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Shock initiation behavior of PBXN-9 determined by gas gun experiments NATHANIEL SANCHEZ, RICHARD GUSTAVSEN, DANIEL HOOKS, Los Alamos National Laboratory — The shock to detonation transition was evaluated in the HMX based explosive PBXN-9 by a series of light-gas gun experiments. PBXN-9 consists of 92 wt% HMX, 2wt% Hycar 4054 & 6 wt% dioctyl adipate with a density of 1.75 g/cm^3 and 0.8% voids. The experiments were designed to understand the specifics of wave evolution and the run distance to detonation as a function of input shock pressure. These experiments were conducted on gas guns in order to vary the input shock pressure accurately. The primary diagnostics are embedded magnetic gauges which are based on Faraday's law of induction along with photon Doppler velocimetry (PDV). The run distance to detonation vs. shock pressure, or "Pop plot," was redefined as $log\ (X^*) = 2.14 - 1.82\ log\ (P)$, which is substantially different than previous data. The Hugoniot was refined as $U_s = 2.32 + 2.21\ U_p$. This data will be useful for the development of predictive models for the safety and performance of PBXN-9 in addition to providing an increased understanding of HMX based explosives in varying formulations.

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