Development of Advanced Low N 12Cr Ferritic/Martensitic Steel for Reactor Applications

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Low nitrogen (<10 ppm) vacuum induction melted (VIM) lab heats of the ferritic/martensitic alloy HT-9 have shown significant resistance to ductility loss after low temperature (<0.3 Tm) irradiation. The present work will examine the role of interstitial nitrogen on the effect of ductility loss after low temperature irradiation. Interstitial nitrogen levels will be controlled via titanium microalloying. High nitrogen (440 ppm) and low nitrogen (10 ppm) VIM heats along with four experimental titanium-containing heats have been produced. After initial characterization of nitrogen in each alloy, subsequent ion irradiation and characterization of irradiated properties will follow.