Abstract Submitted
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**Time-resolved studies of impact-initiated combustion in aluminum powder compacts**[1] JENNIFER BREIDENICH, Georgia Insitute of Technology, SEAN DIXON, BRADY AYDELOTTE, NARESH THADHANI, Georgia Institute of Technology — The mechanisms of combustion reaction occurring under impact loading of aluminum powder compacts are studied using UV/Vis spectroscopy to gain time-resolved chemical information. Impact experiments performed on aluminum powder compacts reveal light emission due to reaction at velocities greater than 400m/s in air, while no reaction is observed in a vacuum (50mTorr). Light emission and reaction occurrence is also sensitive to the density of the Al powder compacts. Upon combustion, wavelengths indicative of the well-known reaction $Al + O_2 \rightarrow AlO + O$, a sharp doublet at 398nm and multiple broad peaks between 420 and 500nm, are observed. Microsecond time-resolved chemical information is gained through analysis of these wavelengths using a spectrometer coupled with an electron multiplier CCD camera. The impact initiated reaction is also monitored by high speed imaging of transient deformation profiles which are compared to those predicted using numerical simulations employing ANSYS-AUTODYN-3D computer code. The insight obtained from the combination of these analyses of impact-initiated combustion reaction in aluminum powder compacts will be presented.

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