Study of crystallization kinetics of Se77.5Te15Sb7.5 glass using isoconversional models

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Abstract:

The crystallization process of Se77.5Te15Sb7.5 glass is studied by differential scanning calorimetry (DSC) technique under non-isothermal conditions at various heating rates. The crystallization parameters are deduced using different models. The validity of the Johnson-Mehl-Avrami (JMA) model to describe the crystallization process for the studied composition is investigated. Comparing experimental and calculated DSC curves indicate that the crystallization process of Se77.5Te15Sb7.5 glass cannot satisfactorily be described by the JMA model. In general, simulation results indicate that the Sestak-Berggren model is more suitable to describe the crystallization kinetics. The crystalline phases are identified using the X-ray diffraction technique and scanning electron microscopy.

Keywords:

chalcogenide glasses; differential scanning calorimetry; crystallisation kinetics; electron microscopy; X-ray microscopy

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