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论文

预热催化氧化反应器导流系统的数值模拟与优化

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摘要：

针对反应室入口截面的气体速度分布均匀性对预热催化氧化反应器的氧化效率和运行稳定性的影响，利用CFD软件对预热催化氧化反应器反应室入口的导流分配系统进行模拟计算，确定了扩张段的最佳导流分配方案。结果表明：未加导流板时的原模型在反应室入口处，速度呈现出周围低、中间高的趋势，速度梯度比较大，反应室氧化床入口截面的速度分布不均匀性系数为0.8左右；布置了水平导流板之后，反应室纵向速度分布略微改善，反应室入口处截面的速度分布不均匀性系数降低到0.5左右；增加垂直导流板改装成网格状导流板后，反应室入口处整个截面的速度分布均匀性明显提高，不均匀性系数降低到0.2左右。

关键词： 预热催化氧化反应器；不均匀性系数；导流板

Numerical simulation and optimization of diversion system in a preheating catalytic monolithic reactor

Abstract:

The velocity uniformity of the gas at the reaction chamber inlet has an important influence on the oxidation efficiency and running stability of the preheating catalytic monolithic reactor (PCMR).The flow field of the reaction chamber inlet of the PCMR was numerically simulated to determine the optimized design of deflectors and improve the flow uniformity by using the CFD software in this paper.The results show that in the original model without deflectors the velocity in the center is much higher than surrounding，and the non uniformity coefficient of the velocity distribution at the inlet cross section of the oxidation bed is 0.8.By arranging the horizontal deflectors，the velocity vertical distribution in the reactor is improved to some extent，and the non uniformity coefficient of the velocity distribution is reduced to 0.5.After the combination of the vertical deflectors and horizontal ones，the uniformity of the velocity distribution is improved obviously and the non uniformity coefficient is reduced to 0.2.

Keywords: velocity

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