

**SHEAR PUNCH TESTING OF <sup>59</sup>Ni ISOTOPICALLY-DOPED MODEL AUSTENITIC ALLOYS AFTER IRRADIATION IN FFTF AT DIFFERENT HE/DPA RATIOS - G. L. Hankin and R. G. Faulkner (I.P.T.M.E., Loughborough University, Leicestershire, LE113UT, UK) M. L. Hamilton and F.A. Garner (Pacific Northwest National Laboratory)\***

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**EXTENDED ABSTRACT**

A series of three model alloys, Fe-15Cr-25Ni, Fe-15Cr-25Ni-0.04P and Fe-15Cr45Ni were irradiated side-by-side in FFTF-MOTA in both the annealed and the cold worked condition in each of two variants, one using naturally occurring isotopic mixtures, and another doped with <sup>59</sup>Ni to generate relatively high helium-to-dpa ratios. Previous papers in this series have addressed the influence of helium on radiation-induced evolution of microstructure, dimensional stability and mechanical properties, the latter using miniature-tensile specimens.

In the final paper of this experimental series, three sets of irradiations conducted at different temperatures and displacement rates were examined by shear punch testing of standard microscopy disks. The results were used to determine the influence of helium generation rate, alloy starting condition, irradiation temperature and total neutron exposure. The results were also compared with the miniature tensile data obtained earlier.

In general, all alloys approached saturation levels of strength and ductility that were relatively independent of He/dpa ratio and starting condition, but were sensitive to the irradiation temperature and total exposure. Some small influence of helium/dpa ratio on the shear strength is visible in the two series that ran at ~490°C, but is not evident at 365°C.

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