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DETERMINATION OF INTRIGUING EFFICIENCY IN THE
ELECTROCHEMICAL METHOD, BASED ON MALEINE ANGIIRID

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Abstract. In this article, an electricity efficiency of the synthorids of Maleine Angiirid was identified 1M HCL + 200 mg / 1 naCl and 0.5 HCL + 200 mg / 1 naCl. The Inhibition Efficiency Was 93.15% and 92.86%, Respective.

Keywords: maleic anhydride, corrosion inhibitor, electrochemical method, monoethanolamine.

Introduction

Corrosion is a reversible process, which converts pure metal to different chemical compounds[1,2]. Nowadays, corrosion is turning into a major issue in many industries, building materials, infrastructure, tools, ships, trains, vehicles, machines, and appliances [3,4]. Carbon steel experiences extensive corrosion during the cleansing process with acids. The NACE 2016 reported shows that at the world level about 2.5 trillion U.S. dollars economic fall caused by corrosion every year total of 10% of total metal of world is lost due to corrosion which influences the economy of the nation [5,6]. In the following studies, corrosion inhibitors were obtained based on methyl methacrylate, poly(methyl methacrylate-maleic anhydride)P(MMA-MAH)s with different percentages methyl methacrylate and maleic anhydride were synthesized and the inhibitory potential of this inihitor on simple carbon steel in a 0.5 M HCl environment studied[7,8].

Experimental part

Materials. 1M HCl + 200 mg/l NaCl for aggressive environments were used. Steel composition: Fe 97.755-97.215%, C 0.17-0.24%, Si 0.17-0.37, Mn 0.35-0.65%, Ni 0.3%, S 0.04 %, P 0.035 %, Cr 0.25 %, Cu 0.3 %, As 0.08 %. 2×2.5 cm² samples of steel with this composition were taken, the surface was cleaned with sandpapers, washed several times in acetone and dried.

Methods. The obtained research results were analyzed by Electrochemical studies.



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Electrochemical studies. One of the most reliable methods for determining the inhibition efficiency of corrosion inhibitors is the electrochemical method.

Electrochemical studies of these MMF-2 brand corrosion inhibitors were studied in Fon-1 corrosion environments at a temperature of 20 °C. Inhibition efficiency of Fon-1(1M HCl+200 mg/l NaCl) without inhibitor at different (50, 100, 150 and 200) concentrations of St2 steel o studied.

In general, when the Tafel curves are studied in the medium with and without the inhibitor, the amount of corrosion current is higher in the medium without the inhibitor, which increases the formation of hydrogen and chloride ions in the solution and stimulates the acceleration of the dissolution of the cathode and anode.

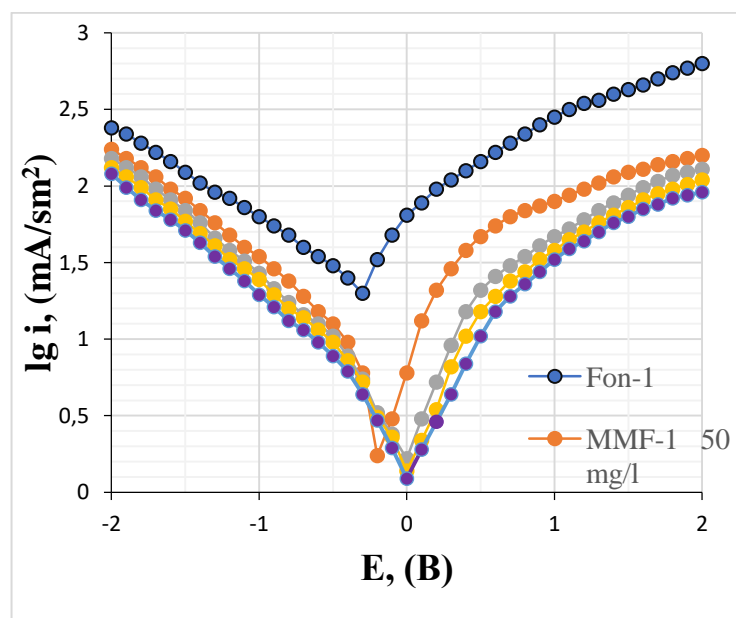


Figure 1. Polarization curves of the steel electrode in the Fon-1 solution in the presence of solutions without and with inhibitors.

Tafel curves (Fig. 3.12) of corrosion current density (i_{corr}), corrosion rate (CR_{PDP}), corrosion potential (E_{corr}), β_a and β_c slopes were obtained (Table 1).

Table-1.

The efficacy of the inhibitor is determined by the method of polarization curves in solution with inhibitor (MMF-1) and without inhibitor.

Inhibitor	C, (mg/l)	$i, (mA/cm^2)$	γ	θ	$\eta, (%)$
Fon-1	-	56,1	—	—	—
MMF-1	50	8,63	5,06	0,821	82,1
	100	6,22	5,83	0,837	83,7
	150	4,13	7,24	0,861	86,1



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	200	2,21	11,81	0,915	91,5
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From Table 1, we can see that the amount of corrosion current is high (56.1 mA/cm²) in solutions without inhibitor, but the amount of corrosion current decreases accordingly with the introduction of an inhibitor into the system and the increase of the concentration of the inhibitor. For example: 8.63 mA/cm² at 50 mg/l, 6.22 mA/cm² at 100 mg/l, 4.13 8.63 mA/cm² at 150 mg/l and 2.21 at 200 mg/l reduced to mA/cm².

Conculusion

The inhibition efficiency of the obtained corrosion inhibitor was studied based on electrochemical methods. Due to the formation of a complex with Fe²⁺ ions, this MMF-1 brand corrosion inhibitor blocks cathodic reactions, reduces the release of hydrogen and prevents anode and cathode melting. Inhibition efficiency was 91.5% at 200 mg/l.

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