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Kinetics of non-isothermal crystallization of ternary $\text{Se}_{80}\text{Te}_{20-x}\text{Zn}_x$ glasses

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ABSTRACT

The crystallization kinetics of $\text{Se}_{80}\text{Te}_{20-x}\text{Zn}_x$ with $x=0.5, 1.0, 1.5, 2.0$ and 2.5 chalcogenide glasses were investigated using non-isothermal crystallization approach. The glass transition temperature (T_g) and crystallization temperature (T_c) of these glasses were determined using the differential scanning calorimeter at different heating rates. The dependence of T_g and T_c on the heating rate (β) has been used for the determination of the activation energy of crystallization (E_c), the activation energy of structural relaxation (E_t), crystallization enthalpy (ΔH_c) and the Avrami exponent (n). It was found that the enthalpy released is minimum at 2.5% of Zn, hence, the glass with 2.5% of Zn is most stable in the $\text{Se}_{80}\text{Te}_{20-x}\text{Zn}_x$ system. The crystallization kinetics for the glasses was studied by using the modified Kissinger and Ozawa equations.

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