The Corrosion Behavior of 316L Stainless Steel in H₂S environment at high temperatures

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The corrosion behavior of 316L stainless steel was studied by electrochemical measurements, X-ray photoelectron spectroscopy (XPS) analysis and Auger electron spectroscopy (AES) analysis. Potentiostatic results show that the presence of H₂S can make 316L more sensitive to temperature. The coexistence of H₂S and Cl⁻ can obviously decrease the corrosion resistance of 316L stainless steel comparing with H₂S-free condition. XPS analysis shows that the passive film formed under H₂S-containing condition is composed of FeS₂, NiO, NiS, Cr₂O₃ and Fe(OH)₂. AES analysis shows that elemental S and Cl can penetrate into the passive film and induce deterioration of the passive film.

Keywords: Stainless steel, hydrogen sulfide, temperature, XPS, AES

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