



PROJECT "THEORY AND APPLICATIONS OF SINTER-CRYSTALLIZATION" DN 19/7

Crystallization behavior of glasses in ZnO-B₂O₃-WO₃-Nb₂O₅ system

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Abstract: Niobium oxide (Nb₂O₅)-containing glasses of 50ZnO-40B₂O₃-5WO₃-5Nb₂O₅ and 50ZnO-35B₂O₃-10WO₃-5Nb₂O₅ doped and undoped with 0.5 mol % Eu₂O₃ are prepared using a conventional melt quenching method, and their crystallization behavior is clarified. The obtained samples were characterized by X-ray diffraction analysis (XRD), differential thermal analysis (DTA) and luminescence spectroscopy (PL). It is found that the thermal stability against crystallization of the glasses decreases with increasing WO₃ content. The presence of Eu³⁺ ions in the glass compositions does not affect the thermal parameters of the glasses. The synthesized glasses were heat treated at the onset of crystallization peak for 3 and 6 hours. All glasses examined in this study basically give the formation of ZnWO₄ and Nb₁₈W₈O₆₉ crystalline phases. In particular, 50ZnO-40B₂O₃-5WO₃-5Nb₂O₅:Eu³⁺ glass shows enhanced photoluminescence emissions due to the 4f transitions ⁵D₀-⁷F_J (J = 0-4) of Eu³⁺ ions is observed.

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