

Abstract Submitted  
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**Photonic Crystal Effects in Surface Enhanced Raman Scattering from Nanocluster/Nanoshell Arrays**<sup>1</sup> KE ZHAO, University of Tennessee, HONGXING XU, Institute of Physics, Chinese Academy of Science & Lund University, Sweden, BAOHUA GU, Oak Ridge National Laboratory, ZHENYU ZHANG, Oak Ridge National Laboratory & University of Tennessee — We study the local optical properties of one-dimensional solid nanosphere dimer arrays with large array spacings, using the generalized Mie theory. We have obtained a large Raman cross section enhancement with magnitude of  $10^{11}$  purely by electromagnetic effects, which is higher if compared with that of an isolated nanosphere dimer and in the literature. A coupled dipole approximation is used to understand this enhancement and the plasmon resonance shift relative to the isolated dimer. We have also studied the nanoshell dimer array and found even higher enhancement with magnitude of  $10^{13}$ . Our studies show that the nanoshell arrays with proper spacings have clear advantages in single molecule surface enhanced Raman spectroscopy (SMSERS).

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