

表面与界面工程

无机/有机复合涂层体系在3.5% NaCl溶液中的EIS

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摘要

采用电化学阻抗谱(EIS)研究了无机富锌底漆/环氧云铁中间漆/氯化橡胶面漆复合涂层体系在3.5%NaCl溶液中的腐蚀电化学行为,考察了紫外辐射对其电化学行为的影响。结果表明:复合涂层体系在3.5%NaCl介质中的腐蚀失效过程可以用4种等效电路来等效。浸泡失效前120 h,电解质溶液电阻 R_c 从开始的 $5 \times 10^9 \Omega \cdot \text{cm}^2$ 以大约 $2.2 \times 10^7 \Omega \cdot \text{h}^{-1}$ 的速度迅速下降到 $4 \times 10^5 \Omega \cdot \text{cm}^2$,到浸泡120 h后 R_c 则以较小的速度 $808 \Omega \cdot \text{h}^{-1}$ 下降,涂层电容 C_c 是按线性增加。紫外辐射不改变复合涂层体系在3.5% NaCl溶液中的电化学行为,仅仅加速复合涂层的失效。

关键词

[复合涂层](#) [EIS](#) [老化失效](#) [紫外辐射](#)

分类号

Electrochemical impedance spectroscopy of inorganic/organic composite coatings in 3.5%NaCl solution

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Abstract

The corrosion electrochemical behavior of composite coatings system composed of inorganic zinc-rich primer, epoxy middle paste and chlorinated rubber top coating in 3.5% NaCl solution was studied with electrochemical impedance spectroscopy (EIS). The effect of UV irradiation on the electrochemical behavior was investigated. The results showed that the corrosion process of the composite coatings in 3.5% NaCl solution could be described in the form of four equivalent circuits. The R_c of composite coatings decreased linearly at a rate of $2.2 \times 10^7 \Omega \cdot \text{h}^{-1}$ and $808 \Omega \cdot \text{h}^{-1}$ before and after 120 h respectively, but the C_c of the coatings increased linearly. UV irradiation could accelerate the aging of the coatings but did not affect the electrochemical behavior in the solution.

Key words

[coating](#) [EIS](#) [aging](#) [ultraviolet irradiation](#)

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