

Abstract Submitted
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Energy Up-conversion in Photo-luminescent Processes of CdSe and CdSe/ZnS Quantum Dots with High Energy Shift MUCHUAN HUA, RICARDO DECCA, Department of Physics, Indiana University- Purdue University Indianapolis, RAJESH SARDAR, MEGHAN TEUNIS, Department of Chemistry and Chemical Biology, Indiana University- Purdue University Indianapolis, DANIEL MINNER, Integrated Nanosystems Development Institute — Photo-luminescent(PL) spectra of CdSe and CdSe/ZnS quantum dots(QDs), with radius in the range of 2.5 nm to 4 nm, have been obtained, where energy up-conversion is noticeable. When sweeping the excitation energy around the center of the PL of the QDs samples, the up-conversion of PL is constant and close to the energy of a single longitudinal optical phonon of bulk CdSe. Meanwhile, the PL intensity depends linearly on the excitation intensity, precluding multi-photon absorption processes. These observations indicate phonon-assisted PL might be responsible for the up-conversion processes. On the other hand, when the samples were excited around the tail of the PL spectra, the energy shift of PL up-conversion increased and showed a strong sample dependence. Potential mechanisms to understand these processes will be discussed.

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