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Synthesis and Sensitivity Studies of PETN and ETN Derivatives NICHOLAS LEASE, VIRGINIA W. MANNER, DAVID E. CHAVEZ, DAVID ROBBINS, LISA KAY, Los Alamos National Laboratory — Nitrate ester explosives are a historic class of explosives first discovered in 19th century. Explosives such as pentaerythritol tetranitrate (PETN) are still commonly used in explosive stockpiles, while other nitrate ester explosives such as erythritol tetranitrate (ETN) have shown increased interest due to ease of synthesis and melt-castability. While both PETN and ETN have been studied extensively, derivatives of PETN and ETN with various explosive functional groups have not. Herein we discuss the synthesis of PETN and ETN derivatives with varied energetic functional groups. Studying functional group effects on material sensitivity can lead to key insights for tuning sensitivity of explosives, for developing new energetic materials. These materials will be fully characterized and studied for impact, spark and friction sensitivity, in addition to determining thermal and melting point behavior.

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