Fabrication of Organised Nanostructrures via Wet Synthesis Route

- J. Mazher, S. Badwe, R. Sengar, and R.K. Pandey (Bhopal University)

Nanocrystalline thin films of ZnSe & CdS have been fabricated using a novel wet synthesis route. The growth of nano structures was monitored using in-situ atomic force microscopy inside a miniature electrochemical cell. It is shown that the nanostructrues exhibit a tendency towards self-organization that is a unique attribute of growth process adopted in the present work. Particle size control down to 1.7 nm has been achieved. The CdS films exhibited a systematic blue shift of the HOMO-LUMO gap up to 3.3 eV as the particle size was decreased. Similar results were also obtained for the ZnSe films demonstrating the versatility of the synthesis route employed by us.

Phonon assisted transitions were also investigated using low temperature photoluminescence and Raman spectroscopy. Peaks characteristics of LO phonon modes and its overtones were observed in the Raman spectra. The sharpness of the Raman peaks implied narrow size distribution in the films. The red shifts in the observed PL peaks vis a vis HOMO-LUMO gap also decreased at lower temperatures which was indicative of the role of phonons in the transition processes.

Results of the detailed morphological examinations using X ray diffraction and atomic force microscopy will also be discussed.