

Abstract Submitted
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Compaction of Ni-Al powders in a sharp interface framework¹

ALEXIA DE BRAUER, H. S. UDAYKUMAR, Univ of Iowa — Under high strain rate loading, structural energetic materials, such as Ni-Al powders, experience large deformation that causes high energy release which may lead to chemical reaction. In particular, the particle interfaces are the locations of energy deposition and reaction between the components. The present work proposes a level set-based numerical framework that models the particles and their interfaces as sharp objects on a Cartesian fixed grid. The current effort focuses on the compaction, heat generation and material melting at the interfaces of Ni and Al particles under high-velocity impact. The chemical reaction between Ni and melted Al is modeled by an Arrhenius type equation. The effect of friction on deformation and heat generation at the interfaces is examined. The material and interfacial modeling is applied on an idealized mixture powder composed of spherical particles and submitted to a flyer plate impact.

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