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Investigation ?n Dry Sliding Wear Performance and Corrosion Resistance of 13Cr5Ni2Mo Supermartensitic Stainless Steel

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Abstract: This work aimed to study the microstructure, wear and corrosion resistance of supermartensitic stainless steel (SMSS). Heat treatment applied to samples consists of quenching after austenitization at elevated temperature (1250 °C) followed by a double tempering at 650 °C. Conventional mechanical properties, scanning electron microscopy (SEM/EDS) analysis and X-ray diffraction methods (XRD) are used to analyze the microstructure and to evaluate the wear mechanisms. The potentiodynamic polarisation and the electrochemical impedance spectroscoopy (EIS) methods are used to evaluate the corrosion resistance in both the 0.5M H2SO4 and 0.5M NaCl aggressive media. The microstructure is mainly composed with tempered lath martensite, small quantity of retained austenite and carbides. Oxidative and abrasive wear dominated the wear process in dry condition. During the corrosion process, the same mechanism of degradation was found in both the 0.5M NaCl and 0.5M H2SO4.

Keywords : Supermartensitic steel, microstructure, friction, Wear Corrosion