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分离工程

电导法测量新型旋风分离器内液膜的分布规律

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摘要

根据电导率变化原理设计了双平行电导探针，并采用该探针对新型旋风分离器内的液膜分布进行了研究。通过对不同结构参数和操作条件的研究发现，液膜沿筒体呈不对称分布，入口附近截面上的液膜随着轴向距离的增大其最厚值点沿圆周后移，液膜呈螺旋带状下行;发展后的液膜厚度在不同截面的最大值在160°左右的圆周角度处。研究还表明，随着处理负荷的增加，切向速度增大，液膜的分布区域变大，有利于分离效率的提高，但整体液膜厚度变薄，不利于减缓筒壁的磨损;入口角度的变化对撞击区附近的液膜分布影响较大，入口角度越大，切向力在径向上的分量越小，液膜的分布范围越小;另外，随着升气管直径的增加，由于分离空间变小，整体液膜厚度增加。

关键词

旋风分离器 双平行电导探针 液膜厚度 分布规律

分类号

Double-parallel conductance probe for measuring thickness of liquid film in new-type cyclone separator

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Abstract

The distribution of the liquid film in a new-type cyclone separator was investigated by two parallel-wire conductance probes which were designed based on variation conductance.It was found that the liquid film on the section surrounding the entrance was distributed asymmetrically with a spiral path.The maximal value of steady liquid film appeared at about 160°.The distribution area of liquid film increased with inlet gas velocity, which was good for separation because of larger centrifugal power.But the thickness of the liquid film decreased, which was bad for lowering abrasion.The change of the inlet angle had a significant influence on the liquid film surrounding the inlet.A larger inlet angle would decrease the distribution area of the liquid film around the inlet.In addition, the size of vent-pipe had no significant influence on the distribution of liquid film, and the thickness of the liquid film increased with the vent-pipe diameter.

Key words

cyclone separator double-parallel conductance probe thickness of liquid film distribution law

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