Corrosion Behavior of 316 Stainless Steel Exposed to a Simulated Salt lake Atmospheric Environment under UV Illumination

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In this study, the corrosion mechanism of 316 stainless steel subjected to wet–dry cyclic accelerated corrosion test in a simulated salt lake atmosphere under ultraviolet (UV) illumination was investigated. The corrosion mechanism was investigated by analyzing the corrosion morphologies, corrosion products, in-situ electrochemical impedance spectroscopy (EIS) with micro-distance electrodes and Mott-Schottky measurements. The results revealed that UV illumination inhibited the corrosion rate of the 316 stainless steel with an increase in the corrosion time. In addition, UV illumination had no significant effect on the type of corrosion products but changed the relative amount of the corrosion products. Furthermore, the corrosion process of the 316 stainless steel under UV illumination was affected by the photovoltaic effect of the semiconductor corrosion products.

Keywords: Stainless steel; Atmosphere corrosion; In-situ EIS; Photovoltaic effect; Semiconductor

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