

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

High pressure–high temperature studies of ammonia JULIUS OJWANG, RYAN MCWILLIAMS, ALEXANDER GONCHAROV, Carnegie Institution of Washington — Raman scattering measurements and x-ray diffraction of ammonia have been made under simultaneous conditions of high temperature and high static pressure in the laser heated diamond anvil cell. The experimental results on phase transitions with pressure increase at room temperature are found to be in accord with previous studies [1]. Pressure was increased up to 52 GPa and temperature ramped up to 2000 K. On increasing temperature at high pressure, strong changes in the ammonia Raman spectra are observed, which could be associated with melting. On melting, ammonia undergoes partial decomposition into nitrogen and hydrogen. We also observed the appearance of new N-H stretch bands at high temperatures which may be related to the formation of new bonds. When quenched back to room temperature the starting phase of solid ammonia is recovered. The shift in frequencies of the vibron bands of nitrogen with pressure shows that it is phase segregated from ammonia.

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Date submitted: 28 Nov 2010

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