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# Pressure dependence of density and structural relaxation of glass near the glass transition region

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## Abstract

A simplified and effective pressure cell together with an experimental procedure has been developed and applied to compress samples of SCHOTT N-BK7 glass under static high pressures in a piston-cylinder apparatus. Results from the density and volume recovery measurements show that, the glass samples were effectively densified in piston-cylinder apparatus with the density at room temperature increasing linearly with frozen-in pressure. To explain the experimental data, we developed a mathematical model based on a suggestion by Gupta (1988) with two internal parameters, named fictive temperature ( $T_f$ ) and fictive pressure ( $P_f$ ), which fits the experimental data well.

**Keywords:** Glass, High pressure, Piston cylinder apparatus, Structural relaxation, Fictive temperature, Fictive pressure.

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