

Ignition and Combustion Characteristics of Metastable Intermolecular Composites

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Novel properties associated with nanostructured materials, including nanoenergetic materials, have attracted a great deal of interest recently. Metastable Intermolecular Composite (MIC) materials are comprised of a mixture of oxidizer and fuel with particle sizes in the nanometer range, and are a subclass of materials known as thermites. They can have higher energy densities than conventional explosives and can exhibit combustion velocities above 1 km/s. These properties make them very attractive in a number of applications. However characterizing these materials is challenging, and the mechanism responsible for the propagation of reaction in loose compacts is not well understood. I will present an overview of efforts at Los Alamos to characterize and better understand the reaction mechanisms of these advanced energetic materials.