

Abstract Submitted
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Surface Enhanced Raman Scattering from a molecule adsorbed on a single cluster of nano metal particles KARAMJEET ARYA, San Jose State University, San Jose, CA 95192 — Very large enhancement up to 14 orders of magnitude in the Raman cross section from a molecule adsorbed on a single cluster of a few nano metal particles has been reported recently. The enhancement is believed mainly due to the enhanced electric field because of the excitation of the localized surface modes. We have developed a diagrammatic Green's function theory in the wave-vector space to solve the Maxwell equation for the enhanced electric field near a spherical metal particle cluster. The large enhancement in the field is due to the multiple scattering of the localized modes of the individual metal particles that has been included exactly. The advantage of working in the wave-vector space is that one does not need the use of complicated translational addition theorem required in the real space as used in earlier calculations. Therefore our approach can be easily extended to any shape or size of the metal particle cluster. We find the enhancement in the Raman cross section can reach up to 10 orders of magnitude for silver particle cluster. The enhancement is in a broad frequency range and is below the Mie resonance of the single metal sphere. The results for gold particle cluster are also presented.

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