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Surface Enhanced Raman spectroscopy substrates: towards sensitive bio-sensing of infectious diseases

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Surface-enhanced Raman spectroscopy (SERS) is a phenomenon that amplifies conventional Raman signal with roughened metallic substrates. Gold and silver metallic nanoparticles are commonly used as SERS substrates. The application of SERS in diagnostics yields sensitivity, multiplexing, and quantification of disease causatives. However, the understanding of the SERS architecture and mechanism is still elusive. Hence the use of density functional theory (DFT) to study its chemistry. DFT is used to study the interaction of the metallic substrates with SERS tags and biological molecules. The simulation results inform experimental work towards the fabrication of reproducible, sensitive, qualitative SERS biosensors.

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