



Optical vibrational modes in (Cd, Pb, Zn)S quantum dots embedded in Langmuir–Blodgett matrices

A. G. Milekhin^a,  , L. L. Sveshnikova^a, S. M. Repinsky^a, A. K. Gutakovsky^a, M. Friedrich^b and D. R. T. Zahn^b

^a Institute of Semiconductor Physics, 630090, Novosibirsk, Russia

^b Institut für Physik, Technische Universität Chemnitz, D-09107, Chemnitz, Germany

Received 12 February 2002; revised 2 August 2002; accepted 30 September 2002. ;
Available online 10 December 2002.

Abstract

Structures with CdS, PbS, ZnS quantum dots (QDs) produced using the Langmuir–Blodgett technique were investigated by infrared (IR), Raman and ultra-violet–visible (UV–Vis) spectroscopies. The QDs size derived from the analysis of UV–Vis spectra and high-resolution transmission electron microscopy images amounts to 2–6 nm. The IR and Raman spectra reveal longitudinal optical phonons localised in QDs and surface vibrational modes. The frequency positions of the surface optical vibrational modes are adequately described taking into account confinement of fundamental optical phonons in the QDs.

Author Keywords: Clusters; Fourier transform infrared spectroscopy; Quantum effects; Raman scattering