Electrochemical Behavior of Austenitic Stainless Steels Exposed to Acetic Acid Solution

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In this work, an electrochemical evaluation was carried out for different austenitic stainless steels in an acetic acid solution based on Italian Decree text. The electrochemical performance of the steels was determined by electrochemical techniques such as potentiodynamic polarization curves, measurements of the open circuit potential, linear polarization resistance, and electrochemical impedance spectroscopy. Although the steels show a high corrosion resistance, the specific performance of each one depends on both the chemical composition and the microstructural characteristics. It was found that an increase in the Cr content decreases the corrosion resistance, but precipitates and inclusions decrease it considerably, thus favoring the release of metallic ions into the electrolyte. In addition, the capacitive properties of the protective oxide depend on both the degree of Cr enrichment degree and its thickness.

Keywords: Corrosion, austenitic stainless steel, food contact, electrochemical techniques, acetic acid.

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