

Optical Properties and Crystallization of Glasses in the System $\text{MoO}_3\text{-Bi}_2\text{O}_3\text{-B}_2\text{O}_3$

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The bismuth-borate glasses have been widely studied over the years due to their high potential for use in applications such as nonlinear optical devices, laser hosts, tunable waveguides, tunable fiber gratings, etc. [1]. On the other hand, the presence of rare-earth ions can greatly improve the nonlinear optical properties of bismuth-borate glasses. This leads to increasing the melting temperature of compositions containing above 30 mol% rare earth oxides. In our previous studies we found that MoO_3 could be a suitable component to improve the melting conditions and modifying the properties of such type of glasses. But it was established that MoO_3 increases immiscibility tendency in the systems investigated [2, 3].

The purpose of this work is to study the optical properties of glasses in the ternary system $\text{B}_2\text{O}_3\text{-Bi}_2\text{O}_3\text{-MoO}_3$. The glasses were obtained by press quenching between two copper plates (cooling rate $\sim 10^2$ K/s). They were characterized by x-ray diffraction (XRD), differential thermal analysis (DTA), UV-VIS and scanning electron microscopy (SEM). According to the DTA data, the thermal stability drastically decreased in glasses with a high MoO_3 content. Most of the glasses were transparent in the visible region. It was established that the increase in the MoO_3 content led to decreasing the transmittance of glass compositions. Moreover, the absorption edge was shifts in the higher wavelength. The achieved results are directed for the preparation of novel low melting oxide glasses with possible applications in optics.

References

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