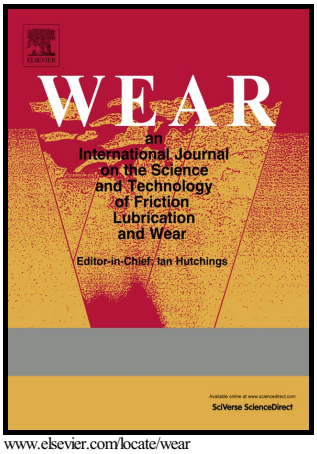

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Abstract

Grade 2507 super duplex stainless steel ordinarily achieves a balance of corrosion resistance and mechanical properties through its dual phase ferrite-austenite microstructure. However, heat treatment in the 600-900°C temperature range causes phase transformations to occur, developing complex microstructures with secondary phases including sigma phase, secondary austenite, chi phase, and chromium nitrides. It has already been demonstrated that in tribocorrosion experiments in 0.6 M NaCl in anodic potentiostatic conditions, the passivity of aged 2507 is eliminated due to mechanical wear, and pitting can occur in and near the wear track. However, the precise mechanism of this loss of passivity is not yet understood. In the present study, we explore the tribocorrosion behavior at selected phases and grain boundaries. Correlating the microstructural features to local surface topography changes and the current transient response revealed precise details of the wear-induced corrosion behavior.

1 Introduction