Poster Presentation

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Structural Studies on nanocrystalline ZnS and CdS

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II-VI semiconductor nanocrystals have attracted much attention due to their size dependent properties ranging from electronic to biological regimes. Herein results of ZnS and CdS ADXRD (Angle dispersive X-ray diffraction) data, recorded in transmission mode, on BL-11 Beamline of INDUS Synchrotron are reported. Semiconductors obtained using wet chemical co-precipitation method, were kept for a few hours in the deep freezer. The wavelength of x-rays was 0.04666 nm (27 keV). A MAR 3450 image plate was used as detector. Sample to detector distance was 185.9178 mm. XRD data were extracted using fit2d. ADXRD pattern was recorded in transmission mode. The fityk program was used to fit pseudo Voigt A function to the ADXRD data to get the half width at half maximum (HWHM) of the peaks. These HWHMs values as well as the Scherrer formula yielded the particle sizes. The Neilson-Riley method was used to refine the lattice parameters. Results of the ADXRD data analyses for both ZnS and CdS are given below:The Particle size (nm), Bravais Lattice, Lattice parameter (nm) and Eg (eV) [UV abs spectra] for ZnS are 2.81, $F^{-}43m$, 0.5371 and 3.82 respectively while for CdS these values are 3.03, $F^{-}43m$, 0.580, 2.59 respectively. From these data the metal-S and Metal-Metal distances were calculated and were found out for ZnS to be 0.2326 nm and 0.3798 nm while for CdS these distances are 0.251 nm and 0.41 nm respectively. These data match well with the literature/1/. Particle sizes were in agreement with Brus's /2/ method. Acknowledgements: One of the authors (SDD) acknowledges the financial assistance from the University Grant Commission, New Delhi (F-37/147/2009(SR)). The authors are also grateful to Dr. S. K. Deb, Head, INDUS Synchrotron Users' Division, Raja Ramanna Center for Advanced Technology, Indore, (M.P.) India.

[1] *The Structure of Crystals, Supplement for 1030-1034 to the second edition, by Ralph W. G. Wyckoff, American Chemical Society,* ***[2]*** *L. E. Brus, J. Chem, Phys. 80 (9), 4403-4409, (1984)*

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