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Synthesis, Formulation and Evaluation of New Less Sensitive Explosives BRYCE TAPPAN, PATRICK BOWDEN, ROBERT LEBRUN, MARVIN SHORTY, PHILIP LEONARD, JOSEPH LICHTHARDT, MATTHEW SCHMITT, VIRGINIA MANNER, LARRY HILL, Los Alamos Natl Lab — The search for insensitive high-explosive (IHE) materials has been on-going for numerous decades at LANL, with numerous advances made in synthesis of new molecules with promising properties. In this study, we have evaluated novel formulations of existing explosives with the intention of developing high explosives with small critical diameters and low shock sensitivities while maintaining high performance. Specifically, 1,1-diamino-2,2-dinitroethene (DADNE or FOX-7) or 3,3'-diamino-4,4'-azoxyfurazan (DAAF) was formulated with 3-nitro-1,2,4-triazole-5-one (NTO) to determine what weight percentage of added DADNE or DAAF yielded steady detonation near predicted values at 12.7 mm diameter. Preparation, purification and characterization have been performed for two mono-molecular explosives, 5,7-diamino-4,6-dinitrobenzofuroxan (CL-14) and 1-nitroso-3,5-dinitro-1,3,5-triazacyclohexane (m-RDX or mononitroso-RDX). A new, one-pot synthesis of m-RDX has produced a 59% yield with limited RDX contamination. Results from small-scale sensitivity tests on CL-14, m-RDX and NTO-based formulations, and rate sticks will be discussed.

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