

Properties of Polyglycidyl Nitrate Plasticizer

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Abstract: To explore the application possibilities of polyglycidyl nitrate plasticizer (PGNN) in propellants and PBX explosives, a series of PGNN with different number average molecular weight were synthesized. The relationships between molecular weight and density, viscosity, glass transition temperature and volatility were studied. The compatibility of PGNN with the main components of propellants and explosives were investigated by TG, and the hazard during storage and transportation were studied by sensitivity test and transport vibration test. Results show that PGNN with molecular weight of 523 has a higher density ($1.43 \text{ g}\cdot\text{cm}^{-3}$), lower glass transition temperature ($-56 \text{ }^\circ\text{C}$) and lower volatility ($60 \text{ }^\circ\text{C}$, $0.096 \text{ mg}\cdot\text{cm}^{-2}\cdot\text{h}^{-1}$). PGNN is compatible with HMX, RDX, AP and Al etc., and has good safety characteristics. Both the friction sensitivity and the impact sensitivity are 0, and no combustion or explosion occurs during the 4 hours of simulated highway transportation test. This research reveals that PGNN with molecular weight of about 500 is an ideal oligomer plasticizer.

Key words: polyglycidyl nitrate plasticizer; oligomer plasticizer; insensitivity; compatibility

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《含能材料》“含能共晶”征稿

含能共晶是不同含能分子通过氢键等相互作用力形成的具有稳定结构和性能分子晶体。含能共晶充分组合了单质含能分子的优点,呈现出感度低,综合性能优良的特点,具有潜在的应用前景,共晶研究已经引起国内外含能材料学界的高度关注。为推动含能共晶的研究和交流,本刊特推出“含能共晶”专栏,主要征稿范围包括含能共晶晶体设计与性能预测、含能共晶的制备、结构解析、性能等。来稿请注明“含能共晶”专栏。