

反应堆工程

高温气冷堆氦气环境中电气设备绝缘设计研究

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摘要 应用巴申定律研究了氦气的电气击穿特性, 并与空气的绝缘特性进行比较。以高温气冷堆氦气透平发电系统电机腔室的设计参数为例, 结合氦气的巴申曲线, 对氦气条件下气体压力和极间距离的关系进行深入探讨, 并提出氦气环境中电气设备绝缘设计需关注的问题。研究结果表明, 氦气最小击穿电压为150~200 V, 绝缘特性较差, 电气设备绝缘结构设计应考虑氦气环境压力的影响, 现有针对压水堆电站电气设备绝缘结构的验收准则和试验方法并不完全适用于氦气环境。

关键词 [高温气冷堆](#) [氦气](#) [巴申定律](#) [绝缘](#)

分类号

Preliminary Study on Insulating Design of Electrical Device in Helium for High Temperature Gas-Cooled Reactor

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Abstract The breakdown performance of helium was studied by Paschen law, comparing with air. Combined with the operation parameter of generator in gas turbine coupled with high temperature gas-cooled reactor and the Paschen curve of helium, the relationship between pressure and insulating structure was discussed. The key points for the insulation design of the electrical device in helium were presented. The results show that the insulation performance for helium which lowest breakdown potentials is 150-200 V is much worse than that of air. The existing test and inspect guidelines of the insulation structure for the pressure water reactor can't be used for the helium. High permeability for helium may be an important reason to destroy the insulation structure.

Key words [high temperature](#) [gas-cooled reactor](#) [helium](#) [Paschen law](#) [insulation](#)

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