

**SYNTHESIS, CHARACTERISATION AND ANTI-CORROSION
SCREENING OF THIOSEMICARBAZONE LIGANDS IN
ACIDIC AND SALT MEDIA**

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ABSTRACT

SYNTHESIS, CHARACTERISATION AND ANTI-CORROSION SCREENING OF THIOSEMICARBAZONE LIGANDS IN ACIDIC AND SALT MEDIA

Nowadays, industrial sector facing a problem of corrosion of metal due to the chemical reaction and environment that cause the degradation of the metal surface. The industrial sector structure are exposed to the condition that accelerate the corrosion process. Acid solution are widely used in industrial acid cleaning but at the same time, it also promote the accelerating of corrosion same goes with the salt solution that can also promote the corrosion rate. Due to that, the use of inhibitor are more likely can prevent this problem. Thiosemicarbazone (TSC) with the presence of sulfur and nitrogen atom can act as a corrosion inhibitor since it will form a protective layer on the metal surface and inhibit the activation corrosion site. The ligand 4-acetylpyridine 1-acetyl-3-thiosemicarbazone (4Acpy1Ac3TSC) and 1-methanal 1-acetyl-3-thiosemicarbazone (1Met1Ac3TSC) were successfully synthesised by a condensation method. The compounds were characterised by using Fourier Transform Infrared (FTIR), UV-Visible and Nuclear Magnetic Resonance (NMR) spectroscopies. The melting point of the ligands were higher than raw materials as expected. The FT-IR spectra data show the presence of stretching band of C=S at 1261 cm^{-1} and C=N at 1655 cm^{-1} in 4Acpy1Ac3TSC and 1699 cm^{-1} in 1Met1Ac3TSC that proved the structures of ligand. The ^{13}C NMR spectra show the formation of C=N, C=S due to the chemical shift at 174.82 ppm, 182.21 ppm respectively for 4Acpy1Ac3TSC and 171.36 ppm (C=N) and 182.90 ppm (C=S) for 1Met1Ac3TSC. The UV-Vis analysis showed electronic transitions which are $\pi \rightarrow \pi^*$, $n \rightarrow \sigma^*$ and $n \rightarrow \pi^*$ shifting to the lower wavelength from its raw materials. The ligands undergo hypsochromic shifting as the absorption peaks shifted to the shorter wavelength. The corrosion inhibition study showed that the inhibition efficiency higher in 4Acpy1Ac3TSC compare to 1Met1Ac3TSC due to the presence of aromatic ring in the 4Acpy1Ac3TSC that resonance effect where the electrons are pushed towards the aromatic ring and increase the electron density, thus increase the corrosion inhibitor efficiency. The corrosion inhibitor efficiency increases as the corrosion inhibitor concentrations increased.