

Carburization Behavior Of 310 Stainless Steel In CH₄/H₂ Gas Mixture

With Trace Amount Of Oxygen

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Summary

The carburization behavior of 310 stainless steel has been studied after cyclic exposures to carburizing gas mixtures at elevated temperatures for 500 hr exposures. A thermodynamic analysis indicated that 1000degreesC was an approximate critical temperature, below which the environment should result in mixed oxidizing/ carburizing behavior while above this temperature, reducing- carburizing behavior should occur. The experimental results agree well with the thermodynamic analysis, at 800degreesC in 2% CH₄/ H₂ for 310SS which suffers both external oxidation, carburization, and internal carburization. At 1100degreesC in 10% CH₄/ H₂ external carburization occurs and internal carburization becomes less pronounced. Schematics are illustrated to show corrosion mechanisms in various exposure environments.

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