



AALBORG UNIVERSITY
DENMARK

Aalborg Universitet

Densification of Glasses at the Glass Transition

Smedskjær, Morten Matstrup

Publication date:
2016

[Link to publication from Aalborg University](#)

Citation for published version (APA):

Smedskjær, M. M. (2016). Densification of Glasses at the Glass Transition: Universal Behavior and Trends. Abstract from Materials Science & Technology 2016, Salt Lake City, United States.

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.

Densification of Glasses at the Glass Transition: Universal Behavior and Trends

Morten M. Smedskjaer

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

Densified glasses recovered from a high-pressure state are of potential technological interest due to their modified physical and chemical properties. Here we apply hot isostatic compression to study structure-property relations in compressed oxide glasses. Although this approach is somewhat modest in both temperature and pressure ($\sim T_g$ and <2 GPa), it enables the densification of relatively large glass pieces (cm^2) suitable for comprehensive characterization. We show that permanent densification at 1 GPa sets in at temperatures above $0.7T_g$ and the degree of densification increases with increasing compression temperature and time, until attaining an approximately constant value for temperatures above T_g . For glasses compressed at the same temperature/pressure conditions, we demonstrate direct relations between the degree of volume densification and the pressure-induced change in mechanical properties such as elastic moduli and extent of the indentation size effect across a variety of glass families.