

IRRADIATION CREEP OF VARIOUS FERRITIC ALLOYS IRRADIATED AT ~400°C IN THE PFR AND FFTF REACTORS - M. B. Toloczko and F. A. Garner (Pacific Northwest National Laboratory, Richland, WA 99352) and C. R. Eiholzer (Westinghouse Hanford Company, Richland, WA)

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Extended Abstract

Three ferritic alloys were irradiated in two fast reactors to doses of 50 dpa or more at temperatures near 400°C. One martensitic alloy, HT9, was irradiated in both the FFTF and PFR reactors. PFR is the Prototype Fast Reactor in Dourneay, Scotland, and FFTF is the Fast Flux Test Facility in Richland, WA. D57 is a developmental alloy that was irradiated in PFR only, and MA957 is a Y₂O₃ dispersion-hardened ferritic alloy that was irradiated only in FFTF. These alloys exhibited little or no void swelling at ~400°C.

Depending on the alloy starting condition, these steels develop a variety of non-creep strains early in the irradiation that are associated with phase changes. Each of these alloys creeps at a rate that is significantly lower than that of austenitic steels irradiated in the same experiments. The creep compliance for ferritic alloys in general appears to be $\sim 0.5 \times 10^{-6} \text{ MPa}^{-1} \text{ dpa}^{-1}$, independent of both composition and starting state. The addition of Y₂O₃ as a dispersoid does not appear to change the creep behavior.