

## Investigation of Core-Shell Nanoparticle in a Confined Space of a Periodic Substrate Based on SERS

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In this paper, surface enhanced Raman scattering (SERS), a key application of plasmonics, is investigated. Since this technique is based on the interaction of light with nanostructures with proper dimensions and material, finding proper materials and calculating optimized nanostructure dimensions affects its output, greatly. In this report, after a general investigation of this application and modeling of parameters and the efficiency of the usage of core-shell nanoparticles (NPs) instead of pure NPs, regeneration and optimization of a structure based on SERS has been done. It is shown that by replacing pure gold nanosphere with core-shell nanosphere, the SERS enhancement factor was  $\sim 2$  times greater than the case of pure gold NP, and absorption cross-section and distribution of electric field was also greatly enhanced.

**Keywords:** SERS, Enhancement Factor, LSP, SPP.

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