



**AALBORG UNIVERSITY**  
DENMARK

**Aalborg Universitet**

## **Heterogeneous enthalpy relaxation in glasses far from equilibrium**

*An invited talk*

Yue, Yuanzheng

*Publication date:*  
2009

*Document Version*  
Publisher's PDF, also known as Version of record

[Link to publication from Aalborg University](#)

*Citation for published version (APA):*

Yue, Y. (2009). *Heterogeneous enthalpy relaxation in glasses far from equilibrium: An invited talk*. Abstract from 2009 Workshop on Topology, Structure, and Dynamics in Non-Crystalline Solid, Paris, France.

### **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](mailto:vbn@aub.aau.dk) providing details, and we will remove access to the work immediately and investigate your claim.

## **Heterogeneous enthalpy relaxation in glasses far from equilibrium**

Yuanzheng Yue

Section of Chemistry, Aalborg University, Denmark

I present the complexity and heterogeneity of the sub- $T_g$  enthalpy relaxation in glasses far from equilibrium, i.e., hyperquenched (HQ) glasses. The relaxation data are obtained using the hyperquenching – annealing – calorimetric scan approach. The extent of the heterogeneity of the sub- $T_g$  relaxation increases with the liquid fragility. It is the heterogeneity of relaxation that results in challenges in modeling the relaxation process when using the existing phenomenological models. Here I report some preliminary results that my research group has achieved in modeling the sub- $T_g$  relaxation. Two major modifications have been made with respect to the TNM model describing structural relaxation in glasses. First, a new stretching function is proposed and introduced into our approach to describe the broad, complex distribution of relaxation times, and hence, to model the heterogeneous enthalpy relaxation. Second, the substantial broadening of the glass transition region during the hyperquenching process is found and taken into account during modeling. To some extent, we have succeeded in modeling the sub- $T_g$  enthalpy relaxation of relatively fragile HQ glasses by applying the modified model. However, the modified model is not capable of describing the fragility dependence of the enthalpy relaxation. The physical foundation needs to be established. Finally, I point out both problems encountered in our modeling work, and perspectives in the future modeling work.