

CORROSION INHIBITION OF COPPER BY DIETHYLAMINE
ALLOYING WITH ZINC IN AQUEOUS SOLUTIONS

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**CORROSION INHIBITION OF SODIUM BENZOATE ON ZINC ALLOYS IN
SEAWATER AND ACIDIC SOLUTIONS**

By

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A thesis submitted in partial fulfillment of the requirements for the award of the degree of
Bachelor of Applied Sciences (Physics, Electronics and Instrumentation)

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PENGAKUAN DAN PENGESAHAN LAPORAN PITA I DAN II

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk:.....

*Corrosion Inhibition of Sodium Benzoate on Zinc Alloys
in Seawater and Acidic Solutions*

oleh *Shobra Monty Mawat*.....no. matrik: *UK12175*.....

telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Fizik sebagai memenuhi sebahagian daripada keperluan memperoleh Ijazah *Sarjana Muda Sains Gunaan (Fiz., Elek. & Inst.)*, Fakulti Sains dan Teknologi, UMT.

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DECLARATION

I hereby declare that this thesis entitled **Corrosion Inhibition of Sodium Benzoate on Zinc Alloys in Seawater and Acidic Solutions** the result of my own research except as cited in the references.

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ABSTRACT

Electrochemical properties and corrosion inhibition of sodium benzoate on Zinc alloys were studied in seawater and acidic solutions at room temperature. Weight loss and electrochemical properties of zinc alloys as well as adsorption and their surface morphology in the presence of sodium benzoate were investigated. Weight loss experiment involving immersion of alloys in seawater and in acidic solutions was conducted for 30days on all the samples. The effects of dissolved oxygen in environmental air circulation on the alloys in seawater were also investigated. The corrosion products and the microstructure on the Zinc alloys were characterized using Scanning Electron Microscope (SEM). Results obtained in this study indicated that weight loss and electrochemical measurement for zinc alloys in seawater and acidic solutions after varied immersion period showed that in the presence of sodium benzoate, the corrosion current densities and corrosion rates of the alloys were significantly decreased and at the same time the inhibition efficiency, IE (%) were increased. The results also revealed that the weight losses of the alloys in sulphuric acid were higher compared to that of in the acetic acid. The presence of more dissolved oxygen in air circulation in the environment contributed to the dissolution of Zinc alloys. Corrosion rate is being calculated from the data and the results collected from the immersed Zinc alloys samples' weight loss in the acidic solutions and seawater. The results from SEM study elucidated that in the presence of sodium benzoate, after immersion in seawater, a thin film was formed on the specimen surface.

ABSTRAK

Sifat elektrokimia dan perencatan kakisan oleh natrium benzoate ke atas aloi zink telah dikaji di dalam air laut dan larutan berasid pada suhu bilik. Kehilangan berat dan sifat elektrokimia aloi zink serta penjerapan dan morfologi permukaannya dengan kehadiran natrium benzoate juga diselidik. Eksperimen kehilangan berat yang melibatkan rendaman aloi zink tersebut telah dijalankan selama 30 hari. Kesan oksigen terlarut di dalam peredaran udara persekitaran terhadap aloi di dalam air laut juga dikaji. Hasil-hasil kakisan dan mikrostruktur di atas aloi-aloi zink telah dicirikan menggunakan Mikroskopi Pengimbasan Elektron (SEM). Keputusan yang diperolehi dalam kajian ini menunjukkan bahawa pengukuran kehilangan berat dan elektrokimia bagi aloi-aloi zink di dalam air laut dan larutan berasid selepas suatu masa rendaman yang tertentu menunjukkan kehadiran natrium benzoat berkesan dalam mengurangkan ketumpatan arus kakisan dan kadar kakisan dan pada yang sama meningkatkan nilai kecekapan perencatan, IE (%). Keputusan ujikaji juga menunjukkan kehilangan berat aloi zink adalah lebih tinggi di dalam asid sulfurik berbanding di dalam asid asetik. Kehadiran lebih oksigen terlarut di dalam peredaran udara persekitaran menyumbang kepada pelarutan aloi zink. Kadar kakisan juga dikira melalui data dan keputusan yang diperolehi daripada rendaman aloi zink di dalam air laut dan larutan asid yang mengalami kehilangan berat. Hasil dapatan dari SEM menunjukkan pembentukan selaput tipis di atas spesimen dengan kehadiran natrium benzoate selepas rendaman di dalam air laut.