

Abstract Submitted
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Impact Initiation of Pressed Al-based intermetallic Forming Powder Mixtures¹ SIWEI DU, NARESH THADHANI, School of Materials Science and Engineering, Georgia Institute of Technology — Aluminum-based intermetallic forming powder mixtures (Ni-Al, Ta-Al, Nb-Al, Mo-Al and W-Al) were uniaxially pressed into 80% dense pellets, to study the impact initiation of reactions. The pressed pellets mounted in front of a projectile were impacted onto a steel anvil using a 7.62 mm gas gun, under a 50 millitorr vacuum. Projectiles made of copper, aluminum or poly carbonate and varying impact velocity (up to 500 m/s) provided different levels of stress, strain, and kinetic energy. The IMACON 200 framing camera was used to observe the transient deformation states and reaction ignition characteristics. AUTODYN 2D was used to simulate the densification and deformation process, and correlate with that observed by high-speed imaging. It is found that the continued straining following densification of the powder compact by the kinetic energy of the projectile, and the resulting stress are both contributing to the initiation of the intermetallic reaction. In this presentation the characteristics of impact initiated reactions in the various intermetallic systems will be presented.

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