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SHORT-TERM CREEP OF ADVANCED RE-CONTAINING 10%CR-3%CO-3%W MARTENSITIC STEEL AT ELEVATED TEMPERATURE

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9-10%Cr-3%Co martensitic steels are perspective materials for elements of boilers, tubes and pipes for fossil power plants which are able to work at ultra-supercritical parameters of steam (T=620-650°C, P=25-30 MPa). The advanced martensitic 10%Cr-3%Co-3%W-0.2%Re-VNbBN steel was crept at temperature of 650°C under the applied stresses from 200 to 140 MPa with a step of 20 MPa. Previously, the steel studied was a solution treated at 1050°C and tempered at 770°C. The addition of Re in the steel studied positively affected the short-term creep at 650°C and stabilized the tempered martensite lath structure formed during 770°C-tempering. Moreover, no evidence for the significant changes in the tempered martensite lath structure of the steel studied excepting the precipitation of the Laves phase particles were revealed during 440 h of creep. The improvement of short-term creep strength can be related to the particle hardening from the Laves phase particles with the high volume fraction and the fine sizes.