

Microstructure, Corrosion and Magnetic Behavior of an Aged Dual-Phase Stainless Steel

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Abstract

In the present work, the effect of the precipitation phenomena on corrosion and magnetic behavior of an aged dual-phase stainless steel was investigated. Aging treatment caused the precipitation of the σ phase, chromium carbides and secondary austenite, which was accompanied by the shifting of the δ/γ interfaces inside the δ ferrite grains. Aging between 700 and 850 °C strongly deteriorated the pitting corrosion resistance of the studied material. Magnetic investigation of the aged material using the vibration sample magnetic technique revealed the sensitivity of the intrinsic magnetic properties to the smallest microstructural change. This was confirmed by the Eddy current technique that led also to the evaluation of the aging-induced localized corrosion.

Keywords

σ phase aging treatment DSS magnetic properties microstructure pitting corrosion