Abstract Submitted
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White-Beam X-ray Diffraction and Radiography Studies on High-Boron Containing Borosilicate Glass at High Pressures[1] KATHRYN HAM, YOGESH VOHRA, University of Alabama at Birmingham, YOSHIO KONO, Carnegie Institution of Washington, ANDREW WERESZCZAK, University of Tennessee- Knoxville, PARIMAL PATEL, U.S. Army Research Laboratory — Multi-angle energy-dispersive x-ray diffraction studies and white-beam x-ray radiography were conducted with a cylindrically shaped (1 mm diameter and 0.7 mm high) high-boron content borosilicate glass sample (17.6% B2O3) to a pressure of 13.7 GPa using a Paris-Edinburgh (PE) press at Beamline 16-BM-B, HPCAT of the Advanced Photon Source. The measured structure factor S(q) to large q = 19 $Å^{-1}$, is used to determine information about the internuclear bond distances between various species of atoms within the glass sample. Sample pressure was determined with gold as a pressure standard. The sample height as measured by radiography showed an overall uniaxial compression of 22.5 % at 13.7 GPa with 10.6% permanent compaction after decompression to ambient conditions. The reduced pair distribution function G(r) was extracted and Si-O, O-O, and Si-Si bond distances were measured as a function of pressure. Raman spectroscopy of pressure recovered sample as compared to starting material showed blue-shift and changes in intensity and widths of Raman bands associated with silicate and B3O6 boroxol rings.

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Kathryn Ham
University of Alabama at Birmingham

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