



Aalborg Universitet

AALBORG UNIVERSITY
DENMARK

Composition-Structure-Mechanical Property Relations in Lithium Aluminoborate Glasses

Liu, Pengfei; Smedskjær, Morten Matstrup

Publication date:
2021

[Link to publication from Aalborg University](#)

Citation for published version (APA):

Liu, P., & Smedskjær, M. M. (2021). *Composition-Structure-Mechanical Property Relations in Lithium Aluminoborate Glasses*. Abstract from Engineering Mechanics Institute Conference 2021.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal -

Take down policy

If you believe that this document breaches copyright please contact us at vbn@aub.aau.dk providing details, and we will remove access to the work immediately and investigate your claim.

Composition-Structure-Mechanical Property Relations in Lithium Aluminoborate Glasses

Pengfei Liu, Morten M. Smedskjaer

Department of Chemistry and Bioscience, Aalborg University, Denmark

Lithium aluminoborate glasses have been found to undergo large changes in their short-range structures under stress. This has important consequences for their mechanical behavior. To further understand structure-property relations in this glass family, we here study the effect of SiO₂ and P₂O₅ additions in lithium aluminoborate glasses. We find that the additions result in a more open network, but also with an increase in the average network rigidity. Consequently, we only observe a minor change in hardness, glass transition temperature, and Poisson's ratio. In lithium phosphoaluminoborate glasses, the cation-oxygen coordination numbers of both B and Al increase systemically upon hot compression, whereas the number of bridging oxygens around Qⁿ (P) decreases. We discuss these changes in relation to the mechanical properties. Overall the study provides insights into the complex structural interactions in mixed network former glasses and their impact on the mechanical properties.