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NHR-200堆芯旁通区三维流动传热数值分析

@解衡\$清华大学核能技术设计研究院!北京100084 @高祖瑛\$清华大学核能技术设计研究院!北京100084

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摘要 应用三维CFD软件PHOENICS 3.2,计算了200MW低温供热堆(NHR 200)堆芯旁通区及上腔室的流场和温场。分析了在堆芯与围板间的乏燃料存放区上端不同挡板布置方案下的流场和温场,并考虑了旁通流量的影响。自然对流对流场和温场的影响不大,不会改变主流方向。在计算区域内,除主流外,还有由堆芯旁通区的下部流通面积突扩造成的一回流区及上腔室堆芯出口流通面积突扩和自然对流而形成的一大回流区。加挡板可阻挡上部大回流区对堆芯旁通区的影响,降低堆芯旁通区流体温度的变化

关键词 [低温供热堆](#) [传热](#) [流动](#) [数值分析](#)

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Numerical Analysis of Three-dimensional Convective Heat Transfer in the Core Bypass of the Nuclear Heating Reactor or NHR-200

XIE Heng, GAO Zu ying (Institute of Nuclear Energy Technology, Tsinghua University, Beijing 100084, China)

Abstract PHOENICS 3.2, a three dimension CFD code, is used to simulate the heat transfer and flow in the bypass and the upper plenum of the core of 200 MW nuclear heating reactor (NHR 200). In order to guide the convective flow, several schemes with and without the baffle are calculated, and the impact of the mass flowrate of the core bypass is considered. The effect of natural convection on the calculated region is so small that it can't change the direction of main flow. The important flows in the calculated region except the main flow are a recirculating flow which occurs in the bottom of the bypass of core due to the change of flow area and another big recirculating flow which occurs in the upper plenum due to the change of flow area and natural convection. Laying the baffle on the top of spent fuel zone can suppress the impact of the recirculating flow on the upper plenum and decrease the change of the temperature on the bypass of core.

Key words [nuclear heating reactor](#) [heat transfer](#) [flow](#) [numerical analysis](#)

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