THE INFLUENCE OF SURFACE DEPOSITED RARE EARTH OXIDES ON THE HIGH TEMPERATURE OXIDATION OF FeCrNi ALLOYS.

Lalgudi V. Ramanathan
Instituto de Pesquisas Energeticas e Nucleares
(Energy and Nuclear Research Institute)
C.P. 11049, Cidade Universitaria
05508 Sao Paulo SP BRAZIL

Abstract

The effect of surface deposited rare earth oxides (REO) such as Y_2O_3, CeO_2, La_2O_3, Nd_2O_3, Gd_2O_3 and Sm_2O_3 or concentrates of yttria and/or ceria to AISI 304 and 310 on the isothermal oxidaton at 900 C and 1000 C for upto 100 hours as well as on cyclic oxidation behavior between 20 and 1000 C has been studied. A technique has been developed to retain a considerble quantity of the REO on the steel surfaces. The application of REO has been shown to significantly increase the oxidation resistance of AISI 304. Yttria and Ceria concentrates also improve scale adhesion and oxidation resistance. The rare earth elements in decreasing order of influence are Y, Ce, La, Nd, Sm and Gd. Study of the oxide morphology revealed that the improved oxidation resistance and scale adhesion is due to the formation of a thin layer of fine grained compact Cr_2O_3 and to increased oxide plasticity.

MME

CORROSION-91, Research in Progress Symposium
March 11-15'91, Cincinnati, OH, EUA.