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Optical properties of CdSe semiconductor nanocrystals under high pressures CHI-TSU YUAN, WU-CHING CHOU, DER-SAN CHUU, Department of Electrophysics, National Chiao-Tung University, Hsinchu 300, Taiwan — In general, the physical properties of semiconductor nanocrystals are different from the bulk materials. CdSe nanoparticles are attracted much attention due to excellent fluorescence properties for potential applications in biological labels[1]. In particular, the emission colors can be tuned to cover whole visible range by changing particle size with the same chemical composition. On the other hand, high pressure technique is another tool to tune the electronic states of crystalline materials. Incorporated colloidal QDs under high pressure environment can provide valuable information to study the electronic and vibrational states of nanometer size materials. In this study, the electronic and vibrational states of colloidal core/shell CdSe/ZnS quantum dots are studied at room temperatures by using high pressure optical measurements. Pressure dependent quadratic lattice behavior can be observed clearly from photoluminescence (PL) and Raman spectra up to ∼7 GPa. This quadratic relationship is consistent with theoretical prediction. The average pressure coefficients for PL and Raman measurements, as well as deformation potential are 32 meV/GPa, 4.2 cm^{-1}/GPa and -1.69 eV, respectively. [1] M. Jr Bruchez, M. Moronne, P. Gin, S. Weiss, and A. P. Alivisatos, Science **281**, 2013 (1998).

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