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Detonation Performance and Shock Sensitivity Analysis of Energetic Cocrystals¹ VASANT VUPPULURI, GABRIEL A. MONTOYA, NICHOLAS CUMMOCK, STEVEN F. SON, Purdue University — Development of new energetic materials is a challenging endeavor due to the difficulty of successful synthesis and scale-up of novel energetic molecules as well as the extensive characterization required. For this reason, cocrystallization has been explored as a possible route to simplifying the development of energetic materials. A number of cocrystals of CL-20 as well as other high-nitrogen materials have been reported that exhibit improved properties such as high density. However, their detonation and shock sensitivity characteristics are not well-understood, both of which are particularly important for evaluating the potential of explosives for use in various applications. In addition, the effect of cocrystallization on these properties is not well-understood. Evaluating these parameters is challenging due to large amounts of material required for most experimental techniques. In this work, results of experiments involving streak camera measurements, floret tests, and PDV are presented to compare detonation performance and shock sensitivity of various cocrystals and their corresponding physical mixtures.

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