Supporting Information

Efficient Dual Functional Raman and Fluorescence Detection Platform Achieved by Controlling Electromagnetic Enhanced Field in Three-dimensional Ag/ZnO Composited Arrays

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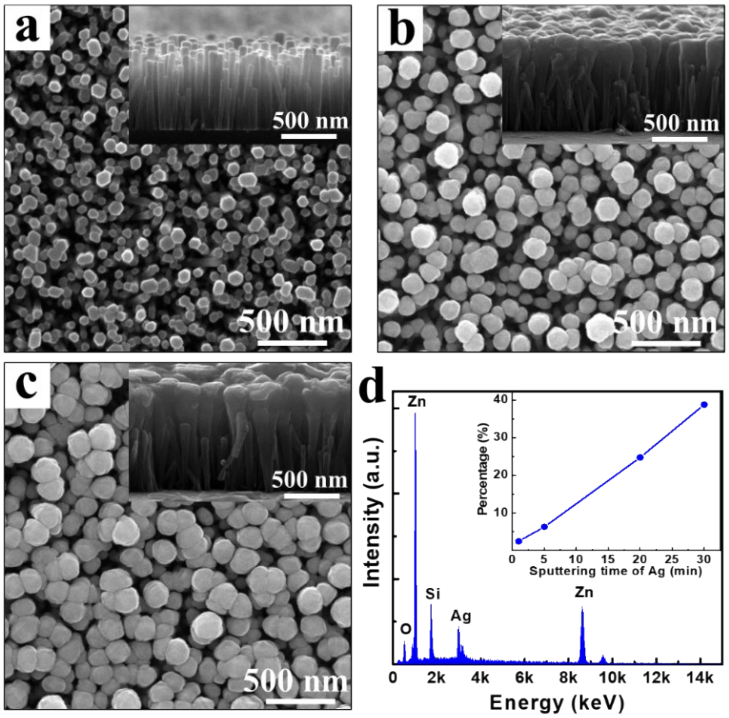

Figure S1. SEM images of Ag/ZnO NRs with different Ag deposition duration of (a) 0 min, (b) 20 min, and (c) 30 min. (d) EDS spectrum of Ag/ZnO (insert figure: Ag content in total samples with 1 min, 5 min, 20 min, and 30 min).

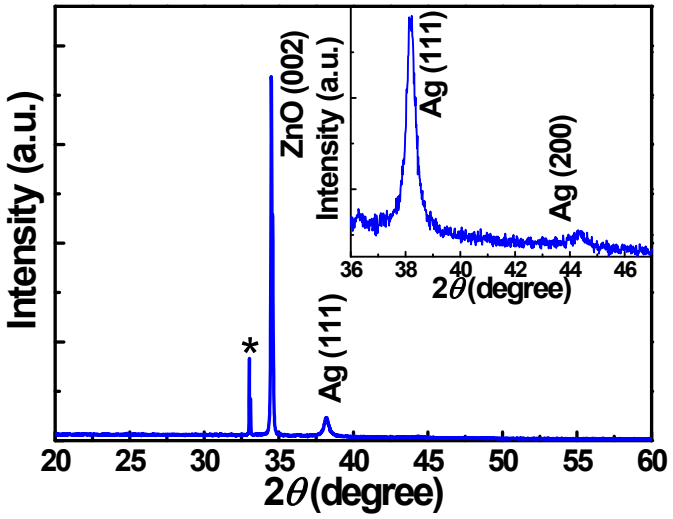

Figure S2. XRD patterns of Ag/ZnO with 1min Ag decorated time. The asterisk represents the silicon substrate.

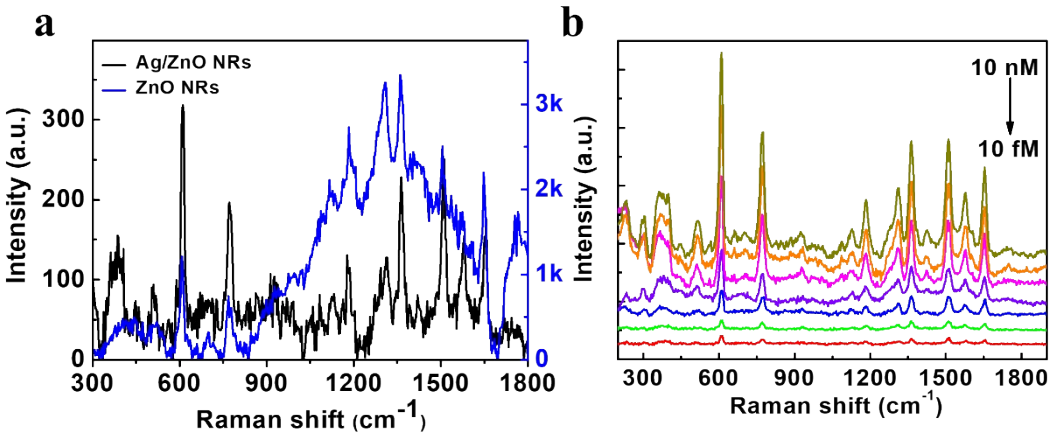

Figure S3. (a) Raman spectra of R6G molecules on Ag/ZnO NRs and ZnO NRs. (b)The Raman spectra of R6G dye against concentration obtained from 20 min Ag deposited NRs.

The SERS activity of the Ag/ZnO NRs was estimated by measuring the enhancement factors (EF) of the R6G peak at 1650 cm^{-1} using the formula: $EF=(I_{SERS}/I_{REF})\times(C_{REF}/C_{SERS})$. Where C_{SERS} is the concentration of R6G molecules on the Ag/ZnO NRs substrate (C_{SERS} = 10 fM) and C_{REF} is the standard Raman spectra of the ZnO NRs substrate ($C_{REF} = 10^{-1}$ M). Here, the Raman intensity of Ag/ZnO NRs (I_{SERS}) and ZnO NRs (I_{REF}) are 176 and 2200 units at the peak of 1650 cm^{-1}, respectively. So, the EF is estimated to be 8×10^{11}.

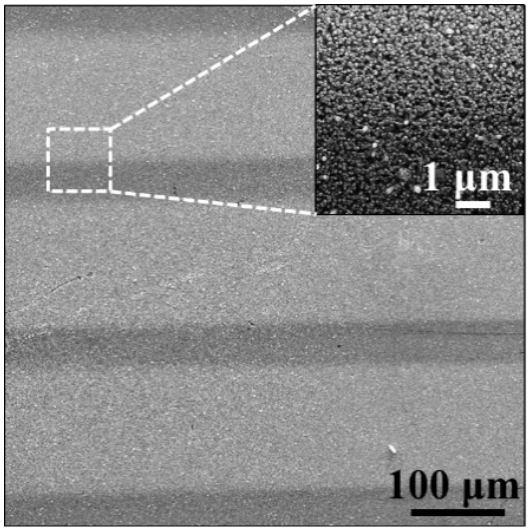

Figure S4. SEM images of patterned substrates with alternative Ag/ZnO (flat section) and bare ZnO zone (narrow part), the close-up view on the interfacial regime.

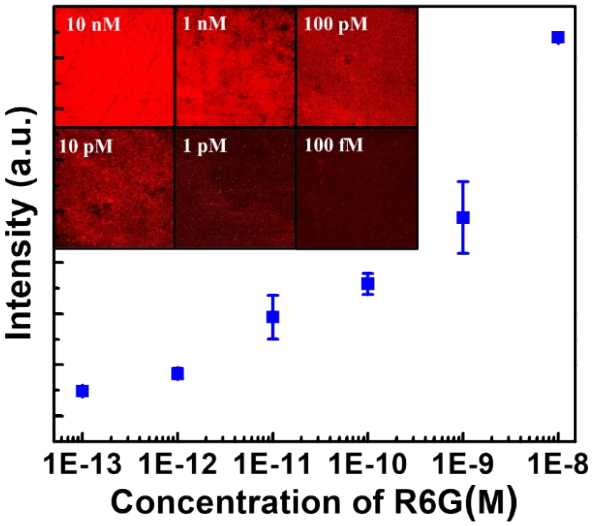

Figure S5. The fluorescence images and intensity of R6G dyes with concentration from 100 fM to 10 nM obtained from 20min Ag deposited NRs, respectively.