

Abstract Submitted
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Internal and External Radiative Decay Engineering of Rare Earth Doped Nanocrystalline Sesquioxides¹ ROBERT DENNIS, The University of Texas at San Antonio, KELLY NASH, MAOGEN ZHANG, WALDEMAR GORSKI, DHIRAJ SARDAR, The University of Texas at San Antonio — Rare earth (RE) based sesquioxide structures (RE_2O_3), when doped judiciously with trivalent RE ions, are not susceptible to photobleaching and offer many sharp electronic transitions with excited state lifetimes on the order of milliseconds. Additionally, internal lattice engineering of the host offers several distinct crystal phases which may be synthesized easily by tuning the host RE. Similarly, the proximity of noble metals to trivalent rare earth ions has shown promise as a sensitizer that greatly enhances the photoluminescence of the rare earth ion. More recently, results have been reported for gold coated silica dielectric nanoparticles which have been modeled extensively and shown to act as a nano-antenna, enhancing the electric field inside the dielectric core. This short range antenna effect offers radiative decay engineering at the external level. Here, we report the internal and external radiative decay engineering of several rare earth doped sesquioxide and metallic hetero-nanostructures and discuss the nanoscale physics of these systems.

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