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# Influence of high dose neutron irradiation on microstructure of EP-450 ferritic–martensitic steel irradiated in three Russian fast reactors

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## Abstract

The microstructure of EP-450 ferritic–martensitic steel was determined after irradiation in BN-350, BN-600 and BR-10 fast reactors at temperatures in the range 275–690 Å°C. The examinations confirm a high resistance of EP-450 steel to void swelling, but the resistance appears to be lower when the dpa rate is reduced.

Depending on irradiation dose and temperature the following was observed: voids (285–520 Å°C), dislocation loops and linear dislocations (275–520 Å°C),  $\hat{I}_{\pm}^{\hat{I}^2}$ -phase (285–520 Å°C),  $\hat{I}_{\neq}$ -phase (460–590 Å°C), and  $M_2X$  precipitates (460–690 Å°C). It appears that the formation of dislocation loops and  $\hat{I}_{\pm}^{\hat{I}^2}$  precipitates at high densities is responsible for the low temperature embrittlement observed in this steel.



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## Keywords

E0300; N0100; R0200; S0800; S1400

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