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Relating polymorphism and decomposition of RDX under static and dynamic compression[1] ZBIGNIEW DREGER, YOGENDRA GUPTA, Insitute for Shock Physics, Washington State University — Knowledge of the reactive behavior of energetic crystals at static high pressures and high temperatures (HP-HT) is an important step toward understanding the shock wave initiation of these crystals. Vibrational spectroscopy in a diamond anvil cell was used to examine the behavior of RDX crystals at the pressures and temperatures relevant to shock wave initiation. Phase boundaries between three RDX polymorphs (α, γ, and ε) were determined up to 12 GPa and 600 K. Decomposition kinetics for the ε- and γ-phases were examined at various pressures and temperatures, and were found to have positive volumes of activation. CO_2, N_2O and H_2O were identified as the main decomposition species. Static HP-HT results were used to identify and understand the following processes in shocked RDX: $\alpha - \gamma$ phase transition, identification of the crystal phase at decomposition, and the role of pressure and temperature in accelerating the RDX decomposition under shock compression. This work demonstrated that static HP-HT results provide an important complementary route to elucidate the physical and chemical processes in shocked RDX crystals.

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