

反应堆工程

混合能谱超临界水堆快谱组件优化设计

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摘要 本工作从热工水力和中子物理两方面对混合能谱超临界水堆混合谱堆芯的快谱区多层组件进行优化设计。对于轴向以再生区和裂变区交替布置的快谱组件, 分别改变其轴向布置方式、燃料芯块直径、栅径比及外围燃料棒距组件盒最小距离, 并分析它们对组件热工和物理性能的影响, 从而得到较优的参数范围, 尽可能提高混合谱超临界水堆的固有安全性和经济性。

关键词 [超临界水堆](#) [多层组件](#) [优化设计](#)

分类号

Optimization for Fast Zone Multilayer Fuel Assembly of Mixed Supercritical Water-Cooled Reactor

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Abstract In order to improve the safety and sustainability of a supercritical water-cooled reactor (SCWR) core, both sub-channel and MCNP analysis were carried out to assess thermal-hydraulic and neutronic performances of the fuel assembly, which was proposed for the fast zone of a mixed-spectrum SCWR (SCWR-M). This fast zone assembly had a multilayer structure and was axially divided into several seed and blanket regions. The effects of some design parameters, i.e. axial configuration, fuel rod diameter, pitch to diameter ratio and duct wall clearance on the thermal-hydraulic and neutronic performance of assemblies were investigated and an optimized parameter ranges were obtained.

Key words [supercritical](#) [water-cooled](#) [reactor](#) [multilayer](#) [assembly](#) [optimization](#)

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