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Compression Behavior and Structure of a Borosilicate Glass under Static and Shock-wave Pressures to 49.1 GPa[1] MURLI MANGHNANI, ANWAR HUSHUR, University of Hawaii, Hawaii Institute of Geophysics & Planetology, Honolulu, HI 96822, TOSHIMORI SEKINE, National Institute for Materials Science, Tsukuba 305-0044, Japan, JONATHAN STEBBINS, Stanford University Department of Geological and Environmental Sciences, Stanford, CA 94305, MINERAL PHYSICS TEAM, SHOCK WAVE TEAM, NMR TEAM — Using ultrasonic interferometry, and Brillouin and Raman scattering, we have determined the elastic moduli, compression behavior (volumetric strain), and structural changes (in Si-O-Si, B-O-B, B-O-Si bonds) of borosilicate glass under hydrostatic pressure to 19 GPa in diamond anvil cell. The elastic and vibrational properties of 4 post-shocked specimens of the same glass, recovered from peak pressures of 19.8, 31.3, 41.3 and 49.1 GPa, are also reported. Raman spectra for the samples shocked to 41.3 and 49.1 GPa are similar to those for the unshocked sample, suggesting that the irreversible density and structural changes are recoverable on following decompression. ^{11}B NMR spectra for all four shocked specimens are similar, and indicate ratios of ^{III}B to ^{IV}B that are not greatly changed from the starting glass.

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