

Abstract Submitted
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Fast Reactions of Aluminum and Explosive Decomposition Products in a Post-Detonation Environment BRYCE TAPPAN, VIRGINIA MANNER, JOSEPH LLOYD, STEVEN PEMBERTON, Los Alamos National Laboratory, EXPLOSIVES APPLICATIONS & SPECIAL PROJECTS TEAM — In order to determine the reaction behavior of Al in HMX/cast-cured binder formulations shortly after the passage of the detonation, a series of cylinder tests was performed on formulations with varying amounts of 2 μm spherical Al as well as LiF (an inert surrogate for Al). In these studies, both detonation velocity and cylinder expansion velocity are measured in order to determine exactly how and when Al contributes to the explosive event, particularly in the presence of oxidizing/energetic binders. The U.S. Army ARDEC at Picatinny has recently coined the term “combined effects explosives” for these materials as they demonstrate both high metal pushing capability and high blast ability. This study is aimed at developing a fundamental understanding of the reaction of Al with explosives decomposition products, where both the detonation and post-detonation environment are analyzed. Reaction rates of Al metal are determined via comparison of predicted performance based on thermoequilibrium calculations. The JWL equation of state, detonation velocities, wall velocities, and parameters at the C-J plane are some of the parameters that will be discussed.

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