

Use of the electrochemical impedance in the study of the inhibition corrosion of the carbone steel

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The corrosion inhibition of carbon steel becomes of such interest because it is widely used as a constructional material in many industries, due to its excellent mechanical properties and low cost. Up to now, great number of efforts has been devoted to study the carbon steel corrosion and the inhibition effect using several techniques [1]. The molecules most often used as corrosion inhibitors are nitrogen, sulphur, oxygen and phosphorus containing compounds. These compounds get adsorbed onto the surface of metal from the bulk of environment forming a film at the metal surface. The use of phosphonic acids to protect carbon steel against corrosion has been the subject of various work [2]. The advantages of these compounds as inhibitors lie in the absence of toxicity. Electrochemical behaviour and corrosion layers of carbone steel electrode, in the absence and presence of a synthesized tetra-phosphonic acid (TPA), namely (methylenbis(2-hydroxy-5,1 phenylene)) phosphonic acid in 3% NaCl medium were investigated by electrochemical impedance spectroscopy (EIS) and The morphology of the thin film formed on the inhibited surface of carbone steel was examined using the scanning electron microscope.

Keywords: corrosion, electrochemical impedance, thin film

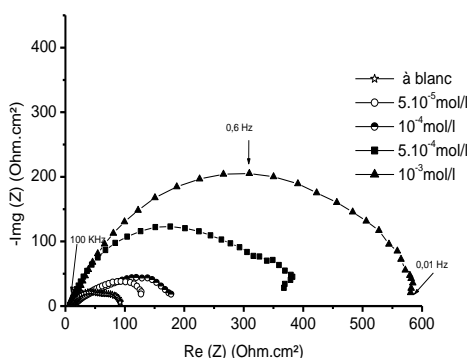


Figure 1 : Impedance spectra of carbone steel in 3% NaCl medium in the absence and the presence of different concentrations of TPA.



Figure 2: SEM of carbon steel immersed in 3% NaCl containing 10^{-3} M of TPA

References

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