

Electrochemical Noise Analysis of Corrosion Behavior of Stainless Steel 304 Exposed in NaCl and FeCl₃ solutions.

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Electrical parameters such as charge of the event (q), characteristic frequency (f_n) and impedance (Z_n) obtained from shot-noise theory have been proposed as indicators of the initiation of pitting corrosion, and have played an important role in the construction of corrosion patterns which are a good approximation to examine the evolution of corrosion type in metals and its alloys. Therefore, in this research paper, Electrochemical Noise (EN) signals (potential and current noise data) have been collected from AISI 304 stainless steel exposed to chloride solution to evaluate the pitting corrosion behavior. The electrochemical tests were carried out at standard condition during 24 hours of exposure in two chlorine solutions (NaCl and FeCl₃). Noise data analysis was mathematical treated by wavelet transform in order to identify the low frequencies that lead the calculation of q , f_n , and Z_n to plot the corrosion behavior and this was correlated with the Energy Distribution Plots (EDP) and metallographic images. The results of all the time series evaluated reveals a concordance in scale of EDP with the initiation and the growth of pitting.

Keywords: Electrochemical noise, Pitting corrosion, Wavelet Transform, Energy Distribution Plot, 304SS.

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