

EFFECT OF HENNA IN ETHYL ACETATE FOR THE
INHIBITION OF ALUMINIUM IN SEAWATER AT
LOW CONCENTRATION

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**EFFECT OF HENNA IN ETHYL ACETATE FOR THE INHIBITION OF ALUMINIUM
IN SEAWATER AT LOW CONCENTRATION**

By

Siti Nurul Ummini Binti Kosen

**Research Report submitted in partial fulfillment of
the requirement for the degree of
Bachelor of Applied Science (Maritime Technology)**

**Department of Maritime Technology
Faculty of Maritime Studies and Marine Science
UNIVERSITI MALAYSIA TERENGGANU
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DECLARATION AND VERIFICATION REPORT
FINAL YEAR RESEARCH PROJECT

It is hereby declared and verified that this research report entitled: **Effect of Henna in Ethyl Acetate for the Inhibition of Aluminium in Seawater at Low Concentration** by **Siti Nurul Ummi binti Kosen**, Matric No. **UK 19921** have been examined and all errors identified have been corrected. This report is submitted to the Department of Maritime Technology as partial fulfillment towards obtaining the **Bachelor Degree of Applied Science (Maritime Technology)**, Faculty of Maritime Studies and Marine Science, Universiti Malaysia Terengganu.

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DECLARATION

I hereby declare that this thesis entitled **EFFECT OF HENNA IN ETHYL ACETATE FOR THE INHIBITION OF ALUMINIUM IN SEAWATER AT LOW CONCENTRATION** is the result of my own research except as cited in the references.

Signature : 

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Date : 10 JANUARY 2013

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ABSTRACT

Aluminium is an important subject of research because it is abundant in nature easy to handle. Nowadays, corrosion is entrenched in maritime industry where the ship plate undergoes corrosion and it depends on the different environment. This study investigates the inhibition performance of henna towards AA5083 in seawater. The characterization of the corrosion was performed by using fourier transform infrared spectroscopy (FTIR), weight loss, electrochemical impedance spectroscopy (EIS), potentiodynamic polarization (PP), and scanning electron microscope (SEM). The inhibition efficiencies (IE%) for all measurement obtained from different method; weight loss, polarization resistance (R_p), corrosion current density (I_{corr}) and corrosion rate are in good agreement where the highest inhibition efficiencies (IE%) is 83.84% at 500ppm after 60 days of immersion. The value for charge transfer resistance (R_{ct}) increase as a result of increasing in the degree of protection of AA5083 in test solution and double layer capacitance (C_{dl}) decrease indicates that a layer was form indicating the formation of a surface film. This reflects the inhibitor does retard the corrosion rate. This research had found that henna is an excellent natural inhibitor for aluminum alloy in seawater.

Keywords: Aluminium (AA5083), Corrosion Inhibitor, Henna, Seawater

KESAN INAI PADA ETHYL ACETATE UNTUK PERENCATAN ALUMINIUM DALAM AIR LAUT PADA KEPEKATAN RENDAH

ABSTRAK

Aluminium adalah satu subjek penting dalam penyelidikan kerana ia banyak terdapat dalam alam semula jadi mudah untuk mengendalikan. Kini, pengawatan sebatu dalam industri maritime di mana plat kapal mengalami pengawatan dan ia bergantung kepada persekitaran yang berbeza. Kajian ini menyiasat pretasi perencatan inai ke arah AA5083 didalam air laut. Pencirian kakisan diuji dengan menggunakan alat fourier transform infrared spectroscopy (FTIR), kehilangan berat, spektroskopi impedans elektrokimia (EIS), pengutuban potentidinamik (PP) dan alat spectroscopy impedance microscope (SEM). Untuk semua pengukuran kecekapan perencatan (IE%) yang diperolehi dari kaedah yang berbeza, kehilangan berat, rintangan pengutuban (R_p), ketumpatan arus kakisan (I_{corr}) dan kadar kakisan di dalam perjanjian yang baik di mana kecekapan perencatan tertinggi (IE%) adalah 83.84% pada 500ppm selepas 60 hari rendaman. Peningkatan untuk nilai rintangan pemindahan cas (R_{ct}) menunjukkan meningkatnya darjah perlindungan untuk AA5083 dalam larutan penguji dan pengurangan nilai untuk kekuatan dua lapisan (C_{dl}) menunjukkan yang satu lapisan telah terbentuk iaitu pembentukan satu lapisan nipis pada permukaan. Ini membuktikan perencat berfungsi dengan melambatkan kadar kakisan. Kajian ini henna merupakan perencat kakisan yang baik terhadap aluminium aloi dalam air laut.

Kata kunci: Aluminium (AA5083), Perencat Pengawatan, Inai, Air laut