SYNTHESIS, CHARACTERISATION AND ANTI-CORROSION SCREENING OF Cu(II) *N*-BUTYLMETHYL DITHIOCARBAMATE AND Cu(II) *N*-ETHYLBENZYL DITHIOCARBAMATE

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This Final Year Project Report entitled **"Synthesis, Characterisation and Anti-Corrosion Screening of Cu(II) *N*-butylmethyldithiocarbamate and Cu(II) *N*-ethylbenzyldithiocarbamate"** was submitted by Nabilah Syakirah Zolkifli, in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Chemistry, in the Faculty of Applied Sciences, and was approved by

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TABLE OF CONTENTS

ABSTRACT

SYNTHESIS, CHARACTERISATION AND ANTI-CORROSION SCREENING OF Cu(II) *N*-BUTYLMETHYLDITHIOCARBAMATE AND Cu(II) *N*-ETHYLBENZYLDITHIOCARBAMATE

Corrosion is a natural occurrence phenomenon that can cause damage to equipments and buildings. Thus, in this research, dithiocarbamate ligand had been used and from it, two complexes of Cu(II) *N*-butylmetyldithiocarbamate ($Cu[BuMedtc]_2$) and Cu(II) *N*-ethylbenzyldithiocarbamate ($Cu[EtBenzdtc]_2$) were produced and had been used as inhibitors for corrosion activity. The complexes were formed *via in situ* process and had been characterised by using FT-IR spectroscopy, UV-Vis spectroscopy, melting point, analysis of gravimetric and molar conductivity measurement. In FT-IR, there were important stretching band such as ν(C=N) and ν(C=S) appeared in the range of 1580 – 1450 cm^{-1} and 1060 – 940 cm^{-1}, respectively and the disappearance of ν(N-H) band shows that the complete reaction had occurred and the bidentate coordination was proved by the single band of ν(C=S). For the UV-Vis analysis, the electronic transition of $n \rightarrow \pi^*$, $\pi \rightarrow \pi^*$, LMCT and *d-d* were present in both complexes. The melting point for $Cu[BuMedtc]_2$ complex is 389-392 ^0C while 362-375 ^0C is the melting point for $Cu[EtBenzdtc]_2$ complex. For gravimetric analysis, the percentage of Cu(II) that had been calculated were 7.5% and 7.6% while molar conductivity shows that both complexes were in non electrolyte nature. Lastly for anti corrosion screening, both Cu(II) complexes had been tested by using HCl and H_2SO_4 acids. The concentration of the inhibitors used for anti-corrosion screening were 0.1 M, 0.01 M and 0.001 M. Form the graph, it shows that the $Cu[BuMedtc]_2$ was more efficient as a corrosion inhibitor than $Cu[EtBenzdtc]_2$ complex. Generally as the concentration of inhibitor increased, the inhibitor efficiency also increased.