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竖直圆管内超临界水传热特性数值模拟

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摘要 为深入研究超临界水的传热特性，利用计算流体力学（CFD）软件，完成了国际原子能机构(IAEA)关于竖直圆管内超临界水传热特性数值模拟的标准题计算，得到了与试验值符合较好的结果。通过研究发现：剪切应力输运（SST）模型可较好地反映超临界水的传热特性，但对网格敏感，需适当的网格相匹配，适当值的选取可能与超临界水所处的状态有关。这些结论对超临界水传热特性的数值模拟有指导意义。

关键词 超临界水 传热 数值模拟

分类号

Numerical Simulation on Heat Transfer Behavior of Supercritical Water in Vertical Pipe

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Abstract Using CFD (Computational Fluid Dynamics) code, numerical investigations on heat transfer behavior of supercritical water were conducted. The IAEA (International Atomic Energy Agency) computational benchmark about heat transfer behavior of supercritical water in vertical pipe was finished. The results are in accord with experimental values. The SST (Shear-Stress-Transport) model is able to reproduce the heat transfer behavior of supercritical water, but it is sensitive to the grid, and needs suitable grid to match. The suitable grid possibly relates to the state of supercritical water. These conclusions are able to guide the numerical simulation on heat transfer behavior of supercritical water.

Key words supercritical water heat transfer numerical simulation

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