

عنوان مقاله:

Fabrication and Structural Characterization of Se-Ge Chalcogenide Glasses by Means of Melt Quenching Technique

محل انتشار:

مجله سرامیک های پیشرفته, دوره 3, شماره 2 (سال: 1396)

تعداد صفحات اصل مقاله: 7

نویسندگان:

Masoomeh Ghayebloo - *Materials Science and Engineering, University of Tabriz*

Mohammad Rezvani - *Materials Science & Engineering, Tabriz University*

(Majid Tavoosi - *Materials Science and Engineering, Malek-Ashtar University of Technology (MUT*

خلاصه مقاله:

The structural and optical characterization of Se-Ge alloys during melt quenching technique was the goal of this study. In this regards, five different samples of $Se_{100-x}Ge_x$ ($x= 10, 20, 30, 40, 50$) were prepared by conventional melt quenching in quartz ampoule. The produced samples were characterized using X-ray diffraction (XRD), scanning electron microscopy (SEM), differential scanning calorimetry (DSC) and Fourier transform infrared spectroscopy (FTIR). The results showed that the glass forming ability of $Se_{70}Ge_{30}$ and $Se_{50}Ge_{50}$ is so low and the structures of these alloys after quenching are combination of amorphous, $GeSe_2$ and $GeSe$ compounds. Although the structure of as-quenched $Se_{90}Ge_{10}$, $Se_{80}Ge_{20}$ and $Se_{60}Ge_{40}$ is fully amorphous, only $Se_{60}Ge_{40}$ shows IR transmittance (with higher 55% transmittance between 0.8-11 μm). The reflective index of this glass was in the range of 3.0 to 3.3 and decrease with increasing the wavelength. The Fermi energy, Urbach energy, indirect and direct band gaps values of $Se_{60}Ge_{40}$ glass were estimated about 0.2883, 0.1526, 1.345 and 1.28 e.V, respectively.

کلمات کلیدی:

Chalcogenide glass, Se, Ge, IR transmittance

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