

## Ignition Performance of the High Energy Chemical Igniter Coated with a PVAc Elastic Microsphere

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**Abstract:** To reduce the effect of formability, combustion duration, burning rate and other parameters of the chemical igniter on the dust combustion and explosion experiments and improve the accuracy and repeatability of experimental data, the chemical igniter coated with a polyvinyl acetate (PVAc) elastic microsphere was developed. Firstly, the ignition powders were desensitized by paraffin wax, then a few drops of petroleum ether was added to the ignition powder to form a spherical ignition powder, then the spherical ignition powder was coated by ethanol solution of PVAc and dried in vacuum. In the process of drying, the petroleum ether was volatilized to make the coated film expand and the ignition powder bulk. The PVAc elastic hollow microsphere prepared has the advantages of good formability, strong toughness, water proof and oxidation resistance, etc. The deflagration characteristics of the igniter were studied by a high-speed camera and compared with other three types of igniters. The experimental results show that the igniter coated by PVAc elastic microsphere has a spherical flame propagation, a moderate flame velocity, and a stable ignition reliability, which can reduce the experimental data error of the dust explosion because of the influences of the igniter.

**Key words:** ignition powder; dust explosion; polyvinyl acetate(PVAc); microsphere coating; dust cloud; burning rate

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