Response Characteristic of PBX-2 Explosive under Projectile Impact at Ambient Temperature and 75 °C

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Abstract: To investigate the response characteristic of PBX-2 explosive under projectile impact at ambient temperature and 75 ℃, the projectile impact tests of PBX-2 explosive were conducted by a high temperature impact test device. The reaction overpressure of the explosive was measured by the shock-wave overpressure sensor and the response characteristics of the explosive at ambient temperature and 75 ℃ were comprehensively analyzed using recovered samples. The stress variation of PBX-2 at ambient temperature and 75 °C at different impact velocities was calculated and analyzed using finite element program LS-DYNA. The results show that the threshold velocity of ignition reaction for PBX-2 explosive at ambient temperature is from 263.5 m \cdot s⁻¹ to 269.9 m \cdot s⁻¹, while the threshold velocity of ignition reaction for PBX-2 heated to 75 °C is from 316 m·s⁻¹ to 367 m·s⁻¹. Compared with ambient temperature state, when the projectile velocity is less than 800 m \cdot s⁻¹, the reaction degree of PBX-2 at 75 $^{\circ}$ C obviously decreases. However, when the projectile velocity is higher than 800 m · s⁻¹, the impact pressure of about 1.54 GPa can make the PBX-2 at 75 °C occur violent reaction.

Key words: impact safety; polymer bonded explosive (PBX); reaction characteristic

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