

## Full Papers

### 防火防爆剂效能的理论研究

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**摘要** 多重保护是安全管理的一个原则,

使用防火防爆剂是多重保护的一个方面。该文就纳米氧化物颗粒的防火防爆性能进行分析,

计算了它们的沉降速度。以甲烷为例, 研究了甲烷燃烧反应初始阶段的机理。并用HYPERCHEM6

计算机程序计算了15种氧化物对甲烷燃烧反应体系分子能量的影响, 得出自由基与氧化物可能的结合方式,

指出ZrO<sub>2</sub>等氧化物能与自由基结合, 从而阻碍了燃烧反应。作为防火防爆剂,

氧化锆纳米气溶胶优于其他同类产品。因此, 它将在安全管理方面发挥日益重要的作用。

**关键词** [纳米, 气溶胶, 防火防爆剂](#)

分类号

## Theoretical Study on Efficiency of Anti-explosion and Fireproof Agents

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**Abstract** Multi-protection is a principle in security management, and the use of anti-explosion and fireproof agents is a crucial part of it. In this paper, the properties of nano-oxide particles in the field of anti-explosion and fireproof were analyzed. The sedimentation velocity of nanometer particles was calculated. CH<sub>4</sub> was taken as an example, and its combustion mechanism of the initial stages was concluded. The effects of 15 oxides on molecular energies of the reaction system were calculated with program Hyperchem 6, and the possible contact manner between radicals and oxides was got. It was concluded that oxides, such as ZrO<sub>2</sub>, could combine with radicals, and thus prevent the combustion reaction. It was found that the nano-ZrO<sub>2</sub> eruptively generated aerosol is superior to other counterparts in serving as the anti-explosion and fireproof agent, and therefore, will play an increasingly important role in the security management.

**Key words** [nanometer](#) [aerosol](#) [eruptively generated aerosol](#) [anti-explosion and fireproof agent](#)

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