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(LY2019000358)

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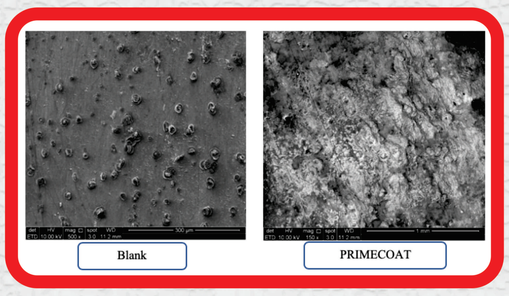
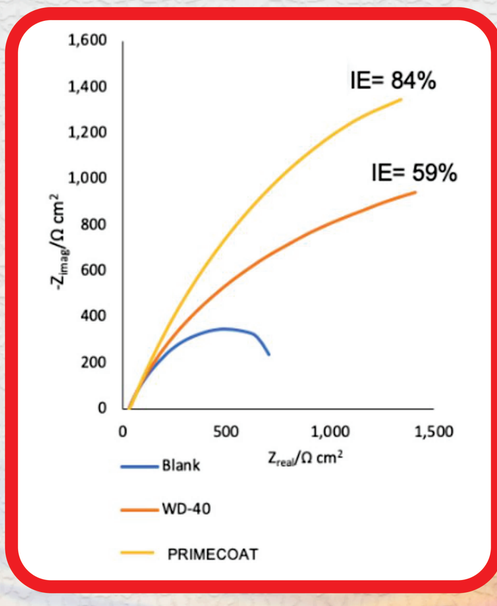
PRIMECOAT: Smart Corrosion Protection Coatings for Building And Construction

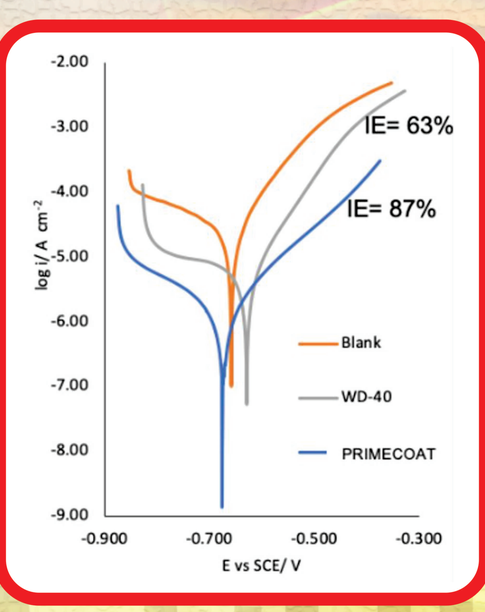
SEM Analysis



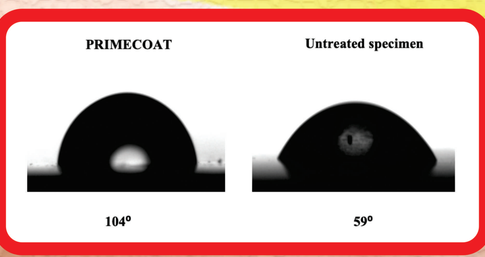
Electrochemical Impedance



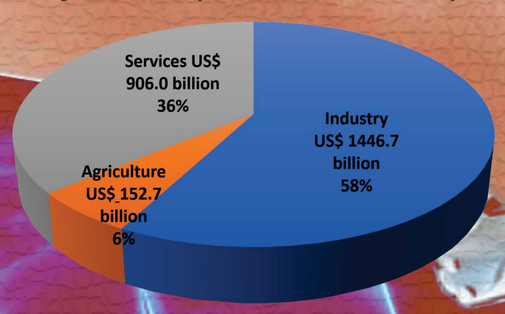
Electrochemical Polarization



Water Contact Angle Analysis



Global Cost of Corrosion by Sector (Billion US$ 2013)



Introduction

- PRIMECOAT is a primary hybrid sol-gel coatings, a potent corrosion inhibitor (caffeine) to enhance resistance against corrosion and stability of coating.

Problem Statement

- Toxic, hazardous chemicals, high disposal costs (such as chromate, phosphate) are popular coating treatments. Strong demand for 'greener' coatings.
- Economic impact of corrosion (major issues: energy and material loss), mild steel corrodes during the industrial acidic applications.
- Hybrid sol-gel films formulated using organic precursors (eco-friendly) exhibit micropores and cracks: leads to pitting corrosion.

Inventiveness and Novelty

- PRIMECOAT is utilization of caffeine (from tea leaves residue) as corrosion inhibitor incorporated into hybrid sol-gel matrix (metal alkoxides: APTES and TEOS) to coat metal substrates.
- Novelty check on Scopus: Novel
- Formulated from less toxic, cost effective and safe chemicals.

Intellectual Property Status

- Filed for copyright (LY2019000358)

Usefulness and Applications

- PRIMECOAT function as shield to cease propagation of corrosion damage, restrict the current passage on the substrate and limits water penetration.
- It is hydrophobic coating (effectiveness of coating against corrosion), can be serviceable on any pure metal and alloy.
- The product shows good corrosion performance (> 85% inhibition efficiency) compared to commercially available coatings.

Status of Invention

- Completed R&D process.
- Field testing: collaboration with JKR and UEKATSU (M) Sdn. Bhd.
- Prototype available.

Commercial Potential

- High potential commercialization: Ingredients used are eco-friendly, cheaper and readily available.
- The cost of PRIMECOAT approximately RM 36 per 1L, which slightly cheaper than commercial coatings (RM 65 per 1L).
- This product has low cost production to produce an efficient coating.

Potential Partners

- Public Service Department (JKR-Civil Engineering)
- Local Construction Company

Knowledge Management

- Human Resources: 2 PhD and 3 MSc candidates
- Grant: USM Short Term Grant 304.PKIMIA.6315100
- Publication: 5 scientific articles in ISI cited journal

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