

**Rheological investigations in the decomposition range
of the system Na₂O-B₂O₃-SiO₂**

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Abstract

Three glass melts from the Vycor-type widely distributed along the mixing gap of the pseudobinary line SiO₂-(B₂O₃:Na₂O = 84:16) were investigated each one with three different thermal histories. The following rheological properties were determined by the cylinder compression method: the Newtonian and non-Newtonian flow behaviour, the stress generation modulus as a measure of the stiffness, the high-temperature tensile strength and the critical deformation rate at which the first crack appears. The influences of the fundamental glass compositions (SiO₂ content) as well as the thermal pretreatments on these properties are demonstrated and discussed on the basis of isochohal conditions (equal Newtonian viscosities). The results can be interpreted by means of the knowledge about the demixing rules and processes which lead to various rheological two-phase systems. Most drastical changes of the rheological properties are observed in the middle of the mixing gap where spinodal decomposition has its optimum and where the differentiation between the matrix phase and decomposed phase is lost.