

Supporting Information

Decoration of Au Nanoparticles on MoS₂ Nanospheres: From Janus to Core/shell

Structure

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1. Preparation of SERS substrates and Raman spectral measurements:

Five pieces of silicon wafers, 0.3 cm × 0.3 cm in size, were cleaned with deionized water and ozone. The colloidal solutions of the Au-MoS₂ Janus NPs, the spherical MoS₂ with or without dispersed Au NPs' decoration, the MoS₂ nanoplates (purchased from Shanghai Mclean Biochemical Science and Technology Co., Ltd.) with or without dispersed Au NPs' decoration, were alternatively dropped onto the silicon wafers and drying at 60 °C, until the surface of the wafer was completely covered with MoS₂ NPs or nanoplates. The pure Au nanoparticles with 20 nm in size were prepared as previously described [Ref.S1]. The pure Au NPs-built film was fabricated in the same way as above. The films were thus obtained and about several microns in thickness.

Rhodamine 6G (R6G) molecules were chosen as the probe molecules. The as-prepared films were used as SERS substrates and soaked in 30 mL R6G solution with 10⁻⁶ M for about 10 hours. The films were then taken out from the solution and washed with deionized water for several times before drying and Raman measurement. Raman spectra were measured on a confocal Raman spectrometer (Renishaw RA100) by 532 nm laser excitation. The exposure time was 10 s. The laser power was 0.5 mW and the diameter of laser spot on the substrates is

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about 1 μm .

[Ref.S1] Zhang, P.; Li, Y.; Wang, D.; Xia, H. High-Yield Production of Uniform Gold Nanoparticles with Sizes from 31 to 577 nm via One-Pot Seeded Growth and Size-Dependent SERS Property. *Part. Part. Syst. Character.* **2016**, 33, 924–932.

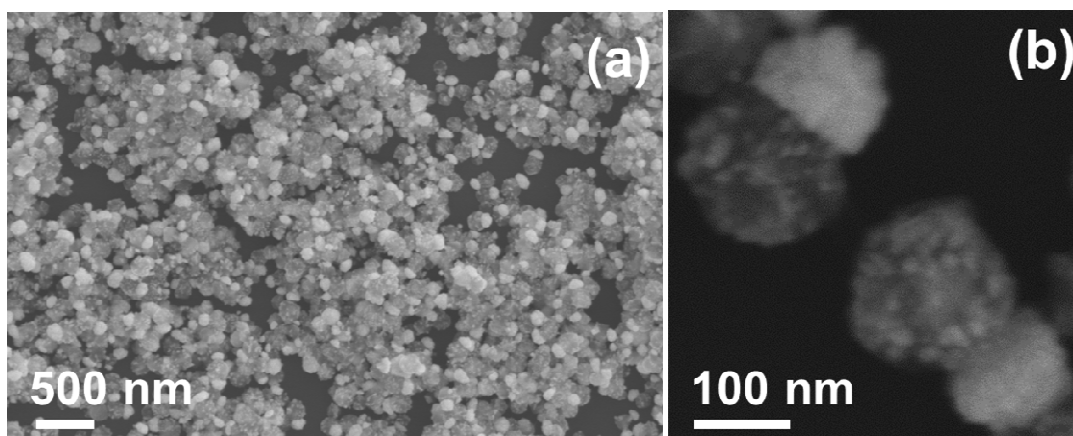


Figure S1 (a): The FESEM image of the products after addition of 100 μL HAuCl_4 solution without PVP into the MoS_2 colloidal solution. (b): The magnified image of two MoS_2/Au Janus particles.

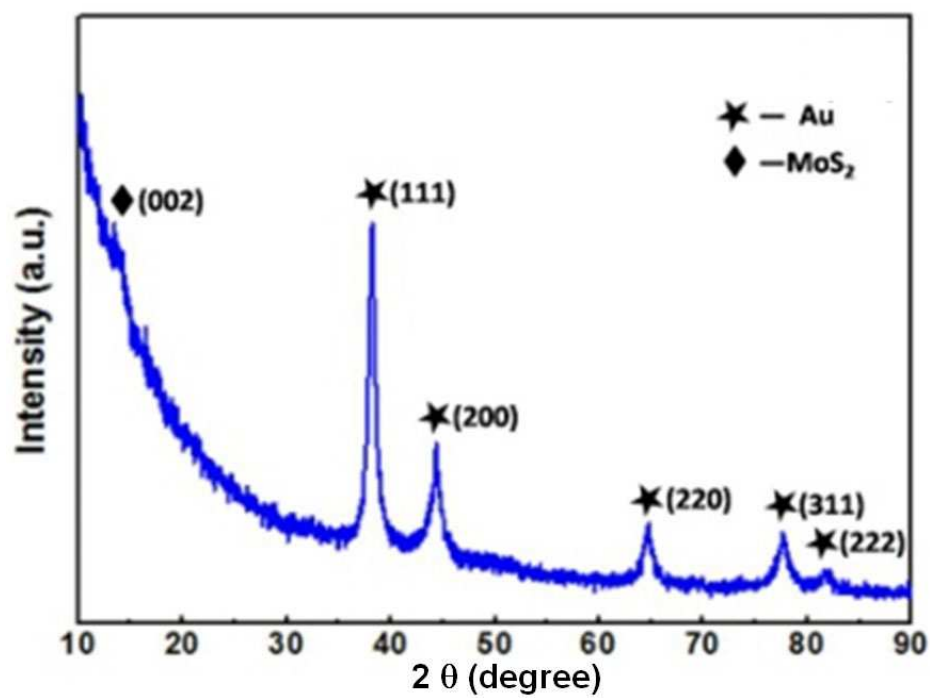


Figure S2 The XRD pattern of the products obtained by addition of HAuCl₄ solution into the MoS₂ colloidal solution with 0.03mM PVP.