

反应堆工程

# TOPAZ- II 反应堆慢化剂温度效应分析

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**摘要** TOPAZ- II 反应堆是以高富集度铀为燃料, 以氢化锆为慢化剂的空间发电用反应堆。与一般采用氢化锆作为慢化剂的反应堆不同, TOPAZ- II 反应堆呈现正的慢化剂温度效应, 且其值较大。本工作采用MCNP程序对TOPAZ- II 反应堆的慢化剂温度效应进行计算, 通过分析氢化锆升温前后主要区域中子能谱和中子产生率、中子吸收率及泄漏率的变化, 得出产生正慢化剂温度效应的原因: 氢化锆升温后, 中子产生率增加较大, 而泄漏率增加较小, 且吸收率减少, 从而产生正的慢化剂温度效应。

**关键词** [氢化锆](#) [慢化剂温度效应](#) [TOPAZ- II 反应堆](#)

分类号

## Analysis of Moderator Temperature Effect for TOPAZ- II Reactor

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**Abstract** TOPAZ- II which is fueled with highly enriched uranium and moderated with zirconium hydride is a reactor for space electric power supply. But difference with normal reactor moderated by ZrH, moderator temperature effect of TOPAZ- II reactor is positive, and the value is large. The moderator temperature effect of TOPAZ- II reactor was calculated with MCNP in this paper. The reason why moderator temperature effect is positive was got by analyzing the changes of neutron spectra of main regions, neutron production rates, neutron absorption rates and leakage rates at different moderator temperature. When moderator temperature rises, neutron production rate large increases and leakage slight increases, but neutron absorption rate decreases, so TOPAZ- II reactor presents positive moderator temperature effect.

**Key words** [zirconium hydride](#) [moderator](#) [temperature](#) [effect](#) [TOPAZ- II](#) [reactor](#)

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