

反应堆工程

超临界水并联通道流动不稳定性理论研究

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摘要 根据并联通道的结构特点, 建立了合理的数学物理模型, 采用半隐式差分 and 交错网格技术对超临界水并联通道中的流动传热进行了数值模拟。运用小扰动法验证了超临界水密度波型流动不稳定的发生, 并计算了流量、入口温度、入口压力对其流动不稳定性发生边界的影响。并联通道系统的稳定性随入口压力和入口流量的增大而增强, 随入口温度的增大而减弱。

关键词 [超临界水](#) [半隐式差分](#) [交错网格](#) [流动不稳定性](#)

分类号

Theoretical Study on Flow Instability of Supercritical Water in Parallel Channels

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Abstract Based on the structure characteristics of parallel channels, mathematical and physical models were established to simulate flow and heat transfer of the supercritical water in the parallel channels with semi-implicit method and staggered mesh method. Flow instability of supercritical water was obtained by using little perturbation method. The effects of mass flow, inlet temperature and inlet pressure on the flow instability boundary were also investigated. The stability of the parallel channels increases with inlet pressure and inlet flow, and decreases with the increase of inlet temperature.

Key words [supercritical](#) [water](#) [semi-implicit](#) [method](#) [staggered](#) [mesh](#) [flow](#) [instability](#)

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