

# **Behaviors of transmutation elements Ca, Ti, Sc in ferritic-martensitic steel under mixed spectrum irradiation of high energy protons and spallation neutrons**

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Ferritic-martensitic steel F82H was irradiated in a mixed proton-neutron spectra in the Swiss spallation neutron source SINQ up to 20.3 dpa at 345°C. Atom Probe Tomography (APT) investigations were performed in order to study the atomic scale evolution of the microstructure of the F82H steel under irradiation.

The irradiation led to the production of about 370 appm of Ca, 90 appm of Sc and 800 appm of Ti. APT experiments revealed that regardless their low bulk concentrations, the spallation products are involved in the microstructural evolution of the steel under irradiation: formation of radiation-induced clusters, segregation at the dislocation loops and alteration of the microchemistry of carbides.

A quantitative description of the observed features will be presented and results will be compared with TEM data of the literature obtained on the same steel and under similar irradiation conditions.

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