The Effect of x fraction of Sulfur (S) atoms, on semiconductor materials Pb(Sx, Se1-x), Pb(Sx,Te1-x) and x fraction of Se atoms on Pb(Sex,Te1-x) Massif and Thin Films for Applications in Sensor Technology.

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ABSTRACT

This research aims to determine the effect of the x fraction of sulfur atoms on the semiconductor alloys Pb(S_x,S_{e1-x}) and Pb(S_x,Te_{1-x}) as well as the x fraction of Selenium atoms on the Pb(Se_x, Te_{1-x}) alloy. This effect can be determined by preparing and characterizing the alloy with x values ??respectively 0.0; 0.2; 0.4; 0.5; 0.6; 0.8 and 1.0 , massif and thin layers.

This research is planned for massive and thin films preparations. However, considering the large number of alloys that will be developed, in the end only massif form preparation and characterization can be carried out. Massif preparation of was carried out using the Bridgman technique. In the Bridgman technique, the mass of each material is calculated based on the atomic molarity ratio, then the materials are placed in a Pyrex tube with an inner and outer diameter of 12 mm and 16 mm respectively. The tube is then vacuumed and heated beyond the melting point of each ingredient. The massive preparation results were then characterized using X - Ray Difraction (XRD) to determine the crystal structure, the chemical composition was determined using Energy Dispersive Spectroscopy (EDS), while the surface morphology was determined using a Scanning Electron Micoscope (SEM).
The results of this characterization will produce all alloys with a cubic structure with the lattice parameter as a function of the fraction x of sulfur atoms in Pb(S,Se,Te) which can be stated explicitly. Next, the surface morphology shows the grain size obtained from the Scanning Electron Microscope (SEM) technique. Finally, the chemical composition of the three Pb(Sx,Se1-x) and Pb(Sx,Te1-x) alloys and the x fraction of Se atoms in Pb(Sex, Te1-x) can be determined using Energy Dispersive Spectroscopy (EDS).

Keywords: Bridgman technique, Scanning Electron Microscope, Energy Dispersive Spectroscopy

Kata Kunci: *Bridgman technique, Scanning Electron Microscope, Energy Dispersive Spectroscopy*