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Title: Influence of the Nano-aluminium on Underwater Energy of RDX-based Pressed Explosive

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摘要: 为了探索纳米铝对RDX基压装炸药的水下爆炸能量的影响,测试了含纳米铝、微米铝、以及纳米铝和微米铝级配的RDX基炸药水下爆炸能量,分析了其水下爆炸能量的变化规律。结果表明,RDX基压装炸药中,当单独使用纳米铝或微米铝时,纳米铝对炸药水下爆炸总能量的提高不如微米铝;当铝粉总质量分数为30%,且纳米铝和微米铝的质量比为1:2时,水下爆炸总能量比单独使用微米铝时提高7%,说明纳米铝和微米铝合理级配能够提高铝粉的能量释放效率。当铝粉总质量分数为35%时,即使采用级配也无法提高含铝炸药的水下爆炸能量。

Abstract: In order to explore the influence of nano-aluminum on the underwater explosion energy of RDX-based explosives, the underwater explosion energies of RDX-based explosives with nano-aluminum, micro-aluminum and particle grading between them were tested. The change laws of underwater explosion energy were analyzed. Results showed that the increase of explosion energy with nano-aluminum explosive was less obvious than that of explosion energy with micro-aluminum explosive when they were used alone. When the mass fraction of aluminum powder was 30% and the mass ratio of nano-aluminum and micro-aluminum is 1:2 in the RDX-based pressed explosive, the underwater total energy can increase by 7% than the use of micro-aluminum alone, revealing that gradation of nano-aluminum and micro-aluminum can improve the efficiency of aluminum powder release energy. When the mass fraction of aluminum powder is 35%, the underwater explosion energy of aluminized explosive with gradation of nano-aluminum and micro-aluminum can not be improved.

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