The Adsorption and Corrosion Inhibition of Imidazole on Aluminum Surface in 0.5M H_2SO_4 Acid

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The electrochemical behavior of aluminum in 0.5M H_2SO_4 and in the presence of Imidazole has been studied. The results obtained showed that the addition of the thiourea inhibits the sulfuric acid corrosion of the aluminum. The inhibition efficiency increases with an increase in the thiourea concentration(Fig 1). The data reveal that, each impedance diagram consists of a large capacitive loop at high frequencies (HF) and a small inductive one at low frequency values (LF)[1].. An equivalent circuit of five elements depicted in Fig. 2 was used in simulation of the impedance data, as previously reported[2].

In this equivalent circuit, R_s is the solution resistance between the working and reference electrode, R_t is the charge transfer resistance corresponding to the corrosion reaction at metal/electrolyte interface and CPE is the constant phase element. CPE is substituted for the respective capacitor of C_{dl} in order to fit better the depressed semicircles L is the inductance, and R_L is the inductive resistance.
indicates that the adsorption is of the physical–probably electrostatic–nature, and that no covalent bond between inhibitor molecules and metal surface is established[3].

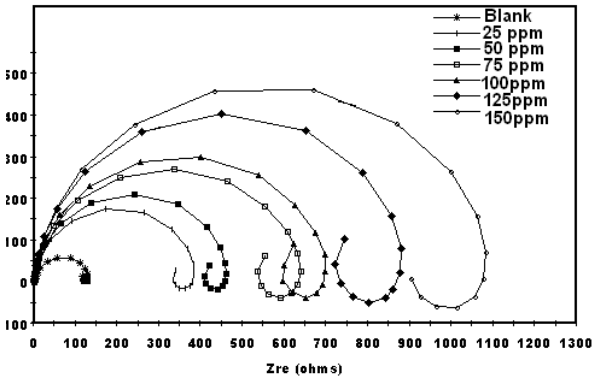

Fig.1. Nyquist plots of aluminum in 0.5M H_2SO_4 with different concentrations of Imidazole.

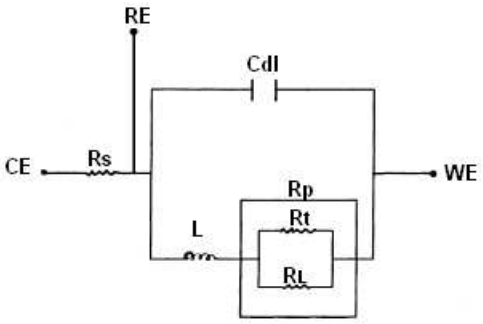

Fig. 2 The equivalent circuit model employed in analysis of electrochemical impedance data.

References

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