

物理

气体离心机供料射流的DSMC模拟

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收稿日期 修回日期 网络版发布日期:

摘要 为研究气体离心机中供料射流对环流的影响, 采用直接模拟蒙特卡罗 (DSMC)方法对径向射流的流动结构进行模拟。通过选择适当的边界条件和分子碰撞模型, 得到了不同供料条件下的二维径向供料射流的流动分布图像, 捕捉到了供料射流的波系结构, 获得了流动参数分布。对计算结果分析可知: 在靠近径向外边界处, 流动参数存在明显的峰; 供料气体速度越高, 对离心机内部流场影响越大; 除速度、密度、压强等流动参数外, 供料射流对温度分布也有较大影响, 出流边界处的温度可升至平均温度的两倍左右, 对离心机分离性能有较大影响。

关键词 [气体离心机](#) [供料射流](#) [DSMC](#) [数值模拟](#)

分类号

DSMC Simulation of Feed Jet Flow in Gas Centrifuge

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Abstract Feed jet flow acts an important role for the counter-current in gas centrifuge. Direct simulation Monte-Carlo (DSMC) method was adopted to simulate the structure of the radial feed jet model. By setting the proper boundary conditions and the collision model of molecules, the flow distributions of the 2D radial feed jet were acquired under different feed conditions, including the wave structure of feed jet and the profile of the flow parameters. The analysis of the calculation results note the following flow phenomena: Near the radial outflow boundary, the obvious peaks of the flow parameters exist; higher speed of feed gas brings stronger influence on the flow field of the centrifuge; including the density, pressure and velocity of the gas, the distribution of the temperature is affected by the feed jet, at the outflow boundary, temperature to double times of the average value.

Key words [gas](#) [centrifuge](#) [feed](#) [jet](#) [flow](#) [DSMC](#) [numerical](#) [simulation](#)

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