

多相流

## 基于强湍流分散的下行床入口结构

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**摘要** 基于对现有下行式循环流化床(下行床)气固混合入口的总结, 提出下行床入口结构设计的关键原则. 依据该原则设计了一种由对撞气体射流引入强湍流场来实现气固快速混合的入口结构. 在内径418mm、高18m的工业示范规模下行床冷态实验平台上, 采用双光路光纤密度探头、激光多普勒测速仪、微压差计和氢气稳态示踪技术对该入口结构及其后的下行床主体的气固流动、混合行为进行了考察. 结果表明, 与以往基于单管或多管射流的入口相比, 该入口结构无需分布器就可以实现大质量流率条件下气固两相的快速均匀分布.

**关键词** [下行床](#) [入口结构](#) [湍流分散](#) [气固混合](#)

分类号

## DOWNER ENTRANCE STRUCTURE BASED ON STRONG TURBULENCE DISPERSION

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### Abstract

Several important principles for designing the structure of the gas-solids entrance for the circulating fluidized bed down-flow reactor(downer)were proposed based on summarizing the existing investigations.A new entrance structure based on strong turbulence dispersion was designed and tested on a semi-industry downer cold model with 418mm I.D. and 18m height. Inside this new type downer entrance, a strong turbulent flow field, which was introduced via the impinging of high velocity gas flows in opposite directions, could make the gas and solids mix well quickly. The gas-solids flow and mixing behavior inside the entrance as well as in the downer main bed were studied by using the dual-optical density probe, Laser Doppler Velocimeter (LDV), micro-manometer and the steady state hydrogen tracing technique. Results showed that compared to the traditional downer entrance structure based on the jet flow from single-tube or multiple-tube, although there was no gas-solids distributor for this new downer entrance, it could quickly make the gas-solids flow with high flux rate be well distributed, indicating that this downer entrance could be a potential excellent entrance for industrial downer reactor.

**Key words** [circulating fluidized bed downer](#) [entrance structure](#) [turbulence dispersion](#) [gas-solid mixing](#)

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