Abstract Submitted
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Pressure waves generated by metastable intermolecular composites in an aqueous environment[1] GEOFF MAINES, MATEI RADULESCU, ANTOINE BACCIOCHINI, BERTRAND JODOIN, University of Ottawa, JULIAN LEE, DRDC-Suffield — In the present study, pressure waves generated by a metastable intermolecular composite (MIC) have been measured experimentally in an aqueous environment. Experiments were performed in a 1.0 L high pressure chamber mounted with high resolution pressure transducers and designed with optical access. Samples consisting of a stoichiometric mixture of aluminum and copper(II)oxide particles were evaluated. Two types of samples were constructed; a mixture of micron-sized raw powders, and ball milled powders with a lamellated nanostructure. A planetary mill was used to refine reactant powders from micron- to nano-scale dimensions. Manual compaction and cold spray deposition techniques were used to consolidate powders in various densities. The dynamics of the pressure wave and high pressure gas bubble were monitored via pressure data and high-speed Schlieren visualization. The effects of reactant particle size and sample density have been evaluated quantitatively and compared with equilibrium calculations. Dynamics of the pressure wave were correlated with the amount of gas released and the rate of burning of the sample material.

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