

Abstract Submitted  
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**Study of thermite mixtures consolidated by cold gas dynamic spray process** ANTOINE BACCIOCHINI, GEOFFREY MAINES, CHRISTIAN POUPART, MATEI RADULESCU, BERTRAND JODOIN, University of Ottawa, JULIAN LEE, DRDC — The present study focused on the cold gas dynamic spray process for manufacturing finely structured energetic materials with high reactivity, vanishing porosity, as well as structural integrity and arbitrary shape. The experiments have focused the reaction between the aluminum and metal oxides, such as Al-CuO and Al-MoO<sub>3</sub> systems. To increase the reactivity, an initial mechanical activation was achieved through interrupted ball milling. The consolidation of the materials used the supersonic cold gas spray technique, where the particles are accelerated to high speeds and consolidated via plastic deformation upon impact, forming activated nano-composites in arbitrary shapes with close to zero porosity. This technique permits to retain the feedstock powder micro-structure and prevents any reactions during the consolidation phase. Reactivity of mixtures has been investigated through flame propagation analysis on cold sprayed samples and compacted powder mixture. Deflagration tests showed the influence of porosity on the reactivity.

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