

# The influence of Fe-ion irradiation on the microstructure of reduced activation ferritic-martensitic steel Eurofer 97

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The reduced-activation ferritic-martensitic steel Eurofer 97 is the European benchmark structural material for in-vessel components of fusion reactor. Experimental data on neutron irradiated Eurofer 97 material have shown decrease in plasticity and radiation hardening at irradiation temperatures about 300 °C. Formation of dislocation loops and  $\alpha'$  pre-precipitates is considered as the main reason of this phenomenon. In this work Eurofer 97 steel was irradiated with Fe ions up to  $10^{16}$  ions/cm<sup>2</sup> at 250, 300 and 400 °C. The irradiated samples were characterized by TEM and APT. TEM study of ion irradiated samples revealed nucleation of dislocation loops. The pair-correlation analysis of APT data detected an initial stage of solid solution decomposition. The hardening of ion irradiated Eurofer 97 was calculated with DBH model taking into account radiation-induced dislocation loops to comparison with the change of yield stress for neutron irradiated Eurofer 97. According to obtained results it can be supposed that the formation of dislocation loops plays the main role in the low temperature radiation hardening of Eurofer 97 at the dose level up to ~10 dpa.

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