Abstract Submitted
for the PSF14 Meeting of
The American Physical Society

Effect of Cadmium Selenide Nanoparticles on the Optical Band Gap of Lead Borate Glasses NICHOLAS BRESLIN, SAISUDHA MALLUR, P.K. BABU, Western Illinois University — The study of the variation of the optical band gap with composition in glasses gives information about the structure and electronic properties. Glasses containing nanoparticles is an interesting system to study due to its fundamental importance in mesoscopic physics and potential for technological applications. We studied lead borate glasses with the composition xPbO:(100-x)B_2O_3:1CdSe varying x between 29, 39, 49, 59, and 69 mol%. Glasses were prepared by the usual melt-quench method. Starting materials were melted at 1000°C and the melt was poured onto a brass plate. Glass pieces obtained through this quenching process were annealed for one hour at 400° C. Annealed glass pieces were polished using a lapping machine. Optical absorption measurements were carried out using a UV-VIS absorption spectrometer. The optical energy band-gaps were determined from the absorption edge data using Mott-Davis model. The optical band gap values are smaller and show unusual variation with PbO content compared to the binary lead borate glasses. In binary lead borate glasses, the absorption edge is due to direct forbidden transition whereas CdSe nanoparticles doped system initially shows indirect forbidden transition and with higher PbO content, it changes to indirect allowed transition

Nicholas Breslin
Western Illinois University

Date submitted: 11 Nov 2014 Electronic form version 1.4