

Microstructural Analysis and Mechanical Properties of Cr 13 Ni 5 Mo 2 Super Martensitic Stainless Steel

Samira.TLILI, Chems.Eddine. RAMOUL, Kheireddine. SLIMANI, Toufik. CHOUCHANE, Tarek. HAZEM, Chaima. TOUHAMI

Abstract : Super martensitic stainless steel Cr 13 has been widely used in many applications particularly in the oil field for their superior mechanical properties and a corrosion resistance. In the present work, we study the microstructure and mechanical properties of a super martensitic stainless steel Cr 13% Ni 5% Mo 2% after quenching treatment at 1050 °C and tempering at 700 °C for 1 hour. Chemical analyzes were obtained by X-ray fluorescence and EDS / SEM. The experiment results that microstructure after heat treatment consisted of martensite and residual austenite estimated at 29%. For mechanical analysis, several methods of investigation were used namely micro indentation, testing tensile and charpy impact test. The friction wear is investigated in dry conditions and ambient air by pin-on-disk tribometer at 2, 6 and 10N load against WC ball. The friction coefficient (COF) varied from 0.62 to 0.56 and wear rate varied from $2.4 \cdot 10^{-3}$ (mm³/N.m) to $0.6 \cdot 10^{-3}$ (mm³/N.m). The wear mechanism was studied by scanning electron microscopy.

Keywords : Super Martensitic Stainless Steel, heat treatment, structure, mechanical properties, wear.