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Equation of state measurements of shocked ammonia gas JOHN LANG, DANA DATTELBAUM, PETER GOODWIN, JOSHUA COE, DANIEL GARCIA, Los Alamos National Laboratory — Ammonia is one of the constituents of the fluid product mixture arising from explosives detonation. Few shock compression experiments have been performed on NH_3 in either the gas or condensed phase. Earlier work by Dick (J. Chem. Phys. **74**, 4053) and Mitchell, *et al.* (J. Chem. Phys. **76**, 6273) examined the shock compressibility of liquid NH_3. Nellis, *et al.* (Science **240**, 781) also performed experiments on liquid mixtures of NH_3 with water and isopropanol (a "synthetic Uranus") to develop an equation of state (EOS) for the outer planets. Here, we present the results from a series of gas gun-driven plate impact experiments on NH_3 gas at elevated initial density. PDV and VISAR optical diagnostics were used to directly measure shock velocities and particle velocities in the shocked gas, used in quantifying the principal Hugoniot locus, and pressure and density of the shocked gas. Emission was measured using both 5-color pyrometry and streak spectroscopy, from which we estimated the temperature of the shocked gas. The pressure and density measurements were in good agreement with results from simulations using the SESAME EOS for NH_3, however the measured temperatures were found to be consistently lower than in the simulations, and lower than shocked atomic gas species such as Ar.

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