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The Preparation of HMX Crystals with Defects and the Influences of Crystal Defects on Thermal Sensitivity and Stability

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Abstract: HMX crystals with defects of different types and populations were prepared by fast recrystallization. These obtained crystals were used to study the influences of crystal defects on thermal sensitivity and stability of HMX by explosion point measurement and thermal analysis. The morphology and defects of HMX crystals were observed by TEM technique. Experimental results show that the explosion point (5 s) of HMX decreases by 51 ~ 54 °C, and its thermal decomposition initial temperature and apparent activation energies also decline remarkably due to the existing defects in the crystals. It could be concluded that the crystal defects would deteriorate both the sensitivity to heat and the thermal stability of HMX.

Key words: physical chemistry; HMX; crystal defect; sensitivity; thermal stability

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