

Supporting Information

Electrophoretic Fabrication of Silver Nanostructure/Zinc Oxide Nanorod

Heterogeneous Arrays with Excellent SERS Performance

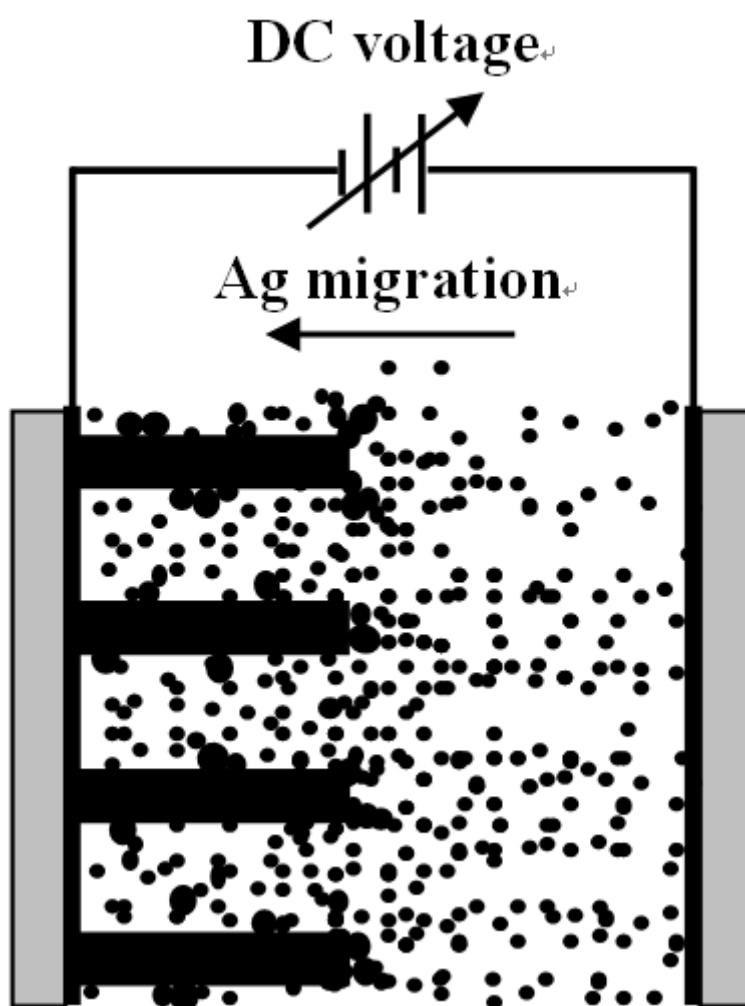
Hui He,^{‡a} Huoquan Li,^{‡a} Weiwei Xia,^a Xiaoshuang Shen,^a Min Zhou,^a Jiurong Han,^a
Xianghua Zeng^{a*} and Weiping Cai^b

a College of Physics Science and Technology, Yangzhou University, Yangzhou 225002, P. R. China.

b Key Laboratory of Materials Physics, Anhui Key Laboratory of Nanomaterials and Nanotechnology, Institute of Solid State Physics, Chinese Academy of Sciences, Hefei 230031, P. R. China.

* To whom all correspondence should be addressed. E-mail: xhzeng@yzu.edu.cn.

‡ These authors contributed equally to this work.



Scheme S1. Schematic illustration for the fabrication of Ag nanostructure/ZnO nanorod heterogeneous arrays based on EPD in the Ag colloidal solution formed by laser ablation in water.

Figure S1 Hui He et al

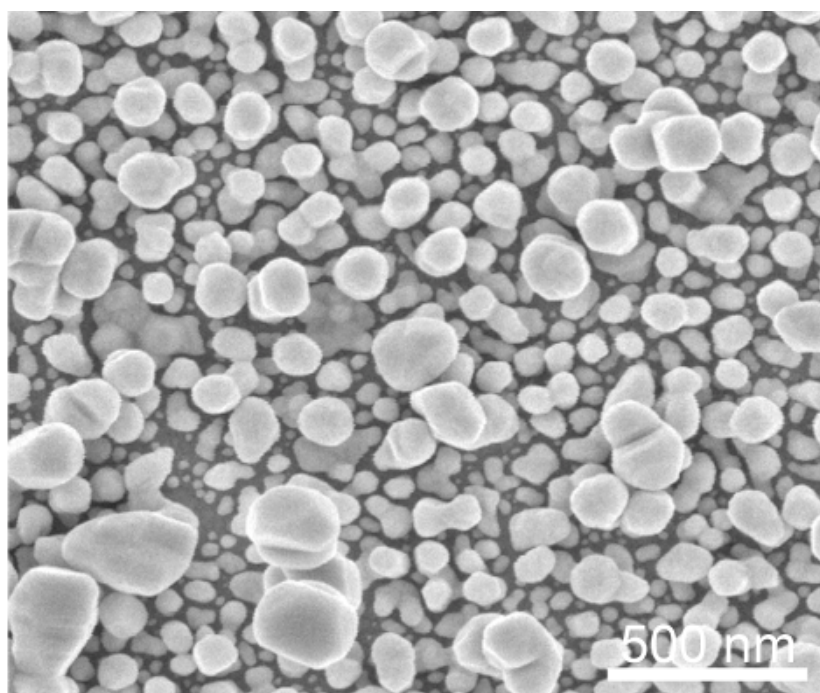


Figure S1. FESEM image of the corresponding 2D Ag nanoparticle film coated on a planar ZnO substrate under the same preparation conditions used for the sample shown in Figure 2c (for comparison).

Figure S2 Hui He et al

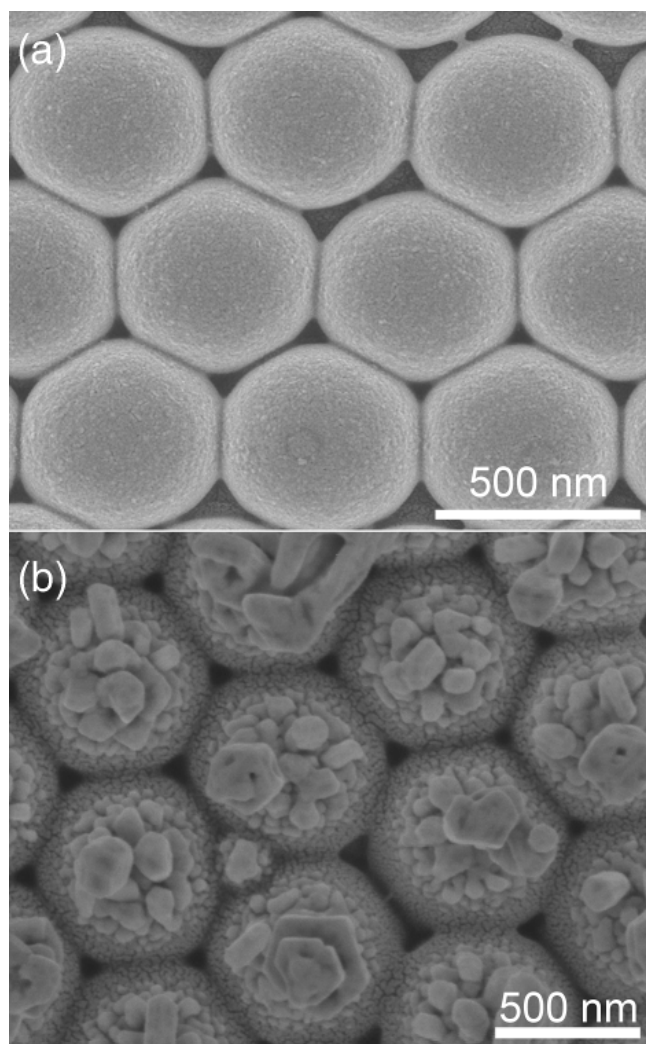


Figure S2. FESEM images of the (a) Au-coated monolayer polystyrene sphere template and (b) deposited Ag nanostructures on it after EPD for 30 min in the Ag colloidal solution shown in Figure 1b.

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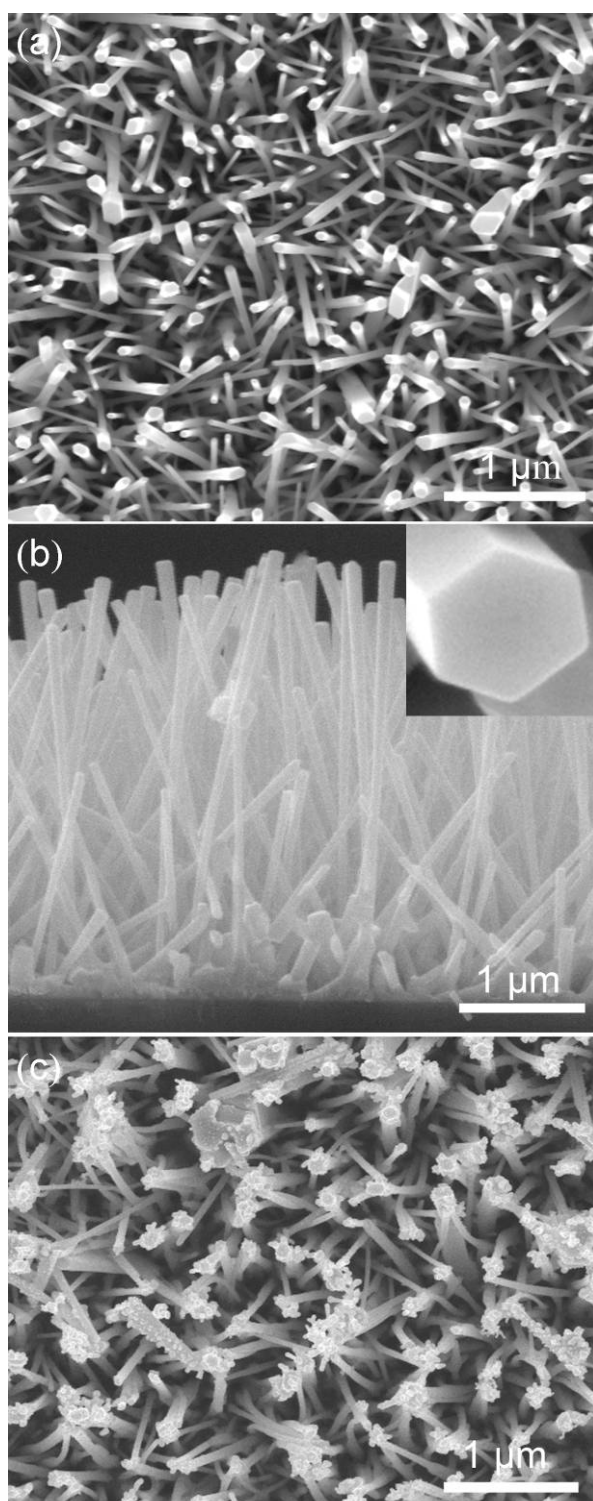


Figure S3. FESEM images of the (a, b) thin ZnO nanorod arrays and (c) deposited Ag nanostructures on it after EPD under the same experimental conditions used for the sample shown in Figure 2c. Inset: the magnified image of an individual nanorod.

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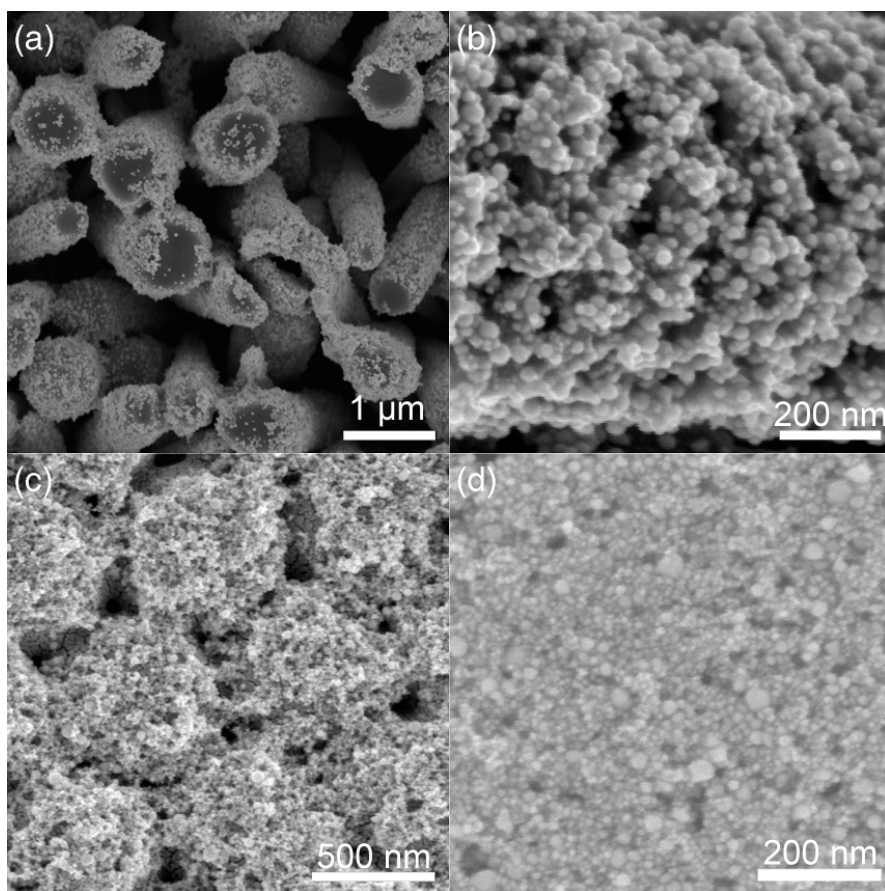


Figure S4. FESEM images of the Ag nanoparticle films produced using EPD for 30 min in the Ag colloidal solution formed by laser ablation in an aqueous solution of 20 mM sodium dodecyl sulfate [$C_{12}H_{25}SO_4Na$ (SDS)] and deposited on (a, b) the ZnO nanorod array shown in Figure 2a, (c) a monolayer polystyrene sphere template, and (d) a flat ZnO film. Panel b contains a magnified side view of one nanorod in panel a.

Surfactants are mainly used to ensure the chemical stability of Ag colloidal nanoparticles during deposition by electrophoresis. If the applied amount of surfactant is sufficient, the colloidal nanoparticles will become stable and exhibit EPD behaviors that are similar to those of Au, without any assemblies on flat or 3D structured substrates.

Figure S5 Hui He et al

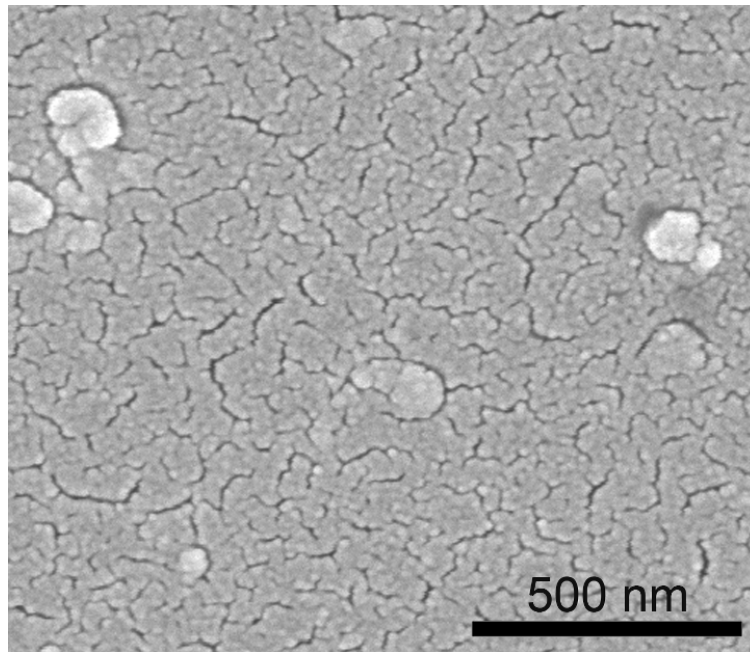


Figure S5. FESEM image of smooth Ag film prepared by ion-sputtering deposition (for SERS comparison).

Figure S6 Hui He et al

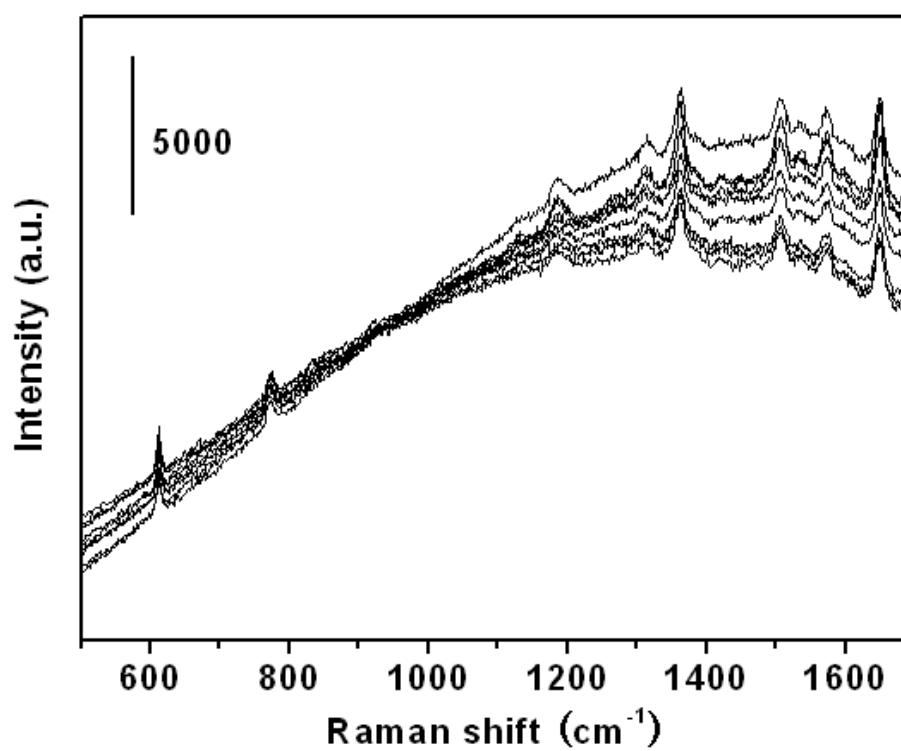


Figure S6. Raman spectra of 10^{-12} M R6G collected from 9 randomly selected sites on the Ag-decorated thick ZnO nanorod array shown in Figure 2c. Data integration time = 2 s.