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Ren, Xiangting; Bockowski, Michal; Youngman, Randall E.; Jensen, Lars Rosgaard; Smedskjær, Morten Mattrup

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Densification of oxide glasses at different time-temperature-pressure routes

Xiangting Ren¹, Michal Bockowski², Randall E. Youngman³, Lars R. Jensen⁴, Morten M. Smedskjaer¹,

1. Department of Chemistry and Bioscience, Aalborg University, Denmark

2. Institute of High-Pressure Physics, Polish Academy of Sciences, Poland

3. Science and Technology Division, Corning Incorporated, Corning, NY, USA

4. Department of Materials and Production, Aalborg University, Denmark

Hot compression is an interesting method for changing the structure and properties of oxide glasses, and it can also help to address some of the unanswered questions regarding the nature of the glassy state through temperature-pressure studies. In this work, we prepared sodium aluminoborate (NAB) and sodium aluminoborosilicate (SNAB) glasses and subjected these to various hot compression treatments, i.e., various pressure/temperature/time paths were explored to access different glass states. We then determined the density of the permanently densified samples and characterized the glass structure using Raman and NMR spectroscopy. At the same time, the influence of hot compression under different conditions on the glass mechanical properties was also explored through indentation experiments.