"ALOE-HEAL COAT" SMART SELF-HEALING COATING FOR ANTI-CORROSION OF AUTOMOTIVE COMPONENTS

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PRODUCT BACKGROUND

- "Aloe-Heal Coat" has been developed as a new smart coating as protection method to reduce corrosion severity of magnesium alloy components.
- Magnesium and its alloys have been used widely as the automotive components, such as BMW engine block, Jaguar seat frames, GM and Ford front cover, for vehicle weight reduction, but magnesium is highly susceptible to corrosion in most environments.
- Smart self-healing act with the presence of microcapsules corrosion inhibitor and epoxy coating that are formulated by ingredient of poly-urea formaldehyde (PUF), resorcinol, ammonium chloride, and polyvinyl alcohol as the shell for the microcapsules. Linseed oil, and aloe-vera extract were added as the secret ingredient for the corrosion inhibitors which is the core ingredient of the microcapsules.

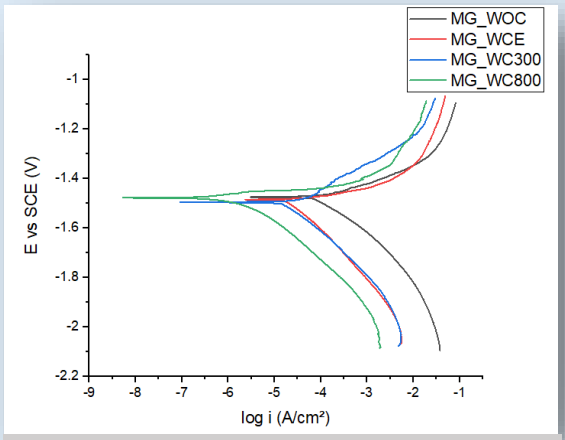
NOVELTY / ORIGINALITY

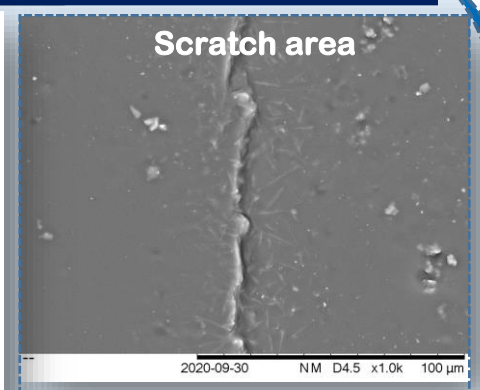
- A novel self-healing coating, able to autonomously repair when scratch/damage occurs on the surface
- A non volatile organic compounds (VOCs) type of materials/mixture of coating (safe compound) with green inhibitors

BENEFIT OF PRODUCT

- Resist more than 90% corrosion susceptibility of Mg automotive/metal component
- Inexpensive materials
- Reduce corrosion maintenance and autonomously repairs damage on surface
- Enhance sustainable environment

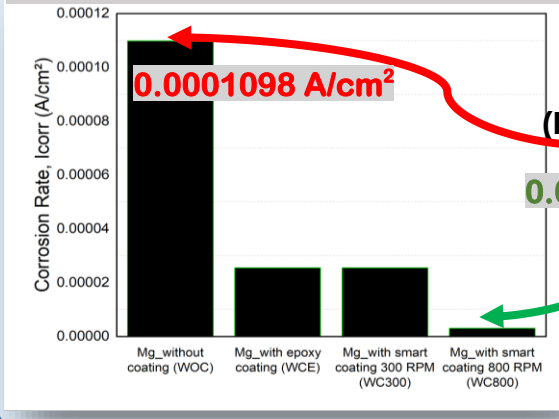
PERFORMANCE OF PRODUCT





Self-healed coating after 7 days, observed by SEM

CORROSION RATE



Mg without coating (Highly corroded)

Mg with smart coating (Not corrode)

 # Corrosion rate reduced 97.2% by using smart coating

STATE OF THE ART

Formulation of microcapsules by in-situ polymerization

Microcapsules characterization (morphology, size, shell thickness)

Epoxy coating with added microcapsules

Scratch test (self-heal ability)

Coating characterization

Corrosion test

IN-SITU EMULSION POLYMERIZATION

STATUS OF PRODUCT

Sample / lab-scale / patent search

PRODUCT CHARACTERISTICS

MICROCAPSULES

EPOXY COATING

SMART SELF-HEALING COATING

PUBLICATION

- Effect of surface condition on the corrosion behaviour of AZ31 Mg Alloy, Material Today Proceeding, 2021, Scopus
- Self-healing coating of magnesium alloy: A review, Journal of material science, (In writing), 2021, IF:3.4, Q1

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