



Electrochemical and Quantum Chemical Studies of 1-(4-Nitrothiophen-2-Yl)-3-(4-(Prop-2-Yn-1-Yloxy) Phenyl) Prop-2-En-1-One on the Corrosion Inhibition of 6063 Al in Hydrochloric Acid

K. Aparna¹, Balakrishna Kalluraya^{1*} and K. Raviprabha²

1. Department of Chemistry, Mangalore University, Mangalagangothri-574199, **INDIA**

2. Department of Chemistry, Shri MadwaVadiraja Institute of Technology,

Bantakal-574115, Karnataka, **INDIA**

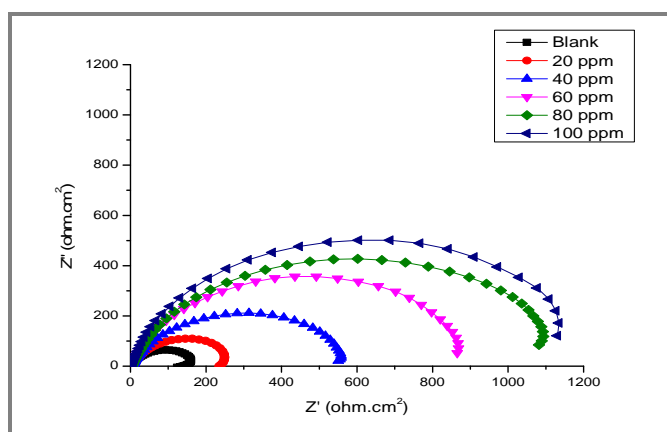
Email: bkalluraya@gmail.com

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ABSTRACT

A new chalcone 1-(4-nitrothiophen-2-yl)-3-(4-((prop-2-yn-1-yl)oxy)phenyl)prop-2-en-1-one (NPOP) was synthesized by the condensation of 4-nitro acetyl thiophene and propargylated benzaldehyde and was characterized by IR, ¹H NMR and Mass spectra. Corrosion inhibition property of NPOP on 6063 Al alloy in 0.5M HCl were studied using weight loss, potentiodynamic polarization and electrochemical impedance spectroscopy (EIS) method. The inhibition efficiency was raised with increase in concentration of the inhibitor and temperature. The chalcone acted as a mixed type of inhibitor and its adsorption on mild steel surface was found to follow Langmuir's adsorption isotherm. Thermodynamic adsorption functions and the activation parameters were also calculated and analysed. All the studied parameters showed excellent inhibitory properties of NPOP against corrosion of alloy in 0.5M HCl.

Graphical Abstract



Nyquist plot for corrosion of 6063Al alloy in 0.5M HCl with various concentrations of NPOP at 333K.

Keywords: Corrosion, 6063Al alloy, HCl, SEM, Quantum chemical studies.