

Abstract Submitted
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Coherency for the Critical Condition of DDT and SDT in Energetic Materials¹ HUAN SHI, TAN XIANGQIAN, Guangzhou University — Most of the past research for the energetic materials focused on the SDT for explosives and DDT for solid propellants. Since the difference between the explosive and solid propellant decreases with the increase of the energy density in the solid propellant, the study of SDT for the solid propellant is needed. In this paper, two-dimensional SDT experiments and thin wall copper DDT experiments have been carried out for two types explosives[E1(95% RDX), E2(95% HMX)] and two types solid propellants[P1(55% RDX), P2(55% HMX)] to investigate the coherency for the critical conditions of SDT and DDT for the same energetic materials. The results show that E1 has the highest sensitivity in both the SDT and DDT tests followed by E2, P1 and P2. Although such rules cannot be generalized to all high energetic materials, it is obvious that a relationship exists between SDT and DDT sensitivity. The relationship between the deflagration hazard in SDT and the combustion hazard in DDT is critical in this study. The measured critical conditions and parameters such as the increase velocity of combustion peak, the highest scope and the movement velocity in SDT indicated that coherency exists between the SDT and DDT.

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