

传递现象

## 用于Texaco气化炉同轴射流计算的不同湍流模型比较

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**摘要** 应用商业CFD软件Fluent, 分别采用Spalart-Allmaras模型、标准 $k-\varepsilon$ 模型、RNG  $k-\varepsilon$ 模型、Realizable  $k-\varepsilon$ 模型和RSM模型对气化炉同轴射流冷态实验台进行了数值模拟, 并通过不同模型计算结果与实验结果的对比, 讨论了各模型受网格质量、网格类型和边界条件的影响。通过对比发现, S-A模型和标准 $k-\varepsilon$ 模型受网格质量影响最小, 但准确性不高; RSM模型受网格影响较大; 而RNG  $k-\varepsilon$ 模型和R  $k-\varepsilon$ 模型在网格划分合理的情况下, 能够给出合理的结果。

**关键词** [数值模拟](#) [湍流模型](#) [同轴射流](#)

分类号

## Comparison of different turbulence models in computation of co-axial jet stream of Texaco gasifier

### Abstract

Based on commercial CFD software Fluent, numerical simulations for flow field of co-axial jet stream in a Texaco gasifier cold test bed was investigated with the Spalart-Allmaras (S-A) turbulence model, standard  $k-\varepsilon$  (S  $k-\varepsilon$ ) model, RNG  $k-\varepsilon$  model, Realizable  $k-\varepsilon$  (R  $k-\varepsilon$ ) model and RSM turbulence model respectively. The sensibility to grid quality, grid style and boundary types of these models were discussed. The accuracy and performance of these five turbulence models were evaluated according to the comparison of simulation results and cold test results. The S-A model and standard  $k-\varepsilon$  model had better compatibility with grid quality and type but poor simulation results. The RSM model had a too rigorous limitation of grid quality to predict velocity field correctly, while the RNG  $k-\varepsilon$  model and Realizable  $k-\varepsilon$  model had better numerical solution based on a reasonable grid.

**Key words** [numerical simulation](#) [turbulence model](#) [co-axial jet stream](#)

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