

Viscosity of Glass-Forming Liquids

Mauro, J.C.; Yue, Yuanzheng; Ellison, A. J.; Gupta, P. K.; Allan, D. C.

Publication date:
2010

Document Version
Accepted author manuscript, peer reviewed version

[Link to publication from Aalborg University](#)

Citation for published version (APA):

Mauro, J. C., Yue, Y., Ellison, A. J., Gupta, P. K., & Allan, D. C. (2010). *Viscosity of Glass-Forming Liquids*. Abstract from 2010 GOMD Annual Meeting of the American Ceramic Society, Corning, 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.

Viscosity of Glass-Forming Liquids

John C. Mauro¹, Yuanzheng Yue², Adam J. Ellison¹,
Prabhat K. Gupta³, and Douglas C. Allan¹

¹*Science and Technology Division, Corning Incorporated, Corning, NY 14831, USA*

²*Section of Chemistry, Aalborg University, DK-9000 Aalborg, Denmark*

³*Department of Materials Science and Engineering, The Ohio State University,
Columbus, OH 43210, USA*

The low temperature dynamics of ultraviscous liquids hold the key to understanding the nature of glass transition and relaxation phenomena, including the potential existence of an ideal thermodynamic glass transition. Unfortunately, existing viscosity models such as the Vogel-Fulcher-Tammann (VFT) and Avramov-Milchev (AM) equations exhibit systematic error when extrapolating to low temperatures, despite their relative success at higher temperatures. We present a model offering an improved description of the viscosity-temperature relationship for both inorganic and organic liquids, using the same number of parameters as VFT and AM. The new model has a clear physical foundation based on the temperature dependence of configurational entropy, and it offers accurate prediction of low temperature isokoms without any singularity at finite temperature. Our results cast doubt on the existence of a Kauzmann entropy catastrophe and associated ideal glass transition.