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Equations of State of Hexanitrostilbene (HNS) JARED GUMP, CHAD STOLTZ, BRIAN MASON, Naval Surface Warfare Center, Indian Head Division, EMILY HEIM, Naval Research Enterprise Internship Program — Hexanitrostilbene (HNS) is an energetic ingredient that is widely used in commercial and military explosives for its thermal stability. However, characterization of its thermodynamic parameters and phase stability is lacking. Crystalline properties, such as bulk modulus and thermal expansion, are necessary to accurately predict the behavior of shocked solids using hydrodynamic codes. In order to obtain these values, equations of state of fine-particle (type IV) HNS were investigated using synchrotron angle-dispersive x-ray diffraction experiments at static high-pressure and temperature. The samples were compressed and heated using diamond anvil cells. Pressure – volume data for HNS at ambient temperature were fit to the Birch-Murnaghan and Vinet formalisms to obtain bulk modulus and its first pressure derivative. Temperature – volume data at ambient pressure were fit to obtain the volume thermal expansion coefficient.

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