

Study of Intergranular Corrosion in Austenitic Stainless Steels Using Electrochemical Impedance Spectroscopy

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Abstract : Electrochemical impedance spectroscopy (EIS) has been used to detect sensitization in austenitic stainless steels that are heat treated in the temperature regime 600-820 °C to produce different degrees of sensitization in the material. The tests were conducted at five different DC potentials in the transpassive region. The quantitative determination of degree of sensitization has been done using double loop electrochemical potentiokinetic reactivation tests (DL-EPR). The correlation between EIS Nyquist diagrams and DL-EPR degree of sensitization values has been studied. The EIS technique can be used as a qualitative tool in determining the intergranular corrosion in austenitic stainless steels that are heat treated at a given temperature.

Keywords : electrochemical technique, intergranular corrosion, sensitization, stainless steels

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