

Abstract Submitted
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Scattering T-matrix theory for surface enhanced Raman scattering in clusters of nanoscale metal particles KARAMJEET ARYA — Very large enhancements up to 14 orders of magnitude in the Raman cross-section from a molecule adsorbed on a single cluster of a few nanoscale 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 plasmon modes. We have developed a Green's function theory using scattering t-matrix approach in the wave-vector space to solve the Maxwell equations for the enhanced field near a metal particle cluster. The large enhancement in the field is due to the multiple scattering of the local modes of the individual metal particles that has been included exactly. We have considered clusters of different shape and size, for example, clusters of two, three, or four spherical particles forming a linear chain, a triangle or a square. Examples of clusters formed on the glass and metal plates are also discussed. We find the enhancement in the Raman cross section can reach up to 10 orders of magnitude for silver particle clusters and is in a broad frequency range. The results for gold particle clusters are also presented.

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