Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Pressure Dependence of the Glass-Transition Temperature for Intermediate and Fragile Glass-Forming Systems[1] WILLIAM OLIVER III, Physics Department, University of Arkansas, Fayetteville, AR 72701, ASHLEY ALTOM, HALEY BEVERBURG, JAMES COOPER III, DANIEL FROST, DAVID LEUSCHKE, CHRISTOPHER WELLS — The glass transition temperature, T_g, is determined over the pressure range 0 to 80 kbar using a diamond anvil cell (DAC). Two methods are used: i) the onset or disappearance of pressure gradients indicated by ruby fluorescence, and ii) a new method in which T_g(P) is determined by significant changes in slope in the P-T curve during pseudo-isobaric temperature ramps. This slope change accompanies the significant change in volume expansion coefficient between the highly viscous, metastable, supercooled liquid state and the solid glassy state. Good agreement is found in the T_g(P) curve using the two methods. While the second method does not allow for quantitative determinations of the volume expansion coefficients of these systems, qualitative results can be obtained. It is found, e.g., that differences in the volume expansion coefficient upon crossing the glass transition are much greater for low-pressure fluids than for the much denser fluids at high pressure. Data will be presented for glycerol, an intermediate strength glass-forming system, as well as the fragile glass former salol.

[1]This work was supported by NSF grants: DMR-0244180 and DMR-0552944.

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Date submitted: 22 Nov 2006 Electronic form version 1.4