

Enhanced Generation of Localized Surface Plasmon Resonance Field Condition upon Attachment of Metal Nanoparticles on Diatom Frustules

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Abstract—A simulation study on generation of localized surface plasmon resonance (LSPR) field on the frustules of diatom when different shapes of gold nanoparticles are adsorbed at the surface of the diatom frustules is presented. Diatoms are the single cell living organism and their frustules are made of silica. When metal nanoparticles are attached on the frustule of diatom it generates a strong LSPR field condition and this LSPR field condition study in metal nanostructure is important for different fields of applications including chemical and biological sensors. It serves as a signal enhancer in surface based sensing studies namely in surface-enhanced Raman scattering (SERS). Different parameters such as metal nanoparticle size, shape and trapping position governing the LSPR field condition has been thoroughly discussed here.

Keywords: LSPR field, SERS, metal nanoparticle, diatom frustules.