Abstract Submitted
for the SHOCK15 Meeting of
The American Physical Society

High Energy Density Nitrogen-Rich Extended Solids DANE TOMASINO, MINSEOB KIM, CHOONG-SHIK YOO, Washington State University — The application of thermo-mechanical energy (by high pressures and temperatures) comparable to chemical bond energies in solids can contribute to this concept in unique ways, as it often converts simple molecular solids into novel three-dimensional network structures in high energy density states. A good example is *cg*-N that was initially predicted to be stable at high pressures and later discovered by laser-heating experiments above 110 GPa and 2000 K. In this talk, we will describe our recent finding of yet-another form singly bonded polymeric nitrogen, synthesized in the stability field higher than that of cg-N. This new phase is characterized by its singly bonded, layered polymeric (LP) structure similar to the predicted *Pba2* and two colossal Raman bands, arising from two groups of highly polarized nitrogen atoms. The present result also provides a new constraint for the nitrogen phase diagram, highlighting an unusual symmetry lowering *3D cg-* to *2D* LP-N transition and thereby the enhanced electrostatic contribution to the stabilization of this densely packed LP-N.

Choong-Shik Yoo
Washington State University

Date submitted: 22 May 2015 Electronic form version 1.4