

**SYNTHESIS, CHARACTERISATION AND ANTI-CORROSION
SCREENING OF Co(II) *N*-METHYLCYCLOHEXYL
DITHIOCARBAMATE AND Co(II) *N*-ETHYLCYCLOHEXYL
DITHIOCARBAMATE**

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This Final Year Project Report entitled “**Synthesis, Characterization and Anti-Corrosion Screening of Co(II) *N*-Methylcyclohexyl dithiocarbamate and Co(II) *N*-Ethylcyclohexyl Dithiocarbamate**” was submitted by Fasihah Esa, 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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ABSTRACT

SYNTHESIS, CHARACTERISATION AND ANTI-CORROSION SCREENING OF Co(II) N-METHYLCYCLOHEXYL DITHIOCARBAMATE AND Co(II) N-ETHYLCYCLOHEXYL DITHIOCARBAMATE

The new series of cobalt(II) dithiocarbamate complexes were successfully synthesised by using 'in situ' method with ethanol. The amines used in this study were *N*-methylcyclohexylamine and *N*-ethylcyclohexylamine. The dithiocarbamate complexes were characterised by using Ultraviolet Visible Spectroscopy (UV-Vis), Fourier Transform Infrared Spectroscopy (FTIR) and molar conductivity. The Co(II) dithiocarbamate complexes were acted as an inhibitor corrosion on mild steel. The data of UV-Vis and FTIR showed an agreement with proposed structures of Co(II) dithiocarbamate complexes. The UV-Visible analysis showed two types of transitions which are $n \rightarrow \pi^*$ and $\pi \rightarrow \pi^*$. The electronic spectra of *d-d* transition appeared at >400 nm and indicate that the Co(II) was successfully coordinated to the dithiocarbamate ligands. Infrared spectra of the complexes showed that the thiouride band, $\nu(\text{C}=\text{N})$ appeared at $1470 - 1480 \text{ cm}^{-1}$. The stretching band of $\nu(\text{C}=\text{S})$ was unsplitting and the region was appeared at range $1010 - 1013 \text{ cm}^{-1}$ indicates that's the behaviour of dithiocarbamate complexes is a bidentate. The molar conductivity of Co(II) dithiocarbamate complexes showed that there was a non-electrolyte. The gravimetric analysis showed the percentages of Co(II) complexes were 15.90% in Co(II) *N*-methylcyclohexyl dithiocarbamate and 14.75% in Co(II) *N*-ethylcyclohexyl dithiocarbamate that exactly same as a calculated amount. The inhibition effects of corrosion on the mild steel were investigated by weight loss method. The inhibitor efficiency was increased as the concentration of inhibitor increased and indicates that the dithiocarbamate complexes were adsorbed on the surface of the mild steel. The efficiency of corrosion inhibitor for Co(II) *N*-methylcyclohexyl dithiocarbamate is better than Co(II) *N*-ethylcyclohexyl dithiocarbamate.