SYNTHESIS, CHARACTERISATION AND ANTI-CORROSION SCREENING OF Ni(II) *N*-METHYLCYCLOHEXYLDITHIOCARBAMATE AND *N*-ETHYLCYCLOHEXYLDITHIOCARBAMATE COMPLEXES

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The Final Year Project Report entitled "**Synthesis, Characterisation And Anti-Corrosion Screening of Ni(II) *N*-methylcyclohexyldithiocarbamate And Ni(II) *N*-ethylcyclohexyldithiocarbamate Complexes**" was submitted by Siti Raubbah Binti Mohd Zamri, in partial fulfilment of the requirements for the Degree of Bachelor of Sciences (Hons.) Chemistry, in the Faculty of Applied Sciences, and was approved by

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ABSTRACT

SYNTHESIS, CHARACTERISATION AND ANTI-CORROSION SCREENING OF NI(II) *N*-METHYLCYCLOHEXYLDITHIOCARBAMATE AND Ni(II) *N*-ETHYLCYCLOHEXYLDITHIOCARBAMATES COMPLEXES

Dithiocarbamate is a ligand that can act as a corrosion inhibitors due to the presence of sulphur and nitrogen atom. Ni(II) *N*-methylcyclohexyldithiocarbamate, $Ni[MeCycHexdtc]_2$ and Ni(II) *N*-ethylcyclohexyldithiocarbamates, $Ni[EtCycHexdtc]_2$ complexes were synthesised through one-pot synthetic method at room temperature and have been characterised by using elemental analyser (CHNS), fourier transform infrared-attenuated total reflectance (FTIR-ATR) spectroscopy, Ultraviolet-Visible (UV-Vis) spectroscopy, nuclear magnetic resonance (NMR) and molar conductivity. The stretching frequency of thioureide band, ν(C⋕N) appeared at 1497 cm^{-1} for $Ni[MeCycHexdtc]_2$ and 1484 cm^{-1} for $Ni[EtCycHexdtc]_2$ while the stretching frequency of ν(C=S) has shifted to lower wavenumber as it changes from double bonding to partial bonding, ν(C⋕S) at (1000±70 cm^{-1}) when compared with the raw material. The structures of both complexes were confirmed as the calculated of percentage for carbon, hydrogen, nitrogen and sulphur were similarly as the results by the elemental analyser. Meanwhile, the percentage of the metal of the complexes are carried by gravimetric analysis which is 12.8% ($Ni[MeCycHexdtc]_2$) and 12.25% ($Ni[EtCycHexdtc]_2$). This was supported by the result from ^{1}H NMR and ^{13}C NMR with the amount of the hydrogen and carbon in the symmetry of complexes. The $Ni[MeCycHexdtc]_2$ complex indicated the square planar complex but not for $Ni[EtCycHexdtc]_2$ complex where it shows the tetrahedral complex. There also a new absorption peak appeared at range 400-600 nm for UV-Vis spectra which show the presence of *d-d* transition and proved that the complexes were successfully formed. The corrosion inhibition was determined by weight loss method which also give the percentage of inhibition efficiency. Based on the experiment, the mass loss will decrease when the concentration of the complexes were increased. Thus, percentage of efficiency will also increase.