

反应堆工程

## 湍流模型对安全壳内氢气浓度场模拟的影响

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**摘要** 利用计算流体力学程序FLUENT和GASFLOW研究了不同湍流模型下, 氢气在安全壳内的传输与混合过程。计算结果表明: RNG k-ε模型能够得到较合理的结果, 它能够较好的模拟氢气的质量扩散, 动量扩散和湍流特征; FLUENT标准k-ε模型、标准k-ε模型和GASFLOW中k-ε模型能够在氢气浓度场分布上得到与RNG k-ε模型基本一致的结果, 但由湍流导致的各种流动参数的波动不能在前三个模型中得到满意的模拟; GASFLOW中代数模型没能较好的模拟氢气的质量扩散和动量扩散, 氢气的浓度场分布与其他模型的计算结果存在较大的差别。因此, 选择合适的湍流模型, 对于研究严重事故下安全壳内的氢气分布有重要的意义。

**关键词** [湍流模型](#) [安全壳](#) [严重事故](#)

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## Effect of Turbulence Models on Hydrogen Distribution in the Containment

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**Abstract** Several turbulence models in FLUENT and GASFLOW were adopted in this paper to investigate hydrogen transport and mixing in the containment. Calculation results by FLUENT and GASFLOW were compared in this paper. The results indicate that RNG k-ε model can obtain better results in parameter fluctuation, velocity field, and hydrogen concentration field than the other models'. The results of standard k-ε model in FLUENT, and k-ε model in GASFLOW have the similar trend as the results of RNG k-ε model's in concentration field. The results calculated by algebraic model in GASFLOW have large differences from the other results in the simulation of mass diffusion, momentum diffusion, and parameter fluctuation. Turbulence model plays an important role in the simulation of hydrogen distribution in the containment under severe accident.

**Key words** [turbulence](#) [model](#) [containment](#) [severe](#) [accident](#)

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