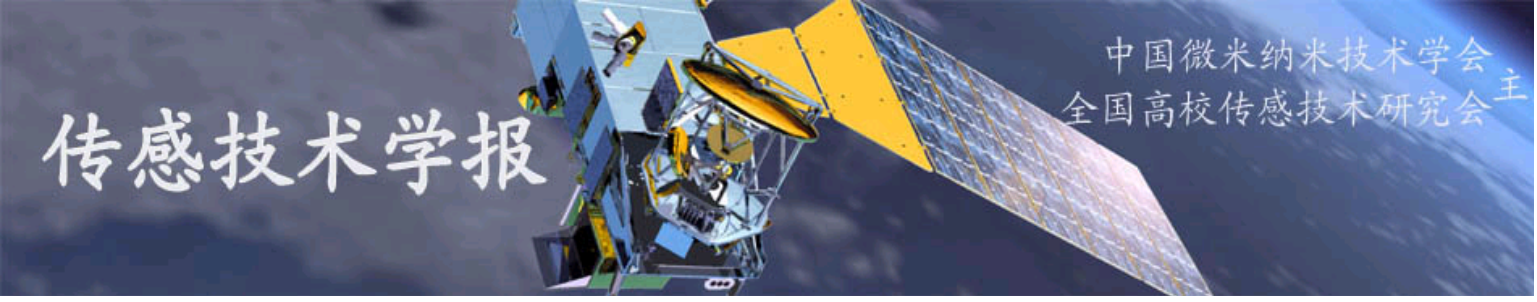

微型直接甲醇燃料电池CO2气泡排除问题研究

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摘　要：

利用CFD方法模拟了微型直接甲醇燃料电池阳极二氧化碳气体在沟道中的流动与分布。结合两相流理论，研究了不同流场布局、沟道尺寸和燃料入口流速对两
压力降及气体分布的影响，得到了最大残余体积含气率与流道宽度及入口速度的关系。结果表明蛇形流场排泡效果要优于平行流场，尤以流道宽度为600μm时
佳。根据计算结果，分别对蛇型流场、平行流场和三通道蛇型流场中气体聚集的位置进行了预测。研究结果为流场的参数设计和结构优化提供了参考。

关键词：微型直接甲醇燃料电池；CFD；数值模拟；流场；二氧化碳

Research on CO2 gas bubble elimination in μDMFC anode flow field

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Abstract:

This paper presents a computational fluid dynamics(CFD) model for simulating carbon dioxide gas flow and distribution in anode flow field of micro direct methanol fuel c
(μDMFC). Combined with the two-phase flow theories, the influence of different flow field patterns and inlet velocity on the pressure drop and gas distribution is
investigated. A relationship between maxim residual gas fraction and the channel width and inlet velocity is obtained. Results show that serpentine flow field performs be
than parallel flow field on CO2 remove, with 600μm is the best channel width. The spots where CO2 blockage would most probably happen in serpentine, parallel and mul
serpentine flow fields are predicted from the simulation results. These conclusions can serve as references for parametrical designing and optimization of the μDMFC and
flow field.

Keywords: μDMFC; CFD; simulation; flow field; carbon dioxide

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