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Studying Corrosion and Adhesion Performance of a Phytic Acid Based Conversion Coating Post-Treated with Garlic Extract on Q235 Steel

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A green phytic acid film was prepared on the steel surface before the natural garlic extract was used for the post-treatment of the conversion coating. Then scanning electron microscopy (SEM) equipped with X-ray energy dispersive spectrum (EDS) were adopted for micro-morphology and elemental composition determination of different samples. Atomic force microscopy (AFM) and contact angle measurement were used to assess the adhesion properties of the prepared coating. At last, the electrochemical characteristic of the coating on the Q235 steel was examined using electrochemical impedance spectroscopy (EIS) and polarization curves in a 3.5 wt. % NaCl. SEM and AFM studies have shown that a homogenous, flake-like coating with lower crack was deposited on the steel surface. Particularly, EIS studies have shown that the anti-corrosion performance of the coating that treated with the garlic extract was markedly improved. Simultaneously, the adhesion property with the subsequent coating adhesion was also increased.

Keywords: conversion coating; phytic acid; corrosion; garlic extract; adhesion

FULL TEXT