原子能科学技术 2007 41 (3): 335-338 ISSN: 1000-6931 CN: 11-2044/TL

反应堆工程

聚变堆氦冷固态包层结构和^{6}Li富集度对产氚率的影响

贾小波[1]，杨永伟[1]，周志伟[1]，经荣清[1]，冯开明[2]

1. 清华大学 核能与新能源技术研究院，北京 100084 2. 核工业西南物理研究院，四川 成都 610041

收稿日期 2005-12-6 修回日期 2006-4-3 网络版发布日期: 2007-5-31

摘要 在聚变堆固态包层基本参数基础上，建立简化20°模型，包层分第1壁装甲、第1壁冷却板、氚增殖区和支撑结构。分别选择Li_4SiO_4和Li_2O做增殖材料，应用MCNP程序，研究第1壁结构布置和6Li富集度对产氚率的影响。结果表明：^{6}Li富集度适宜选择在30%~80%之间；第1壁选择Be装甲可提高产氚率；冷却管板的厚度应取3 cm以下，以避免对产氚造成不利的影响。

关键词 固态包层；^{6}Li富集度；产氚率

分类号 TL34

Influence of Helium Cooled Solid Blanket Structure and ^{6}Li Enrichment on Tritium Breeding Ratio in Fusion Reactor

JIA Xiao-bo1, YANG Yong-wei1, ZHOU Zhi-wei1, JING Xing-qing1, FENG Kai-ming[2]

1. Institute of Nuclear and New Energy Technology, Tsinghua University, Beijing 100084, China; 2. Southwestern Institute of Physics, Chengdu 610041, China

Abstract Based on the preliminary parameters of fusion reactor, the calculation model with 20° range was built for the solid blanket including the first wall armor, the first wall cooling plate, the tritium breeding region and the support structure. Li_4SiO_4 and Li_2O were adopted as tritium breeder material, respectively. By using code MCNP, the influence of structure and ^{6}Li enrichment on tritium breeding ratio was studied. The results show that ^{6}Li enrichment in the range of 30% to 80% is suitable, the beryllium armor of first wall leads to increase of the tritium breeding ratio, and the thickness of first wall cooling plate should not exceed 3 cm to avoid negative effect on tritium production.

Key words solid blanket _ ^{6}Li enrichment _ tritium breeding ratio

DOI

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