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Optical Vibration Modes in (Cd, Pb, Zn)S Quantum Dots in the Langmuir–Blodgett Matrix

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The structures with CdS, PbS, and ZnS quantum dots produced using the Langmuir–Blodgett method are investigated by infrared (IR) spectroscopy, Raman scattering, and ultraviolet (UV) spectroscopy. The quantum dot size estimated from the UV spectra and high-resolution transmission electron microscopy (HRTEM) falls in the range 2–6 nm. The longitudinal optical (LO) phonons localized in quantum dots and the surface optical vibration modes are revealed in the IR reflection and Raman scattering spectra of the structures under investigation. The frequencies of the surface optical modes are adequately described with allowance made for the effect of localizing optical phonons in the quantum dots.

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