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反应堆工程

# 12Cr-ODS钢中氧化物强化相（$Y_2O_3$）辐照损伤行为研究

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**摘要** 本文采用电子束（$e^-$） 氦离子（$He^+$）、氢离子（$H^+$）束同时复合辐照方式研究12Cr-ODS铁素体钢中氧化物弥散强化相（$Y_2O_3$）辐照损伤行为，对不同辐照方式下辐照区内的氧化物形貌变化进行原位观察。研究结果表明，15 dpa辐照后，氧化物周围出现微小高密度空洞，相界面变得不规则，氧化物在此特定条件下发生体积收缩或长大，尺寸有少量变化，但无明显溶解现象，对钢的性能不会产生影响。

关键词 辐照损伤 氧化物稳定性 ODS钢

分类号

# Irradiation Damage Behavior of Oxide Dispersion Strengthened Phase in 12Cr-ODS Ferritic Steel

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**Abstract** Irradiation damage behavior of oxide dispersion strengthened phase ($Y_2O_3$) in 12Cr-ODS ferrite steel was investigated by electron ($e^-$) helium ion ($He^+$), hydrogen ion ($H^+$) dual-beam irradiation. The morphology change of oxide in irradiation region was observed in-site at different irradiation models. The experiment results show that oxide size is not changed obviously under 15 dpa irradiation, however, high density small voids form surrounding oxide, and the phase boundaries are changed irregularly. The volume of oxide is shrank or expanded in the specified condition. The size of oxide is damaged lightly but not dissolved, which would not affect the performance of the steel.

**Key words** irradiation damage oxide particles stability ODS steel

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