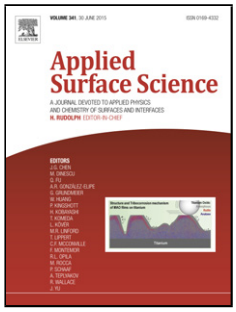

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Synergistic effects of semiconductor substrate and noble metal Nano-particles on SERS effect both theoretical and experimental aspects*

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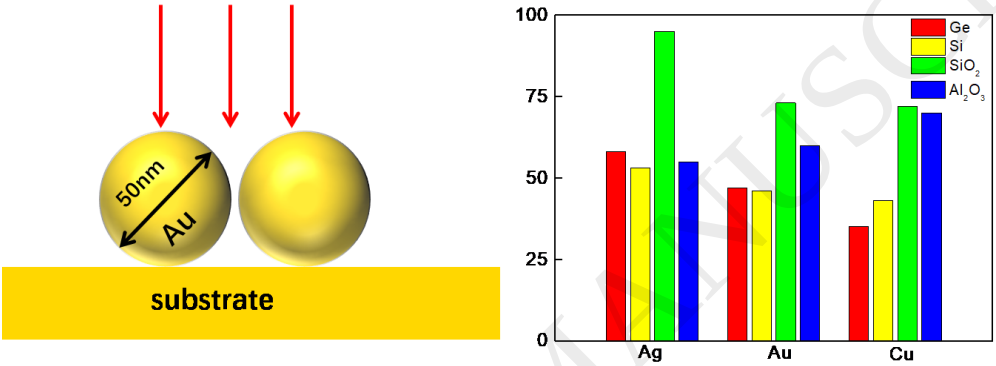
Graphical abstract



Hightlights

- SERS effect of Ag, Au, Cu increases with the decreasing of the inter distance of particles. While the distance of the NPs reaches the critical value of 3 nm, the strength of SERS effect will be greatly enhanced.
- SERS effect of Ag on Ge> Si; the SERS effect of Agon SiO_2 >Al_2O_3; the SERS effect of Ag on SiO_2 >Ge. For Au and Cu nanoparticles, the SERS effect of them on oxide substrate is stronger than that on non-oxide substrate.
- Silver nanoparticles prepared by chemical method show thatthe SERS enhancement effect of Ag-SiO_2 substrate is best.

Abstract As a means of chemical identification and analysis, Surface enhanced Raman spectroscopy (SERS), with the advantages of high sensitivity and selectivity, non-destructive, high repeatability and in situ detection etc., has important significance in the field of composition

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