SYNTHESIS OF COMPOSITE CORROSION INHIBITOR BASED ON MALEIC ANHYDRIDE

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Abstract. In this article, the optimum conditions for the synthesis of corrosion inhibitors based on maleic anhydride, monoethanolamine, and phosphoric acid and the inhibitory efficiency of the obtained inhibitor are studied. In this case, the mole ratio of the starting materials was 2 moles (122 g) of monoethanolamine: 1 mole (98 g) of maleic anhydride: 1 mole (98 g) of phosphoric acid, and the yield of the reaction was 92.5%. The IR spectra of the structure of this obtained inhibitor were studied.
Keywords: corrosion inhibitors, monoethanolamine, phosphoric acid, maleic anhydride.

Introduction. Corrosion is a reversible process, which converts pure metal to different chemical compounds[1]. Nowadays, corrosion is turning into a major issue in many industries, building materials, infrastructure, tools, ships, trains, vehicles, machines, and appliances [2,3]. 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[4], and the inhibitory potential of this inihitor on simple carbon steel in a 0.5 M HCl environment studied[5].

2. Experimental part

2.1. Synthesis of composite corrosion inhibitor. This reaction is the reverse of the above process, that is, the process proceeds with the release of a large amount of heat. It is explained that one of the main reasons for this is not only the high reaction activity due to the presence of two functional groups in the composition. Based on this property, a 500 ml flask with a flat bottom is taken, first, 2 moles (122 g) of monoethanolamine are poured into it and the system is cooled in the presence of cooling agents (mainly chilled water). While stirring the reaction mass, 1 mole (98) of maleic anhydride is slowly added to the reaction mixture. The mixture was stirred for 45 minutes and the intermediate product was obtained with a yield of 92.5%. 1 mol (98 g) of phosphoric acid is slowly added dropwise to the intermediate product obtained based on monoethanolamine and maleic anhydride and mixed. The resulting intermediate product has the following physicochemical properties:

Table-2.1.

Physico-chemical properties of MMF-1 brand corrosion inhibitor

№	Aggregate status	pH	Density g/cm2	Solvent
MMF-2	An interesting colored, dark substance	5,4	1,37	In hot water

3. Results and Its Discussion

2.1. IR-spectrium analyses. The obtained reaction product was analyzed by IR-spectra methods.

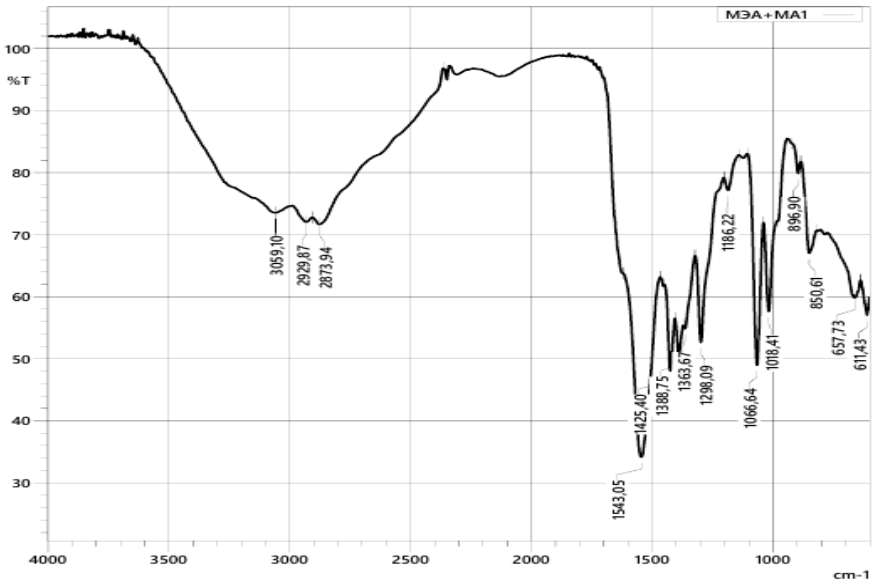

Figure 2.1. IR-spectra of MMF-1 composite corrosion inhibitor.

From the IR spectrum analysis of the intermediate product of MMF-2 corrosion inhibitor, we can see that the valence vibrations of the OH group were observed in the broad and intense absorption region of 3059.10cm^{-1}. Valence vibrations of -C-N- bonds to the area of 1298.09-1182.62 cm^{-1}, asymmetric valence vibrations of -C-O-C- bonds in the area of 1298.09 cm^{-1}, valence, intensive vibration frequencies of -C-OH groups 1186.22 cm^{-1} Valence and intensity fluctuations were observed in the range of -1 field.

Conclusion.

It is known from the results of the research that the optimal conditions for the synthesis of corrosion inhibitor based on maleic anhydride, monoethanolamine, and phosphoric acid were studied and its structure was analyzed using IR-spectrium.

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