

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 °C 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 Cr_{1.36}Fe_{0.52} 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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