

The Effect of the Deposition Parameters on the Microstructural and Optical Properties of Mn-Doped GeTe Chalcogenide Materials

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Abstract : In this work, the effect of the magnetron sputtering system parameters on the optical properties of the Mn doped GeTe were investigated. The optical properties of the $\text{Ge}_{1-x}\text{Mn}_x\text{Te}$ thin films with different thicknesses are determined by analyzing the transmittance and reflectance data. The energy band gaps of the amorphous Mn-doped GeTe thin films with different thicknesses were calculated. The obtained results demonstrated that the energy band gap values of the amorphous films are quite different and they are dependent on the films thicknesses. The extinction coefficients of amorphous Mn-doped GeTe thin films as function of wavelength for different thicknesses were measured. The results showed that the extinction coefficients of all films are varying inversely with their optical transmission. Moreover, the results emphasize that, not only the microstructure, electrical and magnetic properties of Mn doped GeTe thin films vary with the films thicknesses but also the optical properties differ with the film thickness.

Keywords : phase change magnetic materials, transmittance, absorbance, extinction coefficients

Conference Title : ICMN 2016 : International Conference on Microelectronics and Nanotechnology

Conference Location : Berlin, Germany

Conference Dates : May 19-20, 2016