

Abstract Submitted  
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**Examination of Shock-Induced Reaction in Ni/Al Powder Mixture**<sup>1</sup> ANIRBAN MANDAL, MATTHEW BEASON, BRIAN JENSEN, Shock and Detonation Physics (M-9), Los Alamos National Laboratory, Los Alamos NM 87545 — Understanding the mechanisms of shock-induced reaction is important for gaining potential control over the synthesis of novel materials with enhanced properties. Toward this, planar shock wave responses of a physical mixture of Ni/Al powders and a composite Ni/Al powder produced through high-energy ball milling (HEBM) were compared. Powder samples pressed to 75% TMD were shock compressed to peak pressures ranging between 10 – 18 GPa and the resulting wave profiles were measured using laser velocimetry. Longitudinal stress – particle velocity states in both powders, calculated from the measured wave profiles using impedance matching, lie along the inert Hugoniot constructed using McQueen’s mixture theory. This suggests that the physical mixture and the ball-milled powder did not react within the duration of our measurements. Implications of this result on proposed shock-induced reaction mechanisms will be discussed. LA-UR-19-21418

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