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Compression and associated properties of boron carbide JENNIFER CIEZAK, DATTATRAYA DANDEKAR, US Army Research Laboratory — The observed loss of shear strength of boron carbide around 22 GPa has been attributed to presence of amorphous material in the shock recovered, and statically indented and pressurized boron carbide. The present work presents a more direct association of the observed loss of shear strength in boron carbide under plane shock wave compression to amorphization in boron carbide under triaxial stress compression. This evidence is obtained from in-situ measurement of Raman, and infrared vibrational spectra of boron carbide confined in a Diamond Anvil Cell (DAC) under hydrostatic and non-hydrostatic pressures. X-ray-diffraction measurements do show a shift in the compression of boron carbide around 27 GPa. However, X-ray diffraction measurements indicate that the amorphization does not extend to micron scale, as there is no evidence of a loss of crystallinity in the recorded diffraction pattern of boron carbide to 47 GPa. Our work shows that shear plays a very dominant role in the stress-induced amorphization of boron carbide.

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