

Abstract Submitted
for the SHOCK17 Meeting of
The American Physical Society

Isotope-Labeled Composition B for Tracing Detonation Signatures VIRGINIA MANNER, DAVID PODLESIAK, RACHEL HUBER, RONALD AMATO, ANNA GIAMBRA, PATRICK BOWDEN, ERNEST HARTLINE, DANA DATTELBAUM, Los Alamos Natl Lab — To better understand how solid carbon forms and evolves during detonation, we have prepared Composition B with ^{13}C and ^{15}N -labeled 1,3,5-trinitro-1,3,5-triazacyclohexane (RDX) and 2,4,6-trinitrotoluene (TNT) in order to trace the formation of soot from the carbon and nitrogen atoms in these explosives. Isotope-labeling of explosives has been performed in the recent past for a variety of reasons, including environmental remediation and reaction mechanism studies. Because it is expensive and time consuming to prepare these materials, and our detection equipment only requires trace amounts of isotopes, we have prepared fully-labeled materials and substituted them into unlabeled RDX and TNT at less than the 1% level. We will discuss the preparation and full characterization of this labeled Composition B, the detonation tests performed, along with the results of the post-detonation soot analysis. Various detonation models predict differing amounts and forms of carbon and nitrogen; these isotopically-labeled precursors have allowed these models to be tested.

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Date submitted: 27 Feb 2017

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