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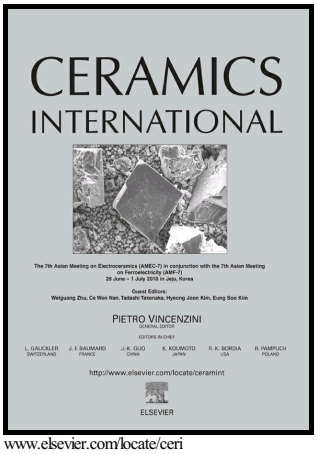

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Effects of Ag additive on structure and crystallization behaviors of $As_2(Se_{15}Te_{85})_3$ glasses

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Abstract

In this work, glass samples of compositions of $As_{40-0.4x}(Se_{15}Te_{85})_{60-0.6x}Ag_x$ (x=0, 10, 16.7, 20, 25 at. %) are prepared. The structural transformations of glasses are deduced from the variations of glass densities and Raman spectra with the addition of Ag. Differential scanning calorimetry is applied to determine the characteristic temperatures, evaluate the thermal stabilities against crystallization, and investigate the crystallization kinetics under non-isothermal conditions. Thermal treatment of the as-prepared glass samples is carried out at both low (190 °C) and high (260 °C) crystallization temperatures. X-ray diffraction patterns demonstrate that crystals precipitated from glass matrices are pure As-Te(Se) phases free of Ag. The results are consistent with the Raman spectra. The relevant mechanism can be understood based on the dual chemical role of the Ag addition on the variations of glass network.

Keywords

As-Se-Te glasses; Ag additive; crystallization behaviors