

**W0468**

**Crystal Structure, Equation of State and Pressure-Induced Phase/Distortional Transition(s) in B<sub>4</sub>C: *In-situ* Synchrotron XRD and Raman Study to 60 GPa.** Murli H. Manghnani<sup>1</sup>, George Amulele<sup>1</sup>, Jilian Zhu<sup>1</sup>, Pzremek Dera<sup>2</sup>, Yuchang Wang<sup>1</sup>, Mariappan Sekar<sup>1</sup>, <sup>1</sup>Univ. of Hawaii, Hawaii Inst. of Geophysics and Planetology, and <sup>2</sup>Geophysical Laboratory, Carnegie Institution of Washington.

Synchrotron X-ray diffraction (XRD) and Raman spectroscopy measurements have been carried out on B<sub>4</sub>C in a diamond-anvil cell to 60 GPa. These results, in conjunction with single-crystal XRD at ambient conditions and high-pressure ultrasonic measurements, are compared with shock wave data in order to understand the compression behavior, establish the equations of state, and explain the observed poor ballistic performance.

Whereas the powder XRD data indicate no easily detectable discontinuous changes within the studied pressure range, the Raman spectroscopy, electrical conductivity measurements, and shock wave data suggest a more complex behavior. Motivated by this discrepancy, a detailed strain/stress analysis based on the peak profile broadening was performed, revealing two regions of discontinuous strain change, which cannot be explained by the transformations of pressure transmitting medium. These changes can be tentatively associated with electronic transformations and changes in bonding. Preliminary results from the electrical resistivity and optical measurements support this interpretation.