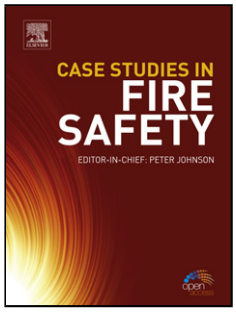

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Effect of Cooling Condition on the Intergranular Corrosion Resistance of UNS S32506 Duplex Stainless Steel

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Highlights

- Slow cooling through the temperature range of 650-800 ºC enhances intergranular corrosion rate in a duplex stainless steel.
- There is no precipitation at alpha/gamma interfaces.
- Cr-depletion zone is observed on the gamma phase side of alpha/gamma interfaces.
- The mechanism of formation process of Cr-depletion zone is proposed.

Abstract

The effect of cooling condition on the intergranular corrosion resistance of UNS S32506 duplex stainless steel was investigated by means of Huey test and microstructural observation. It was found that quenching at a temperature below 800 ºC after air cooling at a fixed rate from solutionization temperature enhances the intergranular corrosion rate. No precipitation has been found at all cooling conditions. Formation of Cr-depletion zone on the γ phase side of the α/γ interface due to local chemical change accompanying α-γ phase transformation during air cooling is responsible for the intergranular corrosion degradation of the UNS S32506 duplex stainless steel.

Keywords: Duplex stainless steel**,** Intergranular corrosion**,** Cooling condition**,** Cr depletion**,** α/γ interface

1. Introduction

Duplex stainless steels (DSSs) are widely used for various applications because of their excellent corrosion resistance in addition to high strength. During practical service in severe environments such as chemical plant intergranular corrosion (IGC) may be one of