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Local Structure and Photoluminescence Decay Dynamics in Undoped and Mn^{2+} Doped ZnSe Nanoparticles THADDEUS NORMAN, Lawrence Livermore National Lab, CHRISTIAN GRANT, Rutgers University, EDWARD OLANO, University of California, Santa Cruz, EDWARD CASTNER, Rutgers University, FRANK BRIDGES, JIN ZHANG, University of California, Santa Cruz — Undoped and Mn^{2+}-doped ZnSe nanoparticles were synthesized from molecular cluster precursors. The nanoparticles were characterized using UV-VIS, PL, ESR, and XAFS. These studies confirmed the presence if Mn^{2+} dopant in the host ZnSe lattice, and suggested the existence of two distinct Mn^{2+} sites in the ZnSe lattice. Energy transfer dynamics in Mn^{2+}-doped ZnSe nanoparticles were also studied using time-integrated and time-resolved spectroscopic techniques. Time-resolved picosecond PL and femtosecond transient absorption studies show that the Mn^{2+} doping substantially shortens the lifetimes of both the bandedge excitonic states and the shallow trap states. Energy transfer from ZnSe to Mn^{2+} likely follows two mechanisms: one that involves mediation through trap states and another without.

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