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DAMAGE OF HIGH-CHROMIUM STEELS UNDER DEFORMATION IN A WIDE TEMPERATURE RANGE

[1,2] Skripnyak N.V., [1]Emelyanova E.S., [1]Skripnyak V. A., [1]Skripnyak E. G.
[1]National Research Tomsk State University, Russia,
[2]Linköping University, Sweden
natali.skrp@mail.ru, emelyanova_es13@mail.ru, skrp2006@yandex.ru

High-chromium steels have high strength properties, corrosion properties and resistance to neutron irradiation, thereby are considered as promising steels for nuclear reactors of IV generation.

The aim of this work was to create a physical-mathematical model and development of a multilevel approach to predict the mechanical behavior of high-chromium steels steel in complex loading conditions and elevated temperatures.

Use a layered approach as the basis for simulation allows taking into account the link between the structure of alloys in terms of external influences and their physical and mechanical properties

The deformation and damage of a high chromium steels in a wide temperature range was studied by numerical simulation method. A model was proposed to predict the deformation and damage of high chromium steels at a quasi–static loading within the temperature range from 295 K to 1100 K. The model takes into consideration mechanisms of hardening and softening high chromium steels in a wide temperature range. It is shown that the ductility of high-chromium steels increases proportional to temperature in the range from 750 K to 1100 K in connection with the growth of precipitates of α'–phase.

THE DUCTILITY OF α+β TITANIUM ALLOYS UNDER DIFFERENT STRESS STATES OVER A WIDE RANGE OF STRAIN RATES

Skripnyak V.V., Kozulyn A.A., Skripnyak V.A., Sergeev M.V.
National Research Tomsk State University, Russia
skrp2012@yandex.ru, kozulyn@ftf.tsu.ru, skrp2006@yandex.ru

In computer-aided design of structural elements in aerospace and transport demand model used to predict the patterns of damage and fracture of coarse-grained and ultrafine-grained titanium alloys in a wide range of temperatures, strain rates and different stress conditions.

The aim of this work was to verify the model describing the processes of damage and ductile fracture coarse and ultrafine-grained alpha – beta titanium alloys in wide ranges of strain rates and temperatures.

The results of experimental studies and numerical modelling of the mechanical behaviour of alpha – beta titanium alloys were received and summarized. This paper presents the results of research of mechanical behavior of titanium alloys VT–6 (this is an analog of alloy Ti–6Al–4V) and BT–5 (this is an analog of Ti–5Al) in a wide range of strain rates (from 0.001 to 1000 1/s) and