Application of ATP-28 in Cast-cured Explosive

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Abstract: The physical and chemical properties of a new energetic polymer adhesive (ATP-28) were analyzed. Adding four plasticizers into ATP-28 respectively, the plasticities of the explosive mixtures containing ATP were studied by viscosity tests. Comparing the detonation velocities of the explosive with ATP or HTPB as its adhesives, the effect of the ATP-28 on the explosion energy was studied. The experimental results show that the viscosity of the energetic adhesive with DOA is decreased by 97%. Temperature plays an important part in the viscosity system. Detonation velocity of explosive formulation containing ATP-28 is 7350 m·s^{-1}. It is shown that detonation velocity can be improved evidently by adding ATP-28.

Key words: materials science; explosive; cast-cured PBX; energetic adhesive

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Recrystallization and Properties of LLM-105

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Abstract: The recrystallization of 2,6-diamino-3,5-dinitropyrazine-1-oxide (LLM-105) was studied. Results show that mean particle diameter, purity and impact sensitivity of LLM-105 may be quite different by different crystallization methods. The products obtained by cooling crystallization and solvent (DMOS)-nonsolvent(hot water) crystallization have low impact sensitivity, the value of H_{50} are 120.0 cm and 108.3 cm. Thermal properties of LLM-105 were studied by DSC-TG, VST, TG and thermal explosion test. Thermal properties parameters of LLM-105 are shown respectively: DSC exothermic onset temperature is 341.2 ℃ (heating rate 10 ℃·min^{-1}); VST: 0.016 mL·g^{-1}/120 ℃/48 h; loss of weight: 0.13%/120 ℃/48 h; thermal explosion temperature for 5 s explosion delay is 367.5 ℃. The results of VST show that LLM-105 has good compatibility with HMX, AS, F_{2311}, F_{2314} and estane. Measured detonation velocity of LLM-105 (LLM-105/F_{2314} = 95/5, 1.845 g·cm^{-3}, 96.4% TMD) is 7991 m·s^{-1}. The experimental results of pressure-density curve show that LLM-105 has good pressing-molded property.

Key words: physical chemistry; LLM-105; recrystallization; property