
CRYSTALLINE PHASES OF Bi_2O_3 DISSOLVED IN 80TeO_2 - 5BiO_3 - 15WO_3

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Glasses with composition 80TeO_2 - $5\text{Bi}_2\text{O}_3$ - 15WO_3 (mol %) were studied as host for crystals structure grown under thermal treatments. It was observed that the dispersion of the size of the crystals can be controlled by subjecting the samples to two-step heat treatment – first during 24-hour at 340°C near of the glass transition temperature (T_g) and another about 40°C above the T_g . With an 80-hour thermal treatment at 40°C above the T_g , crystals with approximately $30\text{ }\mu\text{m}$ of size was observed. The treatment at the same temperature but during 24 hours it was observed that the crystals size was about $3\text{ }\mu\text{m}$. Nanostructures with size about $80 - 100\text{ nm}$ were observed in samples subjected to the same type of heat treatment, but with minor time intervals - 5 hours at 40°C above the T_g . The crystalline phase - Bi_2O_3 - was identified by powder X-ray diffraction (XRD), and the crystal size was evaluated using a scanning electron microscope (SEM) and also using atomic force microscopy (AFM). Images of the largest crystals have also been made using optical microscopy. It was also possible to observe that during the pouring of melting glass, there was the pulling of fiber with a diameter of $140\text{ }\mu\text{m}$. The results of this study indicate that it is possible to grow nanoscale structures, thermally stimulated, into 80TeO_2 - $5\text{Bi}_2\text{O}_3$ - 15WO_3 glasses.