Optical transitions in polarized CdSe, CdSeZnSe, and CdSeCdSZnS quantum dots dispersed in various polar solvents

Thuy U.T.D., Liem N.Q., Thanh D.X., Protiere M., Reiss P.

Institute of Materials Science (IMS), Vietnamese Academy of Science and Technology (VAST), 18 Hoang Quoc Viet, Cau Giay, Hanoi, Viet Nam; DRT/LITEN/DTNM/L2 T, DSM/DRFMC/SPrAM (UMR 5819 CEA-CNRS-UJF 1)/LEMOH CEA Grenoble, 17 rue des Martyrs, 38054 Grenoble Cedex 9, France; College of Technology, Hanoi National University, 144 Xuan Thuy, Hanoi, Viet Nam

Abstract: The optical transitions in ensembles of colloidal CdSe-based quantum dots (QDs) have been systematically studied as a function of the net QDs' polarity/polarization and of the solvent's polarity. While the general trend observed for all QD systems dispersed in different solvents is similar, the spectral shifts are more pronounced in core QDs than in core/shell structures. Our results can be rationalized by taking account of the electric field experienced by the QDs that results from their effective polarization in solvents of different polarities (quantum confined Stark effect) as well as from the effect of the external dielectric environment (solvatochromatic effect). ?? 2007 American Institute of Physics.

Index Keywords: Dielectric devices; Electric field effects; Optical transitions; Polarization; Quantum confinement; Semiconducting cadmium compounds; Dielectric environment; Polar solvents; Quantum confined Stark effect; Solvatochromatic effect; Semiconductor quantum dots

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Correspondence Address: Liem, N.Q.; Institute of Materials Science (IMS), Vietnamese Academy of Science and Technology (VAST), 18 Hoang Quoc Viet, Cau Giay, Hanoi, Viet Nam; email: liemnq@ims.vast.ac.vn
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1. Thuy, U.T.D., Institute of Materials Science (IMS), Vietnamese Academy of Science and Technology (VAST), 18 Hoang

Quoc Viet, Cau Giay, Hanoi, Viet Nam
2. Liem, N.Q., Institute of Materials Science (IMS), Vietnamese Academy of Science and Technology (VAST), 18 Hoang Quoc Viet, Cau Giay, Hanoi, Viet Nam, College of Technology, Hanoi National University, 144 Xuan Thuy, Hanoi, Viet Nam
3. Thanh, D.X., Institute of Materials Science (IMS), Vietnamese Academy of Science and Technology (VAST), 18 Hoang Quoc Viet, Cau Giay, Hanoi, Viet Nam
4. Proti??re, M., DRT/LITEN/DTNM/L2 T, DSM/DRFMC/SPrAM (UMR 5819 CEA-CNRS-UJF 1)/LEMOH CEA Grenoble, 17 rue des Martyrs, 38054 Grenoble Cedex 9, France
5. Reiss, P., DRT/LITEN/DTNM/L2 T, DSM/DRFMC/SPrAM (UMR 5819 CEA-CNRS-UJF 1)/LEMOH CEA Grenoble, 17 rue des Martyrs, 38054 Grenoble Cedex 9, France

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