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

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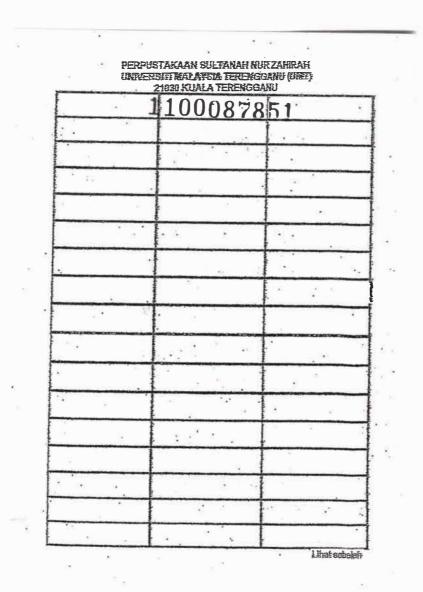
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By

Siti Nurfarahin Binti Muhd Nasir

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 2013



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 High Concentration by Siti Nurfarahin binti Muhd Nasir, Matric No. UK 20201 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 HIGH CONCENTRATION is the result of my own research except as cited in the references.

Signature Name Matric No. Date

: SITI NURFARAHIN BINTI MUHD NASIR : UK 20201 : 13 JANUARY 2013

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ABSTRACT

Aluminum alloy type 5083 or AA5083 is suitable for marine applications because of its characteristic. A smart approach to overcome this problem by introduced the existence of inhibitor where it works by retarding the rate of corrosion by forming a surface layer as it protect any metal from reacting to the environment. This study was using a plant extract (henna) which is 600ppm, 700 ppm, 800ppm, 900ppm and 1000ppm are use. Aluminium was cut into 25mm x 25mm x 3mm and was polish manually using 600, 800 and 1200 grit of emery paper. Henna was extracted using a solvent which are ethyl acetate using rotary evaporator (Rotavap). To investigate the content of each extraction, a Fourier Transform Infrared Spectroscopy (FTIR) device was used. The corrosion behavior was investigated using several methods which were weight loss measurement, potentiodynamic polarization measurement, electrochemical impedance spectroscopy (EIS) and scanning electron microscope (SEM). Calculation of inhibition efficiency, IE (%) for weight loss, polarization resistance, corrosion current density and corrosion rate.

KESAN INAI DALAM ETIL ASETAT UNTUK PERENCATAN ALUMINIUM DALAM AIR LAUT PADA KEPEKATAN TINGGI

ABSTRAK

Jenis aluminium aloi 5083 atau AA5083 adalah sesuai untuk aplikasi marin kerana ciricirinya. Satu pendekatan yang bijak untuk mengatasi masalah ini dengan memperkenalkan kewujudan perencat dimana ia berfungsi dengan memperlahankan kadar kakisan dengan membentuk lapisan permukaan kerana ia melindungi mana-mana logam daripada bertindak balas terhadap alam sekitar. Kajian ini telah menggunakan ekstrak tumbuhan (inai) dengan kepekatan sebanyak 600ppm, 700ppm, 800ppm, 900ppm dan 1000ppm. Aluminium telah dipotong ke 25mm x 25mm x 3mm dan menggilap manual dengan menggunakan 600, 800 dan 1200 kertas pasir. Inai telah diekstrak menggunakan pelarut iaitu etil asetat menggunakan penyejat putar (Rotavap). Untuk mengetahui kandungan setiap pengekstrakan,spektroskopi inframerah transformasi Fourier (FTIR) peranti telah digunakan. Aktiviti pengaratan dii kaji menggunakan beberapa kaedah iaitu pengurangan berat bahan ujikaji, ukuran polarisasi potentiodynamic dan spektroskopi impedans elektrokimia (EIS) selain itu, pengiraan kecekapan perencatan IE (%) untuk kehilangan berat bahan ujikaji, rintangan pengutuban, ketumpatan arus kakisan dan kadar kakisan.