SYNTHESIS, CHARACTERISATION AND ANTI-CORROSION SCREENING OF Ni(II) N-BUTYL METHYL DITHIOCARBAMATE AND Ni(II) N-ETHYL BENZYL DITHIOCARBAMATE

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

Two dithiocarbamates complexes which are Ni(II) N-butylmethyl dithiocarbamate, Ni[BuMedtc]$_2$ and Ni(II) N-ethylbenzyl dithiocarbamate Ni[EtBenzdtc]$_2$ were successfully synthesised using in situ method. Both complexes were characterised by FT-IR and UV-Vis spectroscopy, gravimetric analysis, molar conductivity, melting point and X-ray Crystallographic analysis. From IR spectroscopy, the important stretching bands which are $v$(C=N) and $v$(C=S) were appeared in the range of 1508-1518 cm$^{-1}$ and 948-967 cm$^{-1}$ respectively. The absence of $v$(N-H) bands after complexation in spectra of both complexes proved that the formation of complexes have been take place. For UV-Vis spectroscopy, there are absorption peak observed in the Ni[BuMedtc]$_2$ and Ni[EtBenzdtc]$_2$ at 325 nm and 330 nm respectively. It is indicated to the $n$-$\pi^*$ transitions. At more than 400 nm, there was absorption peak appeared which is indicated to the $d$-$d$ transitions of Ni(II) complexes. The melting points of both complexes were higher than 300 °C. The molar conductivity showed that Ni[BuMedtc]$_2$ and Ni[EtBenzdtc]$_2$ were non-electrolyte. The gravimetric analysis showed the percentage of Ni(II) in Ni[BuMedtc]$_2$ was 7.5% meanwhile in Ni[EtBenzdtc]$_2$ was 5.98%. For X-ray crystallographic analysis, only Ni[BuMedtc]$_2$ that was successfully produced single crystal that suitable for this analysis. The results obtained showed that Ni[BuMedtc]$_2$ is four-coordination tetrahedral geometry and adopted to hexagonal system with the crystal parameter: $a = 25.544(10)$ Å, $b = 25.544(10)$ Å, $c = 7.018(5)$ Å, $\alpha = 90^\circ$, $\beta = 90^\circ$, $\delta = 120^\circ$ and $Z = 9$. The corrosion inhibition study showed that C2 has higher corrosion inhibitor efficiency than Ni[BuMedtc]$_2$. From this study also showed that the inhibitor efficiency increased as the concentration of inhibitor increased.