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Ignition Temperature of $2Al/Fe_2O_3$ Thermite

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Abstract: Ignition temperature of $2Al/Fe_2O_3$ thermite was studied by analysis and experiments. Failure temperature of aluminum particle oxide film was analyzed according to the weight, resistance and appearance of aluminum powder undergoing different temperatures. Critical ignition temperatures of thermite spheres with different radii were calculated by Frank-Kamenetskii theory and measured by a high-temperature muffle furnace. Results show that the protective film fails almost completely at the melting point of aluminum, and ignition occurs at temperature of about 1600 K, and the independent of the volume of thermite sphere and ignition temperature is not correctly calculated by the Frank-Kamenetskii theory of homogeneous combustible system.

Key words: applied chemistry; aluminum powder; ferric oxide powder; thermite failure of oxide film; ignition temperature
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专利选登

1. 工业安全雷管用优化型起爆元件(本发明涉及一种工业安全雷管用的，在常温或低温下高度可靠地起爆用的优化型起爆元件。)
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申请(专利权)人：中钢集团武汉安全环保研究院有限公司
发明(设计)人：李显泉，李克菲

2. 一种雷管激发装置及使用该装置的雷管(本发明属于炸药起爆器材技术领域，具体涉及雷管的激发装置及使用该装置制成的雷管。)
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申请(专利权)人：中国科学技术大学
发明(设计)人：沈兆武，周听清，马宏昊

3. 用于销毁弹药上所安装引信的方法和设备(本发明所涉及的领域针对在战场上找到的、且带有引信的军火弹药。)
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