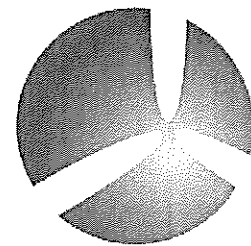


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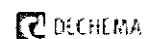
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BOOK OF ABSTRACTS

Corrosion Protection of AA2024 by Sol-gel Coatings Modified with Ce (III)-enriched Zeolite

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Oppositely to traditional coating formulations, the functionality of self-healing coatings is based on the storage of inhibitors within inert micro/nanocontainers for undefined period of time, with the active species being released only when certain conditions in the surrounding media are fulfilled. The major challenge for researchers is to find environmental-friendly micro/nanostructures and modify them in such a way that the triggering conditions for the release of inhibiting species match those corresponding to coating failure and corrosion initiation.

Ion exchangers are a class of functional materials that display ion exchange properties owing to existence of fixed ionic sites bonded to their framework, which is held together by chemical bonds or lattice energy and can be called polyions. Oppositely charged ions move throughout the framework and can be replaced by ions of similar charge. Their well-defined compositions and tunable structural features allow minute tailoring of their specific properties. A very unique structural features make zeolites excellent ion exchangers. Zeolites are crystalline-aluminosilicates which structure is formed by an array of corner-sharing SiO_4^{4-} or AlO_4^{5-} tetrahedrals. These building blocks become arranged in a periodic way to form channels and cages with large specific surface areas. The overall negative charge of these aluminosilicates requires the presence of cations to maintain the electroneutrality.

In the present work, we studied the corrosion protection efficiency of sol-gel coatings modified with 26.9 wt% of Ce(III)-enriched zeolites microparticles. This accounts for 3.9 wt% of Ce (III) in the coating. The studies were carried out by using Electrochemical Impedance Spectroscopy (EIS) and Local Electrochemical Impedance Spectroscopy (LEIS). The coatings were characterized by Scanning Electron Microscopy coupled with Energy Dispersive Spectroscopy (SEM/EDS). The experimental results confirmed the uptake of Mn^{2+} and Cu^{2+} ions, resulting from dissolution of alloy intermetallic inclusions in response to the release of Ce (III). The exchange of Ce (III) with those metallic cations is part of the self-healing process. Moreover uptake of chloride ions by CeNaX zeolites was also observed and was evaluated by crystal membrane chloride-selective electrode.

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