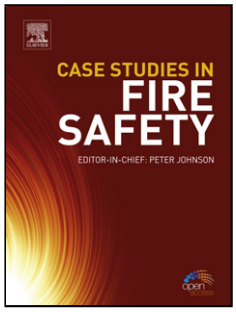

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Self-healing ceria-modified coating for corrosion protection of AZ31 magnesium alloy

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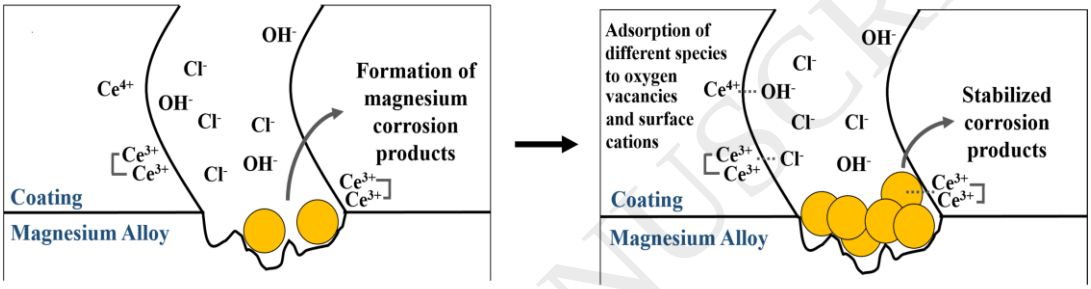
Graphical abstract



Highlights

- Modification of hybrid epoxy-silane coating with ceria nanoparticles
- Ceria leads to improved and stable corrosion protection of AZ31
- Delay of corrosion propagation in the presence of ceria
- Enhanced corrosion protection with low concentration of ceria nanoparticles

Abstract

A hybrid siloxane-based coating was modified with CeO_2 nanoparticles and applied on AZ31. The corrosion protection performance was evaluated via electrochemical impedance spectroscopy (EIS) in 0.05 M NaCl. CeO_2-modified coating showed improved and more stable protective performance compared to the blank coating. Localized healing of the modified coating was studied via scanning vibrating electrode technique (SVET), scanning ion-selective electrode technique (SIET) and localized electrochemical impedance spectroscopy (LEIS). Addition of ceria led to lower cathodic activity in 0.05 M NaCl and alkalization was kept