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Characterization of Bu-NENA/NC Low Sensitive Double-base Propellant

ZHAO Ben-bo¹, XIA Min¹, HUANG Jia-qj², LI Wei², LIU Qiang², LUO Yun-jun¹

(1. School of Materials Science, Beijing Institute of Technology, Beijing 100081, China; 2. Yibin North Chemical Industry CO., LTD, Yibin 644219, China)

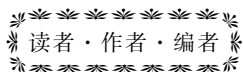
Abstract: Bu-NENA (N-butyl-N-nitrate ethylnitramine)/NC (nitrocellulose) double-base propellant was formulated with Bu-NENA as a replacement for NG (nitroglycerin) and the NG/NC propellant was also prepared as a control. The sensitivity, evaporation, thermal decomposition and mechanical properties of the double-base propellants were investigated. Results show that the friction sensitivity of the Bu-NENA/NC propellant drops to 18% from 94%, and the H_{50} of the impact sensitivity enhances to 27.1 cm from 8.1 cm. Thermogravimetric analysis of Bu-NENA/NC propellant reveals that the onset temperature and the peak temperature of first decomposition stage reach to 144.6 °C and 179.5 °C from 120.3 °C and 151.5 °C, respectively. The value of evaporation rate for Bu-NENA/NC propellant at 80, 90, 100 °C is lower than that of NG/NC propellant, which indicates that the volatility of the Bu-NENA/NC propellant decreases. Bu-NENA/NC double-base propellant has better mechanical property than NG/NC propellant and the low temperature elongation at break point rises to 13.63%, which is 1.63 times to that of the NG/NC propellant.

Key words: double-base propellant; Bu-NENA (N-butyl-N-nitrate ethylnitramine)/NC (nitrocellulose); mechanical property; thermal decomposition; evaporation

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