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## Research on Mechanical Properties of PVB-Based High Solid Content Propellant

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Abstract: To study the mechanical properties of polyvinyl butyral (PVB) -based high solid content propellant, the effect of PVB with various viscosity, PVB blended with viscosity of 45 mPa · s and 300 mPa · s and plasticizers 1,2-dibutylphthalate (DBP) and acetyl tributylcitrate (ATBC) on the PVB-based high solid content propellant was analyzed by a static mechanical test. The effect of PVB with various viscosity and two plasticizers on the dynamic mechanical property of PVB-based propellant was studied by dynamic thermomechanical analysis (DMA). Results show that with the increase of the viscosity of PVB, the high temperature tensile stress of the propellant increases, the normal temperature and high temperature elongation decrease. The PVB blended with mass ratio of 1:3 with viscosity of 45 mPa · s and 300 mPa · s can make the tensile mechanical properties of the propellant achieve the average value of these two kinds of single viscosity propellant. Replacing DBP with ATBC decreases low and normal temperature tensile elongation slightly The PVB based propellant with PVB of viscosity of 45 mPa · s has stronger α-transformation and the propellant with plasticizer DBP has stronger  $\beta$ -transformation.

Key words: solid propellant; polyvinyl butyral (PVB); mechanical property; dynamic thermomechanic analysis

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## 《含能材料》高效毁伤弹药专栏征稿

高效毁伤弹药以"利用最小化成本获得最大化效果"为目标,对含能材料的性能和能量提出了更高的要求。为进一步 促进高效毁伤弹药及其技术的研究,本刊将于2015年增设高效毁伤弹药专栏,内容涉及(1)传统含能材料的优化和改进以 及先进含能材料的开发和应用,包括:传统含能材料合成、制造、处理和应用的新方法与新技术,新的 CHON 含能材料的开 发和应用,金属化炸药,非传统概念炸药(如燃料空气炸药、温压炸药),高能量密度材料;(2)含能材料能量的控制输出研 an出模式 org.cn www.energetic-materials.org.cn 究,包括:能量输出增强(如组合装药),能量输出聚焦/定向,能量输出模式可控(如多模装药),能量输出范围可控(如低附

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