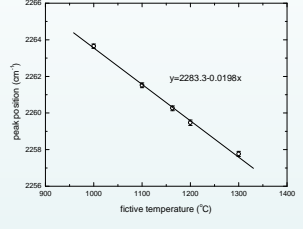
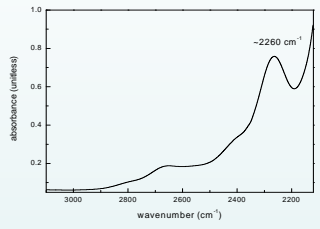
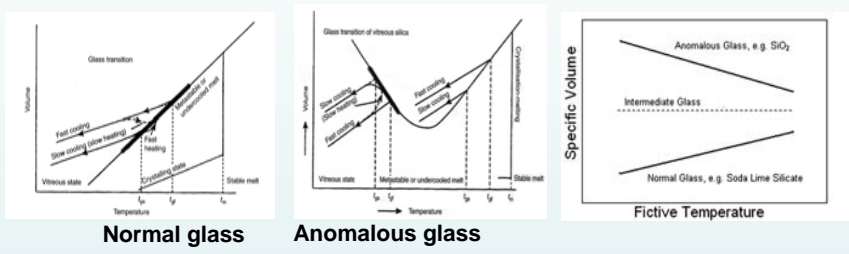


# Glasses with fictive temperature-independent properties

## DMR-0804043

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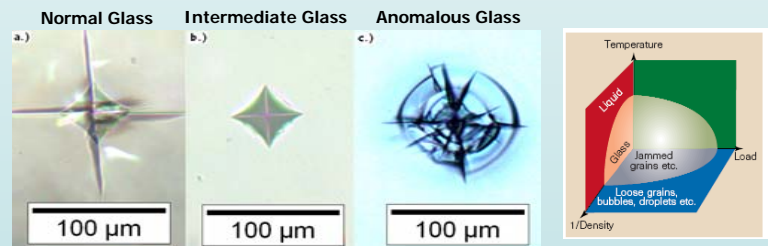
### ➤ Intermediate glasses



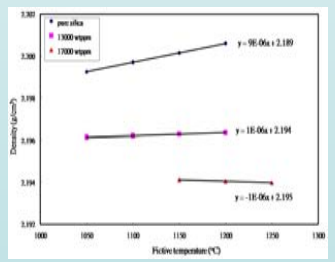
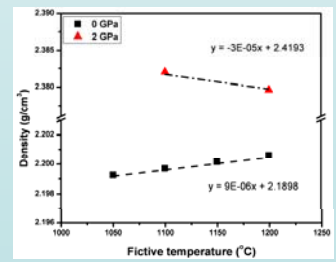
Fictive temperature of glasses can be measured simply from the shift of FTIR silica structural band peak. (A. Agarwal, K.M. Davis, M. Tomozawa, J. Non-Cryst. Solids, 185 (1995) 191.)

- Intermediate glasses can be made by changing composition. They are expected to have unique properties.
- ❖ Intermediate glasses are crack-resistant. (CaO-Al<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub> system glasses.)

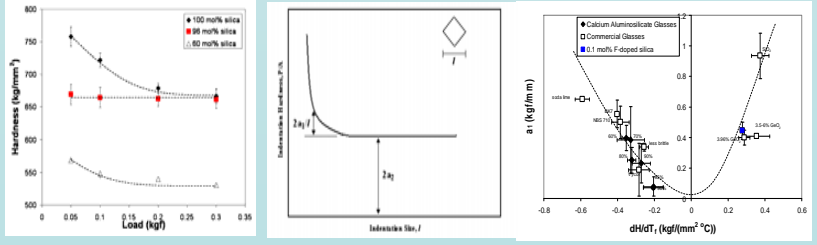
SiO<sub>2</sub> glass has many unique properties. Preparation of intermediate glasses without changing drastically the silica glass composition is desired. L. Huang and J. Kieffer, (Appl. Phys. Lett. 89 (2006) 141915.) suggested that high pressure treatment of silica glass can convert the anomalous glass to the normal glass. Addition of a small quantity of F can also change SiO<sub>2</sub> glass to normal glasses.



Gross, Tomozawa, Koike, J. Non-Cryst. Solids, 355 (2009) 563. Liu and Nagel, Nature, v. 396, p. 21, Nov. 5, 1998.



- ❖ Intermediate glasses show a small indentation size effect.



Gross, Tomozawa, J.A.P. 104 (2008) 063529

### ➤ Conclusions

Intermediate glasses with fictive temperature-independent properties were produced by various methods. Intermediate glasses were found to have unique mechanical properties such as high crack initiation resistance and low indentation size effect.