Preparation of alumina films on FeCrAl (ce) stainless steel

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Abstract :
FeCrAl(Ce) stainless steel was functionalized by a conversion treatment in order to allow alumina by diffusion coatings with strong interfacial bonding. The very porous conversion coating produced in a pack aluminization technique had excellent adhesion and was conductive enough to permit conditions favorable for the precipitation of alumina oxyhydroxide during Aluminium diffusion coatings. In this work, the bed was prepared as a mixture of Al, NH4Cl and Al2O3 and heat-treated at 900°C in an atmosphere made up of steam with subsequent air-cooling. The effect of the bed content on the coating was examined. With the high-activity, the desired Fe2Al5 was formed as the outermost coating layer. The coating presented chimeical composition gradients suitable for strong adhesion. The improvement of the thermal oxidation behaviour was studied at 1273K. Two different aqueous environments, which are (1) NaCl and (2) H2SO4, are employed for using the technique of potentiodynamic polarization curve. The obtained experimental electrochemical parameters (Ecorr, Jcorr, etc) were used to compare the corrosion resistance of the tested steel state complemented by electronic scanning microscopy (MEB) in combination with dispersive analysis X in energy (EDS) or X ray diffraction and XPS indicated that the elements concentration maximum was located in the vicinity of the interface especially in the FeCrA(Ce) B. These results are discussed in terms of an addition effect on the development of the microstructure of oxide films.

REFERENCES: