



Aalborg Universitet

AALBORG  
UNIVERSITY

## Tg of silica

Yue, Yuanzheng

*Publication date:*  
2012

*Document Version*  
Accepted author manuscript, peer reviewed version

[Link to publication from Aalborg University](#)

*Citation for published version (APA):*  
Yue, Y. (2012). *Tg of silica*. Abstract from Glass Summit, Wuhan, China.

### 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.

## **$T_g$ of Silica**

Yuanzheng Yue

Section of Chemistry, Aalborg University, Denmark

While most of glass systems exhibit normal glass transition and relaxation behaviors, vitreous silica shows many abnormal behaviors although it is chemically one of the simplest systems. Here we demonstrate and analyze some anomalous features of vitreous silica regarding the glass transition. First, the pattern of the heat capacity jump from glassy to liquid state becomes distorted after a certain number of the DSC scans (up to 1350 °C). Second, the onset glass transition temperature ( $T_g$ ) decreases with increasing number of DSC scans, and reaches a constant value after a certain number of DSC scans. Third,  $T_g$  of silica dramatically increases with decreasing the hydroxyl concentration (HOC), but will not reach the value of 1200 °C at the zero OHC content as claimed in literature. Forth, there is a striking difference in the shape of the glass transition peak between bulk and fiber vitreous silica, even if they both undergo the same thermal history prior to calorimetric scans. All these features, along with high sensitivity of  $T_g$  to OHC, probably explains why there is still lack of a generally accepted  $T_g$  value for the vitreous silica in the glass community. Considering the above-mentioned anomalous features it is necessary to define and quantify the standard  $T_g$  of silica. The origin of those features of vitreous silica is discussed from the energetic and structural aspects.