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High-Temperature Corrosion of Aluminized and Chromized Fe-25.8%Cr-19.5%Ni Alloys in N2/H2S/H2O-mixed Gases

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Abstract : Alloys of Fe-25.8%Cr-19.5%Ni (SUS310 stainless steel) were either chromized or aluminized via pack cementation, and corroded at 800 oC for 100 h in 1 atm of (0.9448 atm of N2+0.031 atm of H2O+0.0242 atm of H2S)-mixed gases. The chromized layer consisted primarily of Cr1.36Fe0.52 and some Cr23C6. Its corrosion resulted in the formation of Cr2S3 and some FeS and Fe5Ni4S8. The aluminized coating consisted primarily of FeAl. Its corrosion resulted in the formation of α-Al2O3, Al2S3, and Cr2S3. Aluminizing was more effective than chromizing in increasing the corrosion resistance of the substrate, due mainly to the formation of α-Al2O3.

Keywords : aluminizing, chromizing, corrosion, H2S gas
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