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高温气冷堆回热循环及透平机组的初步研究

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摘要 结合了模块式高温气冷堆与气体透平循环技术的高温堆气体透平循环是核电领域中的全新概念,为提高核电的安全性和经济性提供了新的思路,具有很强的竞争优势。其中,高温气冷堆回热循环是该方案的主流。在高温堆回热循环方案中,氦气透平机组的工作介质为氦气,其物性与空气有很大的不同,因此,氦气透平与燃气透平在热力参数、气动参数、尺寸、级数等方面有着较大的差别。本研究对回热循环以及氦气透平进行了初步分析,并通过与燃气透平比较,揭示了回热循环与氦气透平的一些基本设计特点。

关键词 [高温气冷堆](#) [回热循环](#) [燃气透平](#) [氦气透平](#)

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Preliminary Study on Helium Turbomachine for High Temperature Gas-cooled Reactor

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Abstract In the high temperature gas cooled reactor (HTGR), gas turbine cycle is a new concept in the field of nuclear power. It combines two technologies of HTGR and gas turbine cycle, which represent the state of the art technologies of nuclear power and fossil fuel generation respectively. This approach is expected to improve safety and economy of nuclear power plant significantly. So it is a potential scheme with competitiveness. The heat recuperated cycle is the main stream of gas turbine cycle. In this cycle, the work medium is helium, which is very different from the air, so that the design features of the helium turbomachine and combustion gas turbomachine are different. The paper shows the basic design consideration for the heat recuperated cycle as well as helium turbomachine and highlights its main design features compared with combustion gas turbomachine.

Key words [high temperature gas-cooled reactor](#) [heat-recuperated cycle](#) [gas turbine](#) [helium turbomachine](#)

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