

Abstract Submitted  
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**Microscopic Models of Hybrid Nanocrystal Superstructures:  
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We investigate the optical properties of hybrid superstructures composed of metal  
and semiconductor nanoparticles (NPs), and bio-linkers/polymers. Our study is in-  
spired by recent experiments on bio-conjugated semiconductor-metal NP complexes  
and their potential applications as sensors. Metal NPs can quench semiconductor  
NP photoluminescence (PL). However, a plasmon enhancement can be achieved by  
organizing many Au NPs into a spherical or cylindrical shell around a CdTe NP. We  
compute electromagnetic fields induced in NP superstructures using a multipole ex-  
pansion approach to describe the optical response of these complexes. Enhancement  
of CdTe emission can result from plasmon mediated enhancement of the excitation  
(Ag structures) or enhancement of the emission process (Au structures). The re-  
sultant optical response comes from a complex interplay of this enhancement and  
quenching and determines the potential applications of these superstructures.

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