

Abstract Submitted  
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**Failure and fragmentation of pressed bimetallic composites** JAMIE KIMBERLEY, MICHAEL HARGATHER, New Mexico Tech, STEVEN THOMA, Reactive Metals International Inc — The dynamic failure and fragmentation response of pressed metallic composites is investigated experimentally using a Kolsky bar and explosive loading. The composites are made of nominally brittle and ductile metal phases, in varying ratios, to explore the effect of composition on the material strength and fragment size distribution. Dynamic compression experiments at strain rates up to 5000 /s are conducted on a Kolsky bar to measure the compressive strength of the materials. High-speed images captured during the dynamic loading provide insight to the nature of the failure mechanisms activated (e.g. brittle vs. ductile fragmentation). Explosively-driven fragmentation experiments are conducted in a shock tunnel to investigate the fragmentation behavior under shock loading which produces higher rates and induces spall failure. These experiments incorporate high-speed schlieren imaging to track the explosively driven shock and resulting fragments as they travel down range. The high-speed images from both experimental setups are correlated with postmortem measurements of the resulting fragment size distributions, providing connections between the composition, mechanical properties, and fragmentation behavior.

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