

## Damage Characteristics of Two HMX-based Anti-overloaded Explosives under Shock Loading

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**Abstract:** Two kinds (casting moulding and pressed fitting) of HMX-based anti-overloaded explosives were chosen to study the damage characteristics and damage failure mechanisms of explosives under overloaded conditions by shock loading. The shock damage was conducted based on shock wave sensitivity test. The damage characteristics of samples before and after shock loading were studied by CT and the shock wave sensitivity was also tested after damage. Results of CT test show that no macro-damage appear in explosive by pressed fitting after the shock damage, while a cavity with length of 7–8 mm and diameter of 1–2 mm appears in cast explosive and is located at 7–8 mm away from one end of the witness board. After shock damage experiments, for cast explosive, above the position of 40 mm from the bottom surface, the explosive density decrease by 1%–5%, and for the pressed fitting explosive, above the position of 50 mm from the bottom surface, the explosive density increase by 1%–8%. The shock wave sensitivity of the both samples decreases after shock damage. The critical gap thicknesses of the cast explosive decreases from 25–27 mm before damaged to 13–15 mm after damaged, while for pressed fitting explosive, the thickness decrease from 38–40 mm to 30–32 mm.

**Key words:** shock damage; HMX-based anti-overloaded explosive; damage characteristics; shock wave sensitivity; CT test

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### 《含能材料》“观点”征稿

为了丰富学术交流形式,及时传递含能材料领域同行们的学术观点和思想,《含能材料》开设了“观点”栏目。“观点”栏目的来稿应观点鲜明、内容新颖、形式上短小精悍。欢迎含能材料各领域的专家积极来稿。来稿时请附个人简介及主要研究工作介绍。

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### 《含能材料》“损伤与点火”征稿

含能材料的损伤特征与点火过程有密切的联系,炸药、推进剂的内部损伤及其对力学特性、安全特性和点火行为的影响规律受到了含能材料学界的高度重视,为推动这一重要研究方向的学术交流,本刊特设立“损伤与点火”专栏。专栏主要征集炸药、推进剂等含能材料的损伤观测与多尺度表征技术、含损伤的本构方程、准静态与动态损伤演化规律、损伤与破坏的宏(细)观模式、损伤对起爆、爆炸、爆轰成长以及非冲击起爆行为的影响等方向的原创新性研究论文。来稿请注明“损伤与点火”专栏。

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