

反应堆工程

基于火焰加速和燃爆转变准则的氢气点火安全性研究

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摘要 采用点火器对可燃混合气体进行预先点火是严重事故下的1种可供选择的氢气缓解措施。基于 σ 准则和 λ 准则可以评估氢气燃烧时发生火焰加速(FA)和爆燃向爆炸的转变(DDT)的可能性。本文分析密闭房间中氢气早期和晚期点火的过程。分析结果表明, 点火器在空间的合理布置和初次点火时间的控制, 可有效移除事故前期的氢气。本方法能用于确定核电站干式安全壳内氢气点火器的数量、位置和点火时间。

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Study on Hydrogen Ignition Safety Based on Flame Acceleration and Deflagration to Detonation Transition Criteria

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Abstract Deliberate ignition of the flammable gas mixture is a promising hydrogen mitigation measure under severe accident. Approach based on σ criterion and λ criterion to evaluate flame acceleration (FA) and deflagration to detonation transition (DDT) was established, and hydrogen deliberate ignition at early and late stage was analyzed in a single close room. The results indicate that deliberate ignition is an effective way to remove hydrogen, depending on igniter location and first ignition time. The approach can be used to determine number, location and frequency of a safe igniter system for a given dry containment in nuclear power plant.

Key words [nuclear power plant](#) [severe accident](#) [hydrogen mitigation](#) [containment](#) [flame acceleration](#) [deflagration to detonation transition](#)

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