Investigation on the corrosion behaviour of 420 welding martensitic steel with the ER308L, ER309L and ER420 fillers studied in 3.5% NaCl solution with and without CO₂

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Abstract
In this research 420 martensitic stainless steel welded with the ER308L, ER309L and ER420 fillers by GTAW method. The corrosion properties of the samples has been studied in 3.5% NaCl solution with and without CO₂. Potentiodynamic polarization used to obtain the ER308L and ER309L have the best corrosion properties. In addition the welding process makes the 420 HAZ zone to be sensitized. The pitting potential of the samples has been decreased in presence of carbon dioxide. Furthermore, by adding CO₂ to the solution the pH has been decreased and the corrosion potential reached near the -500 mV/SCE and the passivity current is also lowered.

Keywords: Corrosion, Welding, Stainless steel, Martensit, Potentiodynamic polarization.