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Electrostatic Accumulation Characteristic and Hazard Analysis of Micro-nano Energetic Materials

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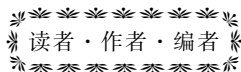
Abstract: In order to analyse the electrostatic hazard of micro-nano energetic materials, the electrostatic accumulation experiments were carried out with industry and nano RDX, HMX explosive using different standard sieve instead of the chute. The electrostatic accumulation of RDX and HMX were obtained by Faraday cylinder, and their electrostatic hazards were analyzed. The influences of explosive powder quantity and particle size on the electrostatic accumulation under condition of the 50 aperture standard sieve were studied. The electrostatic hazards of nano RDX sieved with different aperture standard sieves were compared. Results show that the more the amount of explosive is, the greater the electrostatic accumulation is. There is certain linear relationship between the standard sieve aperture and the electrostatic accumulation. The average mass charge density of nano RDX and HMX with the particle size of 80 nm are -21.1 and $-8.1 \mu\text{C} \cdot \text{kg}^{-1}$ respectively, and are about 3.6 times of those of industrial RDX and HMX respectively, indicating a high electrostatic hazard. The electrostatic accumulation of RDX is about 2.6 times of those of HMX in the same particle condition.

Key words: RDX; HMX; micro-nano energetic materials; electrostatic accumulation

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高能量、低特征信号、低易损、低成本、低污染、灵活能量管理和高可靠性成为当前固体推进剂面临的紧迫课题,为促进其研究,本刊将于2015年开设推进剂研究专栏,以专题报道固体推进剂研究的最新研究进展。欢迎广大学者投稿,来稿时请选择对应的专栏。

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