Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Molecular crystals as precursors for poly-nitrogen[1] GUSTAV BORSTAD, JENNIFER CIEZAK-JENKINS, US Army Research Laboratory — The application of pressure to matter results in dramatic modifications of its properties. The compression of molecular crystals first eliminates "empty" space between the molecules. It then alters the electron density distribution, favoring the increase of atomic coordination and the formation of polymers. The polymerization of low-Z compounds into covalently-bonded networks in three dimensions tend to generate materials characterized by superconductivity, super-hardness, and high-energy density.[1] Poly-nitrogen (analogous to diamond) has been synthesized under extreme conditions above 100 GPa and 2000 K in diamond anvil cells, but could not be recovered to ambient conditions.[2] A useful form of poly-nitrogen would have to be synthesized at low-pressure with enhanced stability at ambient conditions. The changes in the intermolecular and intramolecular interactions with pressure play a crucial role in the synthesizing and stabilizing of the structure as well as in tuning its properties. In this talk, we provide Raman and x-ray diffraction data on nitrogen-containing compound biuret and compare it to work on other possible poly-nitrogen precursors. References [1] W. Grochala *et al., Angew. Chem. Int. Ed.* **46,** 3620 (2007). [2] M. I. Eremets *et al.*, *Nat. Mater.* **3,** 558 (2004).

[1]During this project, coauthor GB was supported in part by an appointment to the Postdoctoral Research Program at the US Army Research Laboratory administered by the Oak Ridge Associated Universities.

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Date submitted: 06 Nov 2015 Electronic form version 1.4