Electronic Supplementary Material (ESI) for Nanoscale

Supporting Information

Highly Effective SERS Substrates Based on Atomic-layer-deposition-tailored Nanorod Array Scaffold

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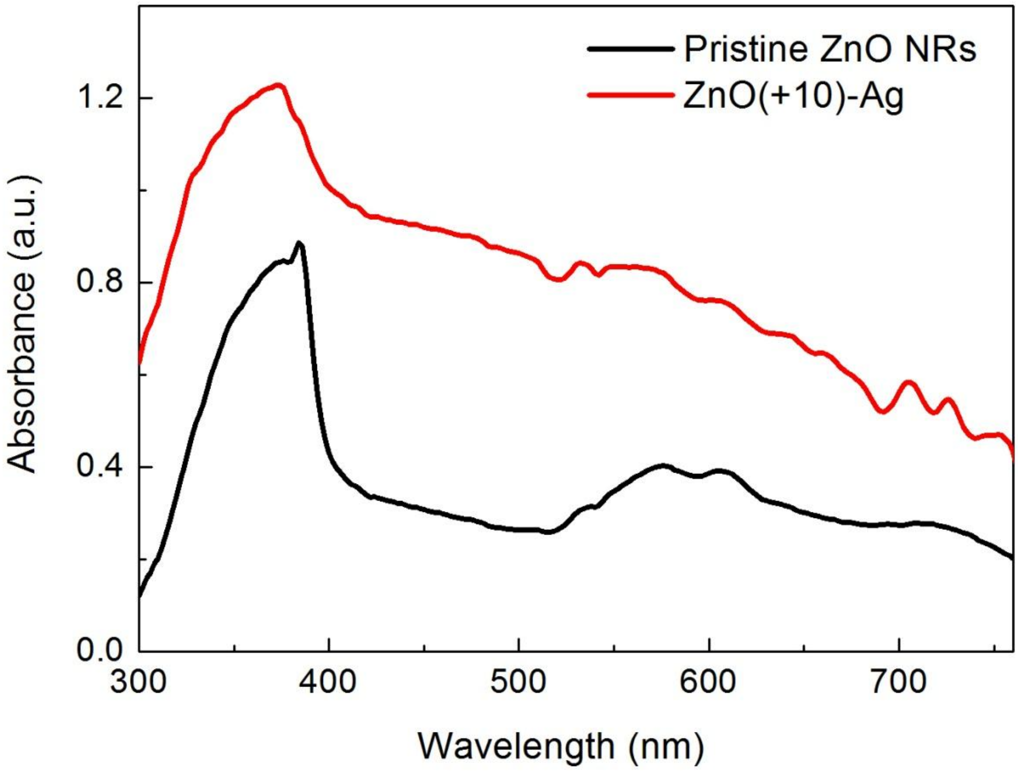

Figure S1 Absorbance of pristine ZnO NRs and SERS substrate of ZnO(+10)-Ag. The number in the parenthesis denotes the ALD coating thickness. Note that the decrease of absorption below 400 nm is due to the detector limit.

Figure S1 shows the UV-vis absorbance (relative) of pristine ZnO scaffold and a typical SERS substrate of ZnO(+10)-Ag. The strong and sharp absorption between 200 and 420 nm is attributed to the ZnO absorption in the UV region. For pristine ZnO NRs, the absorption between 500 and 650 nm is attributed defects. For ZnO(+10)-Ag, no evident absorption peak corresponding to the Ag surface plasmon resonance (SPR) could be observed which would be around 600 nm. The absence of SPR absorption of Ag nanoparticles is most probably due to the small amount of Ag nanoparticles by sputtering. It is noted that, SPR absorption peak of individual Au nanoparticles obtained by similar sputtering has been indeed observed using electron energy loss spectroscopy (EELS, data not shown here). One feature one can see is that, the absorption of ZnO(+10)-Ag in the whole UV-vis range has undergone a broadband increase with a ratio of 2-3 folds. This increase is an indication of a non-resonant effect of the plasmonic field concentration [1] as mentioned in the introduction part of the text.

[1] H. Ditlbacher, A. Hohenau, D. Wagner, U. Kreibig, M. Rogers, F. Hofer, F. R. Aussenegg and J. R. Krenn, Phys. Rev. Lett., 2005, 95.