

Thermal Treatment Effect on Tribological and Corrosion Performances of 13Cr5Ni2Mo Super-Martensitic Stainless Steel

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Abstract: Wear behavior of 13Cr5Ni2Mo supermartensitic stainless steel (SMSS) were investigated in air and in argillaceous paste at room temperature. Prior to wear testing, the samples were subjected to two treatments, namely; quenching followed by double tempering. A pin-on- disc test rig was used to conduct the wear test with a tribo-pair consisting of supermartensitic stainless steel sliding against itself. It was observed that the microstructure of the thermally treated samples mainly consisted of tempered martensite and carbides. Wear results showed that oxidative and abrasive wear dominated the wear process of the treated samples in both dry conditions and in argillaceous paste. Additionally corrosion tests were performed in 5.0% NaCl solution via potentiodynamic polarization tests. It was found that the passive film formation provides a good corrosion resistance to the samples.

Keywords : Martensitic Stainless Steel, Thermal Treatments, wear, corrosion