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Improvement of corrosion resistance of aluminum using
super-hydrophobic method / Mohd Alif Osman.

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IMPROVEMENT OF CORROSION RESISTANCE OF ALUMINUM USING
SUPER-HYDROPHOBIC METHOD

By

MOHD ALIF BIN OSMAN

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

DEPARTMENT OF PHYSICAL SCIENCES
FACULTY OF SCIENCE AND TECHNOLOGY
UNIVERSITI MALAYSIA TERENGGANU
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Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: Improvement of Corrosion Resistance of Aluminum Using Super-Hydrophobic Method oleh Mohd Alif Bin Osman, no. matrik: UK 13703 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 (Fizik Elektronik & Instrumentasi), Fakulti Sains dan Teknologi, UMT.

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DECLARATION

I hereby declare that this thesis entitled Improvement of Corrosion Resistance of Aluminum using Super-hydrophobic Method is the result of my own research except as cited in the references.

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IMPROVEMENT OF CORROSION RESISTANCE OF ALUMINUM USING SUPER-HYDROPHOBIC METHOD

ABSTRACT

A novel super-hydrophobic film was prepared by Livingston solution chemically adsorbed onto the aluminum. A superhydrophobic surface was prepared on aluminum substrate. The film formation and its structure were characterized by means of Fourier transformation infrared spectroscopy (FTIR) and scanning electron microscopy (SEM). The formation of a composite interface composed of the flower-like surface nanostructures, water droplet and air trapped in the crevices was suggested to be responsible for the superior water-repellent property. The corrosion behavior of the super-hydrophobic surface was investigated with potentiodynamic polarization measurements and electrochemical impedance spectroscopy. Due to the 'air valleys' and 'capillarity' effects, the corrosion resistance of the material was improved remarkably.

PENAMBAHBAIKKAN KERINTANGAN PENGARATAN MENGGUNAKAN KAEDAH SUPER-HIDROFOBİK

ABSTRAK

Novel super-hidrofofik yang telah dibuat dengan menggunakan larutan Livingston telah menyerap ke dalam aluminium secara kimia. Permukaan super-hidrofofik telah disediakan di atas unsur aluminium. Formasi filem dan strukturnya the dikhususkan oleh FTIR dan SEM. Formasi itu juga mengandungi permukaan bunga nano-struktur, titisan air dan perangkap udara di dalam celahan adalah dicadangkan untuk pencegahan air yang lebih baik. Sifat-sifat pengaratan pada super-hidrofofik telah di teliti menggunakan 'potentiodynamic polarization measurements' and EIS. Merujuk kepada kesan 'bukit udara' dan 'sifat kerambutan', rintangan pengaratan pada bahan telah bertambah baik secara luar biasa.