

Abstract Submitted
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Exciton-phonon coupling in ZnSe/CdSe alloyed quantum dots

ANNE KELLEY, KE GONG, DAVID KELLEY, Univ of California - Merced — Zinc to cadmium cation exchange of ZnSe quantum dots has been used to produce a series of alloyed $\text{Zn}_{1-x}\text{Cd}_x\text{Se}$ quantum dots. As x increases, the lowest-energy exciton shifts to the red, initially broadening and then sharpening as x approaches 1. Resonance Raman spectra obtained with excitation near the lowest excitonic absorption peak show a gradual shift of the longitudinal optical phonon from 251 cm^{-1} in pure ZnSe to 210 cm^{-1} in nearly pure CdSe with strong broadening at intermediate compositions. The overtone to fundamental intensity ratio, a rough gauge of exciton-phonon coupling strength, is much larger for intermediate compositions than for either pure ZnSe or pure CdSe. Partial localization of the hole in locally Cd-rich regions of the alloyed particles increases the strengths of local internal electric fields, increasing the coupling between the exciton and polar optical phonons.

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