Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

_In_ situ Raman Scattering Studies of High-Pressure Stability and Transformations in the Matrix of a Nanostructured Glass-Ceramic Composite[1] KRISTINA LIPINSKA-KALITA, High Pressure Science and Engineering Center, UNLV, STEPHEN GRAMSCH, Geophysical Laboratory, Carnegie Institution of Washington, DC, PATRICIA KALITA, Department of Physics, UNLV, RUSSELL HEMLEY, Geophysical Laboratory, Carnegie Institution of Washington, DC — High-pressure Raman scattering studies were performed on a glass-based composite with nanometer-sized gallium oxide aggregates embedded in a potassium-silicate host glass. The aim of our studies was to advance the understanding of pressure-driven structural transformations in the glass matrix of the composite. Throughout the studied pressure range the Raman spectra confirmed that the glass matrix undergoes a range of structural transformations comparable to that reported previously for a pure SiO_2 glass. Compression from ambient up to 10.8 GPa was completely reversible on decompression to ambient pressure. At higher pressures the Raman spectra demonstrated a breakdown of the intermediate-range order in the glass matrix and a permanent reduction in SiO_4 ring statistics toward smaller than six-ring configurations and a coordination change of the silicon atom. The overall spectral profile at the end of the decompression cycle indicated the occurrence of permanent reconstructive structural changes in the glass matrix.

[1]Supported by: DoE cooperative agreement FC08-01NW14049 and DoE-NNSA (CDAC)

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Date submitted: 18 Jan 2005 Electronic form version 1.4