

反应堆工程

# 10 MW高温气冷堆氦气流中石墨粉尘的凝并发展

雒晓卫, 华宏亮, 于溯源

清华大学 核能与新能源技术研究院, 北京 100084

收稿日期 2004-6-17 修回日期 2005-1-7 网络版发布日期: 2006-10-18

**摘要** 在10 MW高温气冷堆中, 因球形燃料元件的循环等多种因素, 石墨构件摩擦磨损而产生石墨粉尘的现象不可避免。石墨粉尘的粒度很小(约1  $\mu\text{m}$ ), 它在氦气的携带下将在一回路内流动。颗粒的布朗运动使石墨粉尘在流动过程中彼此碰撞而出现石墨粉尘的凝并现象, 由此改变了石墨粉尘的粒度分布。本工作采用离散分区模型, 针对10 MW高温气冷堆, 计算了石墨粉尘在氦气流中的碰撞与凝并状况。计算结果表明, 在10 MW高温气冷堆中, 石墨粉尘的凝并现象不严重。

**关键词** [高温气冷堆](#) [石墨](#) [颗粒](#) [碰撞](#) [凝并](#)

分类号 [TL342](#)

## Coagulating Evolution of Graphite Dust in Helium Flow of 10 MW High Temperature Gas-Cooled Reactor

LUO Xiao-wei, HUA Hong-liang, YU Su-yuan

Institute of Nuclear and New Energy Technology, Tsinghua University, Beijing 100084, China

**Abstract** In the case of the cycle of spherical fuel element, it is inevitable to take place the wear of graphite components and generate the graphite dust in the core of 10 MW High-Temperature Gas-Cooled Reactor (HTR-10). The graphite dust with the size about 1  $\mu\text{m}$  will flow in the primary circuit by carrying of helium. Under the action of Brownian motion, the particles collide and coagulate each other, and the distribution of particle size will be changed. The discrete-section model was employed to calculate the collision and coagulation of graphite dust in HTR-10. The calculated results indicate that the coagulation of graphite dust in HTR-10 is not serious.

**Key words** [High-Temperature Gas-Cooled Reactor](#) [graphite](#) [particle](#) [collision](#); [coagulation](#)

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