

Abstract Submitted  
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**Phase Diagram of Ammonium Nitrate**<sup>1</sup> MIHINDRA DUNUWILLE, CHOONG- SHIK YOO, Department of Chemistry Washington State University and Institute for Shock Physics — Ammonium Nitrate (AN) has often been subjected to uses in improvised explosive devices, due to its wide availability as a fertilizer and its capability of becoming explosive with slight additions of organic and inorganic compounds. Yet, the origin of enhanced energetic properties of impure AN (or AN mixtures) is neither chemically unique nor well understood - resulting in rather catastrophic disasters in the past<sup>1</sup> and thereby a significant burden on safety, in using ammonium nitrates even today. To remedy this situation, we have carried out an extensive study to investigate the phase stability of AN, in different chemical environments, at high pressure and temperature, using diamond anvil cells and micro-Raman spectroscopy. The present results confirm the recently proposed phase IV-to-IV' transition above 15 GPa<sup>2</sup> and provide new constraints for the melting and phase diagram of AN to 40 GPa and 673 K. 1. Stephens, H. W. The Texas City disaster, 1947. Austin, TX: University of Texas Press. 1997 2. Alistair, J. D. et al., J. Phys. Chem. A 2011, 115, 11889; Dunuwille, M. et al., J. Phys. Chem. A 2012, 116, 7600.

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