SYNTHESIS, CHARACTERISATION AND ANTI-CORROSION SCREENING OF Cu(II) *N*-METHYLCYCLOHEXYL- AND Cu(II) *N*-ETHYLCYCLOHEXYLDITHIOCARBAMATES COMPLEXES

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This Final Year Project Report entitled **"Synthesis, Characterisation Anti-Corrosion Screening of Cu(II) *N*-methylcyclohexyl- and Cu(II) *N*-ethylcyclohexyldithiocarbamates Complexes"** was submitted by Siti Hajar binti Yaacob, in partial fulfillment of requirements for the Degree of Bachelor of Science (Hons.) Chemistry, in the Faculty of Applied Sciences, and was approved by

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ABSTRACT

SYNTHESIS, CHARACTERISATION AND ANTI-CORROSION SCREENING OF Cu(II) *N*-METHYLCYCLOHEXYL- AND Cu(II) *N*-ETHYLCYCLOHEXYLDITHIOCARBAMATES COMPLEXES

The industrial sector has facing with the corrosion problem that causes the degradation of material. Even there are several technologies have been introduced for prevention the corrosion problem such as painting, plating and alloying, but the uses of inhibitor is more likeable for prevent this problem. Cu(II) *N*-methylcyclohexyl dithiocarbamate Cu(*N*-MchDTC)$_2$ and Cu(II) *N*-ethylcyclohexyl dithiocarbamate Cu(*N*-EchDTC)$_2$ complexes were successfully synthesised by in situ method. The compounds obtained were characterised by using infrared (FT-IR), Ultra Violet-Visible (UV-Vis), gravimetric analysis, molar conductivity and melting point**.** After that, the complexes were used for corrosion study by using weight loss method. From the FT-IR spectral data, it indicated that the both complexes were formed with a bidentate bonding of ligand to metal. From the UV-Vis analysis, there are three obvious absorption peaks that appeared which are $n \longrightarrow \sigma^*$, $\pi \longrightarrow \pi^*$ and LMCT transitions. The presence of absorption peak at more than 400 nm was the evident of *d-d* transition of Cu(II). The molar conductivity showed the both Cu(II) complexes were exist as a non-electrolyte behavior. The gravimetric analysis showed that the percentages of Cu(II) in the Cu(*N*-MchDTC)$_2$ complex was 12.48 % and Cu(*N*-EchDTC)$_2$ complex was 9.23 %. For the corrosion inhibition study, the Cu(*N*-MchDTC)$_2$ is a good corrosion inhibitor compare to Cu(*N*-EchDTC)$_2$. When the inhibitor concentration increases, the inhibitor efficiency also increases. It is opposite with the rate of corrosion. When the inhibitor concentration used increases, it will cause the rate of corrosion decreases.