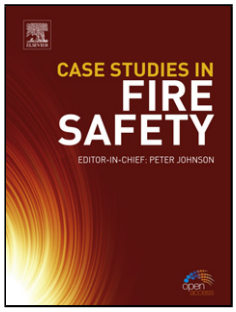

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Corrosion protection properties of inhibitor containing hybrid PEO-epoxy coating on magnesium

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Highlights

- A hybrid coating with duplex-layered structure was developed on magnesium
- The hybrid coating contains effective corrosion inhibitor of 3-methylsalicylate
- The corrosion performance of hybrid coatings was studied by EIS
- Active corrosion protection mechanism by inhibitor was characterized by SVET

Abstract

A hybrid PEO-epoxy coating was developed for magnesium. A highly-efficient corrosion inhibitor (3-methysalicylate) was impregnated into the anodized layer, which was sealed by an epoxy layer through dip-coating process. Influence of dip-coating parameters on coating properties was investigated. The corrosion performance was evaluated through general and localized electrochemical techniques. As a result, the epoxy layers registered superior resistance, whereas the anodized layer suppressed corrosion expansion. Longer immersion and triple-dipping favored the production of better sealed epoxy layer. The active protection mechanism was achieved by suppression the re-deposition of detrimental impurity and/or adsorption upon the exposed surface from incorporated inhibitor.

Key words: Magnesium; Hybrid coating; Corrosion inhibitor; SVET; Active corrosion protection;

1. Introduction

Up to date, plasma electrolytic oxidation (PEO) (also denoted as micro arc oxidation, MAO) has been widely accepted and practically applied for protecting Mg, Al, Ti and their alloys with aims of enhancing their corrosion performance and widening their applications in industry [1-4]. During PEO treatment,