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PREDICTION OF CREEP-RUPTURE PROPERTIES FOR AUSTENITIC STAINLESS STEELS UNDERGONE NEUTRON IRRADIATION AT DIFFERENT TEMPERATURES

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Early the physical-and-mechanical model of integranular fracture has been developed that allows the prediction of creep-rupture properties of austenitic stainless steels at different neutron fluxes and temperatures. The model is based on the equations of void nucleation and growth on grain boundaries caused by inelastic deformation (creep and plastic strain) and diffusion of vacancies. The model has been verified when using available published data for austenitic stainless steels of 18Cr-9Ni and 18Cr-10Ni-Ti grades.
The aim of the present work is further verification of the model for austenitic stainless steels under neutron irradiation. For this in-reactor tests are carried out for gas-filled tubes at different temperatures (550 oC and 600 oC) in RBT-6 reactor with neutron flux equal to 5e+13 n/cm2. Specimens are made from austenitic stainless steels of 18Cr-9Ni and 16Cr-11Ni-3Mo grades. The results calculated by the model are compared with the obtained experimental data, and their good agreement is shown.

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