Corrosion Behavior of Electromagnetic Shielding Coating under the Interaction of Steady Magnetic Field with Corrosion Medium

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doi: 10.20964/2017.10.24

Received: 28 April 2017 / Accepted: 24 July 2017 / Published: 12 September 2017

Electrochemical impedance spectroscopy was conducted to analyze the influence of coating properties on the corrosion behavior of electromagnetic shielding coating (EMSC) in a 3.5 wt.% NaCl solution under a 0.1 T steady magnetic field (MF). The results showed that the coating fillers and the acting time in the MF were the key factors affecting the corrosion behavior of the EMSC. The MF had a homogenizing effect on magnetic fillers in the coating, which could improve the corrosion resistance of the coating, but it could not play the same role in a coating with non-magnetic fillers. Moreover, the strength of the homogenizing effect depended on the acting time in the MF. The penetration of the solution into the topcoats of a double-layer EMSC was found to provide more time for the movement of the filler in the primers, compared with the time taken by a single layer system. Therefore, the EMSC primer in the double-layer system presented better corrosion resistance, which was manifested by the EIS results.

Keywords: magnetic filler; magnetic field; homogenizing effect; electromagnetic shielding coating; electrochemical impedance spectroscopy

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