

Abstract Submitted  
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**Effects of powder characteristics on impact initiated combustion in aluminum powder compacts**<sup>1</sup> JENNIFER BREIDENICH, NARESH THADHANI, Georgia Institute of Technology — The processes leading to the initiation of impact induced combustion in aluminum powder compacts under uniaxial stress loading are investigated as a function of different powder characteristics. The mechanistic processes leading to reaction initiation in the Al samples are investigated via high speed and IR imaging of light associated with the reaction. Compacts composed of larger size particles of aluminum (approximately  $70(\mu\text{m})$ ) are shown to be more sensitive to impact initiated combustion than those composed of smaller particle sizes. Mechanical pre-activation by high energy ball milling (HEBM) of the Al powders shows increased reactivity. Images captured during compaction and deformation, revealing light emission, are correlated with CTH simulations indicating areas of localized strain and heating during deformation of the particles. These observations are used to explain the impact-initiated combustion sensitivity of Al powders as a function of powder characteristics and to understand the processes leading to reaction initiation.

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