

多相流和计算流体力学

液固分布器的数值模拟和结构优化

王一平, 周翠彦, 朱丽, 刘俊杰, 邓林

天津大学化工学院;天津大学建筑学院

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摘要 流化床内液固两相流的均布问题一直是制约流化床发展的难点。本文采用颗粒动力学双流体模型来描述液固两相流,应用CFD方法模拟了二维液固流化床换热器下管箱中的流场流动特性,并用模拟手段优化了下管箱中液固分布器的结构参数。模拟结果与试验值吻合较好,模拟结果表明:在V型挡板角度小于滑落角的挡板型式下,多孔板的开孔率在35%左右,开孔直径大小在12mm左右时,下管箱中固含率的不均匀度最小,这种结构参数下液固分布器的分布效果最好。

关键词 [Eulerian模型](#) [液固两相流](#) [流化床换热器](#) [数值模拟](#) [颗粒动理学理论](#)

分类号

Numerical simulation and structure optimization of liquid-solid distributor

WANG Yiping,ZHOU Cuiyan,ZHU Li,LIU Junjie,DENG Lin

Abstract

How to uniformly distribute the liquid-solid two-phase flow is a difficulty which restricts the development of the liquid-solid fluidized bed. An Eulerian multiphase model incorporating the kinetic theory for solid particles was used to simulate the liquid-solid two-phase flow. The hydrodynamics in the lower vessel in a two-dimensional liquid-solid fluidized bed heat exchanger was simulated with the CFD method. The structural parameters of the liquid-solid distributor was optimized by simulation methods. The simulation results were in relatively good agreement with the experiments. The results indicated that when the angle of the V baffle was less than slide angle, the hole ratio of perforated plate was about 35% and the hole diameter was about 12 mm, the unevenness of solids volume fraction in the lower vessel was the least.

Key words [Eulerian model](#) [liquid-solid two-phase flow](#) [fluidized bed heat exchanger](#) [numerical simulation](#) [kinetic theory of granular flow](#)

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通讯作者 周翠彦 airudianbi@163.com

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