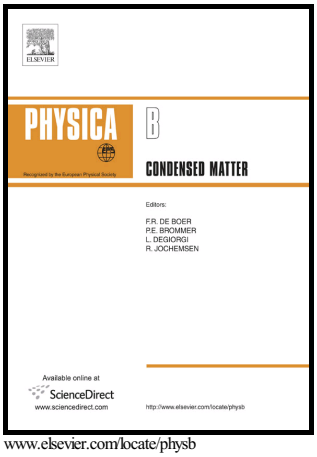
Investigation of effect of annealing on thermally evaporated ZnSe thin films through spectroscopic techniques

M.G. Mahesha, Meghana N Rashmitha, Meghavarsha Padiyar



www.elsevier.com/locate/physb

PII: S0921-4526(17)30311-3
DOI: http://dx.doi.org/10.1016/j.physb.2017.06.011
Reference: PHYSB309989

To appear in: *Physica B: Physics of Condensed Matter*

Received date: 5 May 2017
Revised date: 2 June 2017
Accepted date: 3 June 2017

Cite this article as: M.G. Mahesha, Meghana N Rashmitha and Meghavarsh Padiyar, Investigation of effect of annealing on thermally evaporated ZnSe thi films through spectroscopic techniques, *Physica B: Physics of Condense Matter,* http://dx.doi.org/10.1016/j.physb.2017.06.011

Investigation of effect of annealing on thermally evaporated ZnSe thin films through spectroscopic techniques

Mahesha M G*, Rashmitha, Meghana N, Meghavarsha Padiyar,

Department of Physics, Manipal Institute of Technology, Manipal University 576104, India

*Corresponding Author. Tel: +91 820 2925624; Fax: +91 820 2571071; Email: maheshamg@gmail.com

Abstract

ZnSe thin films have been grown on clean glass substrates by thermal evaporation technique and deposited films have been annealed at 473K. William-Hall method has been adopted to extract information on crystallite size and internal strain in the film from X-ray diffractogram. Effect of annealing on ZnSe films has been analyzed by spectroscopic techniques which include optical absorption, Raman, and photoluminescence spectroscopy. From optical absorption, band gap has been estimated along with other optical parameters like refractive index and extinction coefficient. Also, Urbach tail, which originates near bad edge due to structural disorders, has been characterized. Raman spectra have been analyzed to get the information on the influence of crystallite size and strain effect on peak position, intensity and width. Photoluminescence spectra have been recorded and analyzed to get an insight on defect levels induced due to vacancies, interstadials, and impurity complexes.

Keywords: II – VI compound semiconductors; Raman spectroscopy; Photoluminescence; PVD; W – H plot; Solar cell materials.