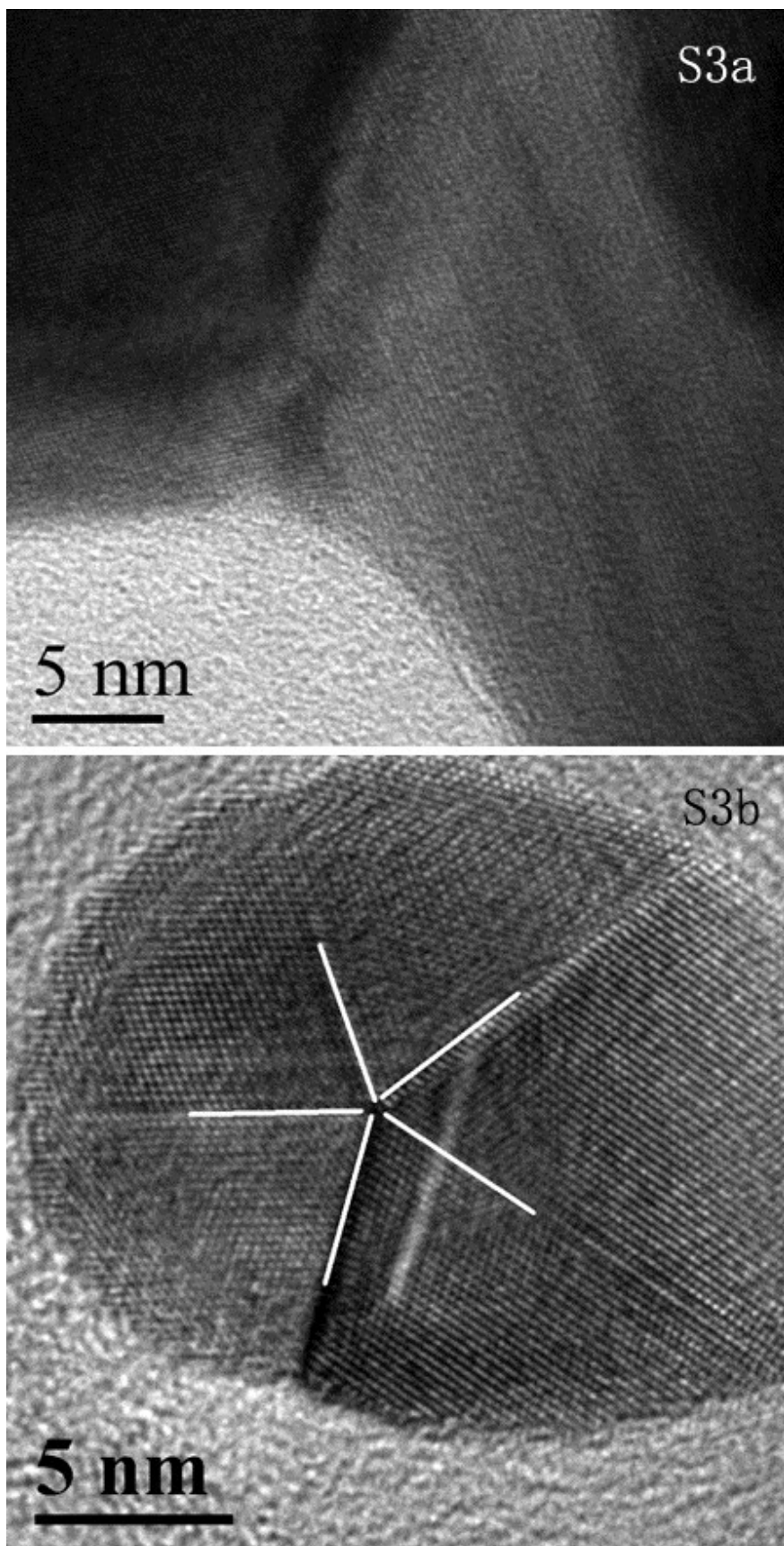
SI Figure 1. TEM image of Ag/Ag-HJAs in $S_{\text{PEG-1}}$ prepared with present method under the assistant of PEG-400 at $VM_{\text{PEG-AgNO}_3} = 1$.



SI Figure 2. HRTEM resolutions of nanoplate marked areas Sa in Figure 2A (S_{free}), which displayed the rip structure of the nanoplate. The width of the rip mouth is about 5 nm. But this structure is not much in the sample.



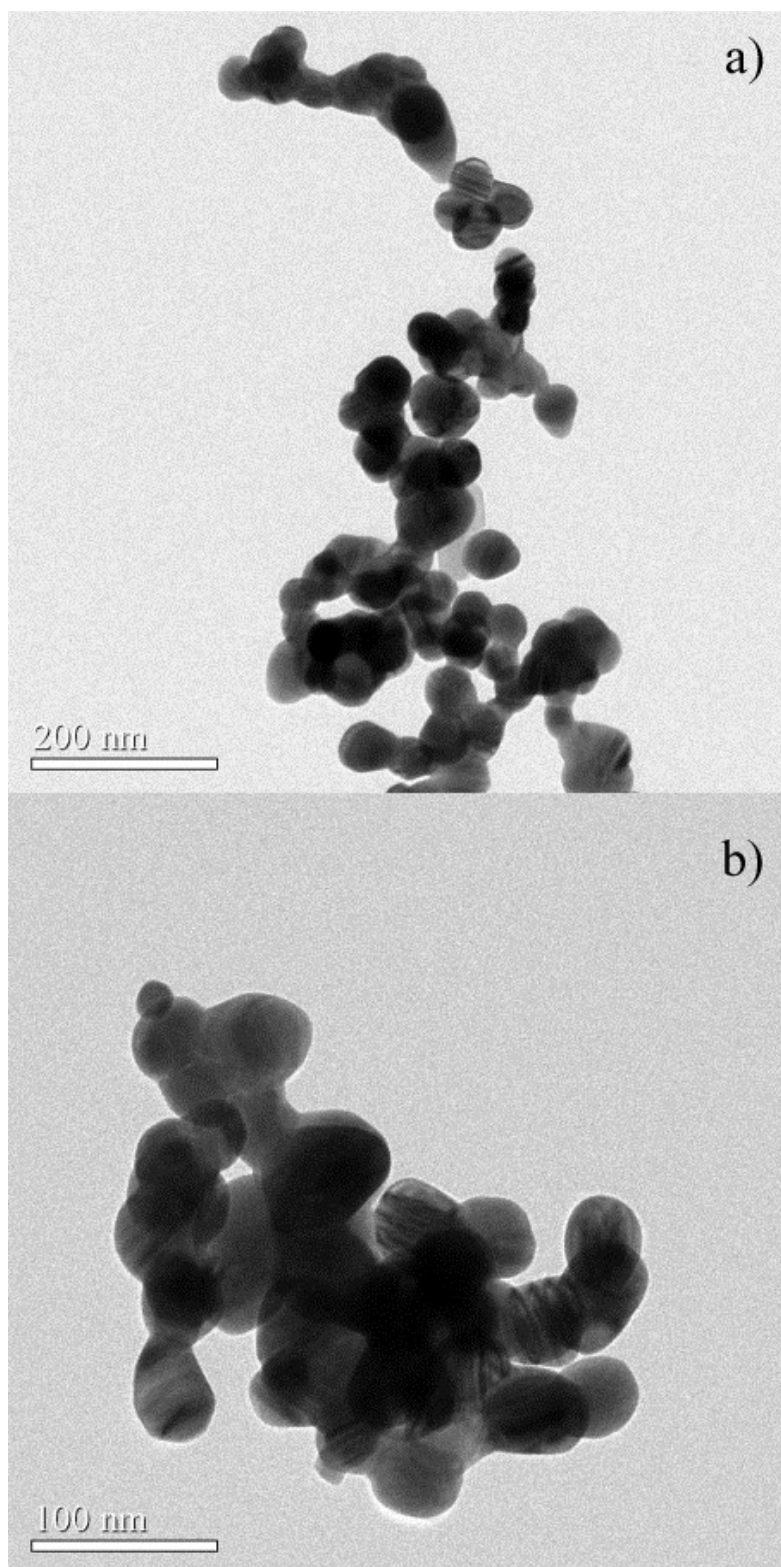
SI Figure 3. HRTEM resolutions of marked areas S3a and S3b in Figure 3b ($S_{\text{PEG-2}}$).



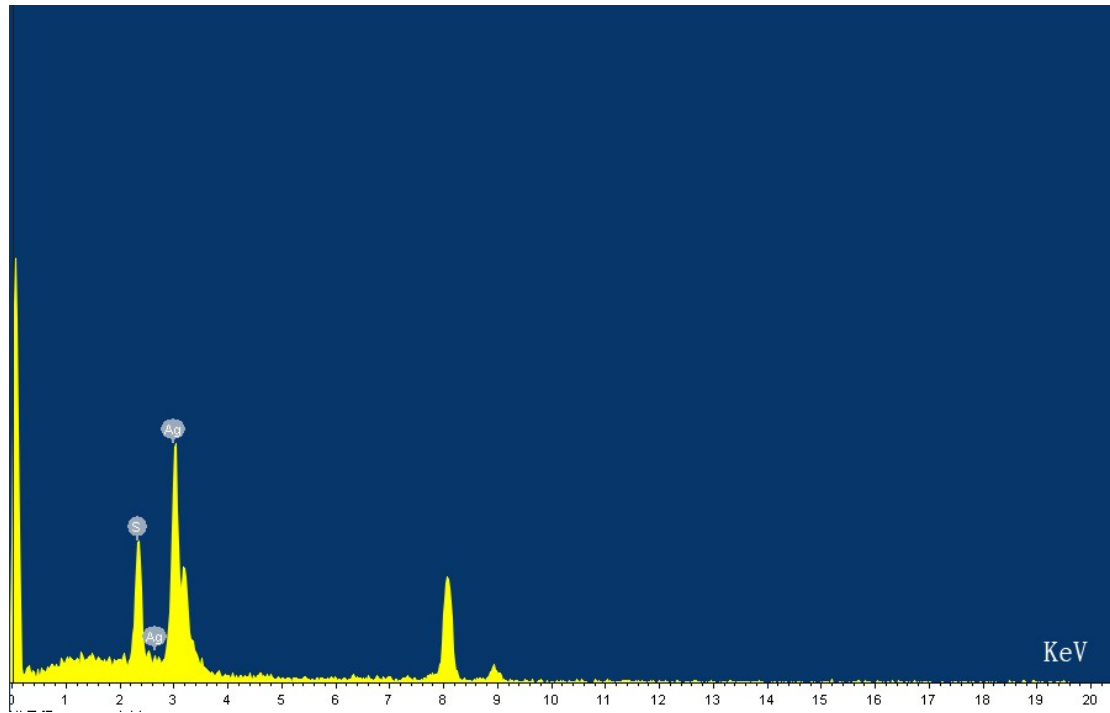
SI Figure 4. The skeleton symbol of PEG-400.



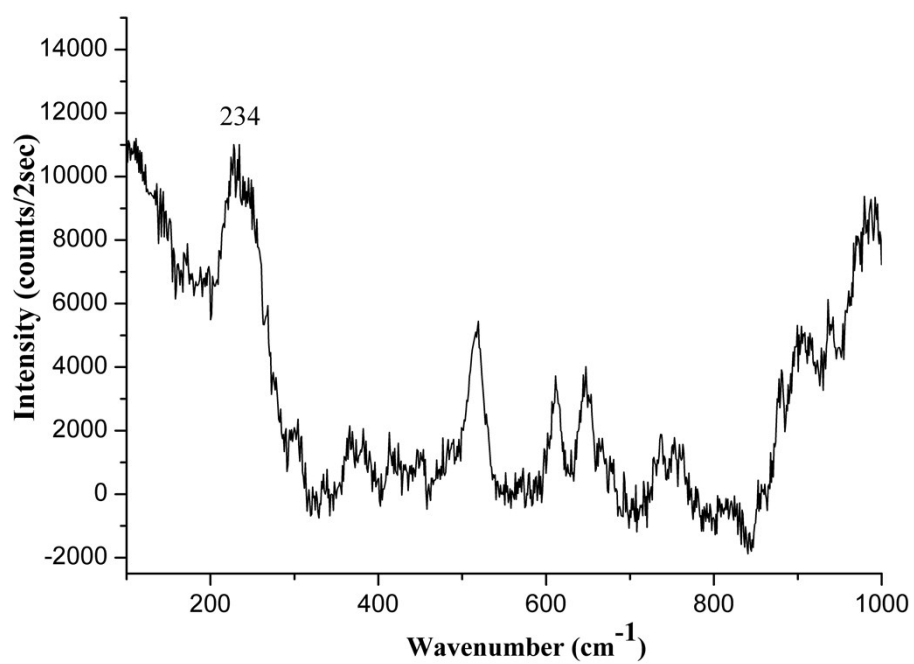
SI Figure 5. TEM images of Ag/Ag-homojunction structures obtained with PEG-200 a), and PEG-600 b) under $VM_{\text{PEG-AgNO}_3} = 1$.



SI Figure 6. EDS spectrum of the sample which was deliberately exposed in the atmosphere for 1.5 years. The pattern shows that the silver sulfide (Ag_2S) has formed on the surface of the sample, arising from the sulfur affinity of silver (sulphophile element). When the silver was exposed in the atmosphere, it can preferentially react with the sulfur species in the air.



SI Figure 7. SERS spectra of R6G (10^{-6} M) adsorbed on $S_{\text{PEG-1}}$.



SI Figure 8. TEM image of Ag/Ag-HJAs in S_{PEG-1}, which clearly displays the rich junction structure.

