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Size and Morphology Dependent Raman Scattering XIANGHUA ZENG, CHUAN HU, JIEYA CUI, Yangzhou Univ — Through thermal evaporation, ripple-like CdS nanobelts (NBs) and ZnS:Al nanowires (NWs) were prepared. Room-temperature photoluminescence spectra showed two luminescence peaks at approximately 513 and 725 nm from the ripple-like CdS NBs, the two peaks can be ascribed to the near band gap transition and defect emissions, respectively. Raman spectra showed that the intensities of the longitudinal optical (LO) phonon and its replica peaks from the ripple-like CdS NBs are more than 4 times larger than those from the normal CdS NBs. The Huang−Rhys parameter S calculated from the intensity ratio of the 2LO to 1LO phonon increases from 3.21 to 3.56 for normal and ripple-like NBs, which is indicative of a strong exciton-phonon coupling interaction dominated mainly by a Frhlich interaction through the charge transfer. The results from the ZnS:Al NWs exhibited that the morphology of ZnS:Al NWs greatly influences on the Raman scattering, while the Al-dopant concentration has a smaller effect on the Raman scattering. The Raman scattering intensity of the pine leaf -like morphological ZnS:Al NWs displayed more than eight times larger than the bulk one, which can be explained as a polarization dependent behavior and a multiple scattering.

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