原子能科学技术 2009 43 (增刊2): 297-300 ISSN: 1000-6931 CN: 11-2044/TL

设备与系统

高温气冷堆备用停堆装置新型供料器分析与试验

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收稿日期 修回日期 网络版发布日期:

摘要 吸收球停堆装置参与球床型高温气冷堆的堆芯反应性调节控制，实现反应堆冷停堆，供料器是数百万个 6 mm吸收球从堆芯反射层被气力输送回到贮球罐的起点，吸收球在供料器中被气流悬浮、加速，需研究不同结构型式的供料器的输送性能及可靠性。利用Fluent软件对新型流化管式供料器进行了数值模拟分析，获得速度、压力分布场，同时进行了空气介质常温流动供料器试验研究。模拟计算得到供料器局部阻力系数约为5.1，试验测得供料器局部阻力系数为5.7，结果在工程应用可接受的范 围内。

关键词 高温气冷堆 备用停堆系统 局部阻力系数 数值计算分析

分类号

Analysis and Experiment of New Style Discharge Vessel in Reserve Shutdown System of High-Temperature Gas-Cooled Reactor

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Abstract The absorber ball system is the reserve shutdown system of pebble-bed high -temperature gas cooled reactor, which participates in the reactor reactivity control and keeps the reactor in sub-criticality. The discharge vessel is the first device through which millions of 6 mm absorber balls are pneumatically conveyed from the side reflector back to the ball storage vessel. The absorber balls are suspended and accelerated by the gas flow inside the discharge vessel, and the study on the conveying performance and the reliability of different discharge vessels is required. The numerical simulation of a new style fluidizing nozzle discharge vessel was performed, the velocity and the pressure distributions were showed. Meanwhile, an experimental study on the discharge vessel using normal temperature air as conveying medium was performed. The simulation result shows that the local resistance coefficient of the discharge vessel is 5.1, and the experiment result shows that the local resistance coefficient of the discharge vessel is 5.7. The results are acceptable for engineering application.

Key words high-temperature gas-cooled reactor reserve shutdown system local resistance coefficient numerical simulation

DOI

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