SYNTHESIS OF CORROSION INHIBITOR FOR IN 0.5 M HYDROCHLORIC ACID MEDIUM

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Abstract.

In this article, the PKA-1 corrosion inhibitor was synthesized based on polyethylenepolyamine and croton aldehyde, its structure was analyzed in YAMR and PMR devices, and its formula was proposed.

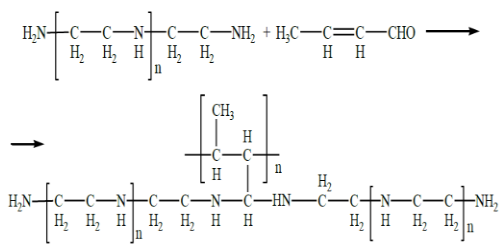
Keywords: polyethylene polyamine, croton aldehyde, hydrochloric acid.

Introduction

Corrosion is the destruction of materials, especially metal and metal-based structures, as a result of chemical reactions or electrochemical processes [1]. In general, there are several types of corrosion, which are characterized by the source of origin and properties [2]. In preventing corrosion, the use of corrosion inhibitors can allow us to use structures for a relatively longer period [3]. Hydrochloric acid is widely used in oil and gas extraction. Therefore, in the oil and gas industry, not only corrosion inhibitors for CO2 and H2S environments, but also synthesis of corrosion inhibitors with high inhibition efficiency for HCl environments play an important role [4,5].

Experimental part

A chemical compound with the following formula was synthesized in the presence of polyethylene polyamine and croton aldehyde in the presence of dimethylformamide solvent.



It was obtained by mixing the starting materials in a ratio of 1:1 at a temperature of 50 °C for 2 hours. The process was then cooled to room temperature and left for 24 hours.

Table 2.1

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Effect of temperature on the formation of corrosion inhibitor PKA-1 based on PEPA and croton aldehyde.

Mole ratio of PEPA and croton aldehyde	Temperature ^0C	Yield %	Temperature ^0C	Yield %
1:1		92.12		89.24
1:2	50	96.51	30	82.05
2:1		87.61		72.62

The resulting product is a hard polymeric solid, soluble in alcohol and acetone, insoluble in water at normal temperature, but soluble at a slight temperature rise.

NMR and PMR spectroscopic analysis of corrosion inhibitor PKA-1.

^{1}H-YAMR and ^{13}C-YAMR spectra of the compound of polyethylene polyamine taken as a sample with croton aldehyde were obtained (Fig. 2.1-2.2).

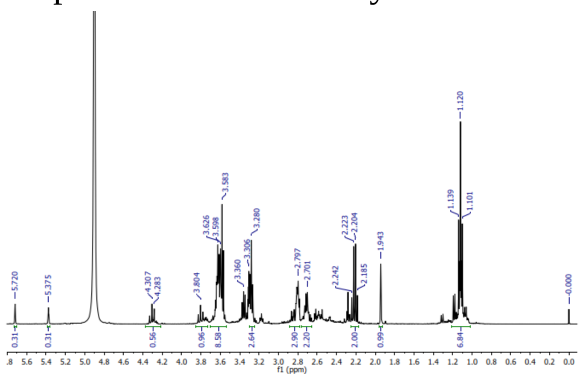

Figure 2.1. YAMR spectrum of corrosion inhibitor PKA-1

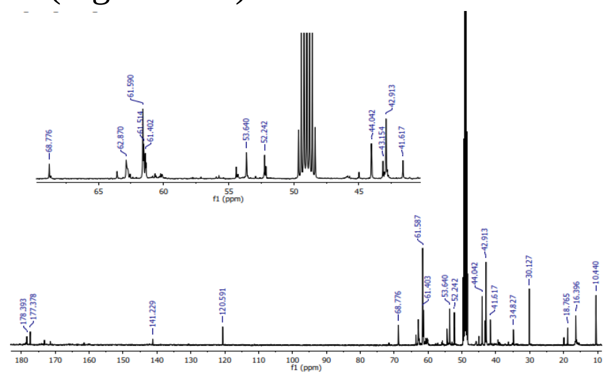

Figure 2.2. PMR spectrum of corrosion inhibitor PKA-1

When analyzing the NMR and -spectrum of the synthesized PKA-1 corrosion inhibitor (Fig. 2.1), proton (N -8) 4.74-4.76 m.d., (N-2 and N -6) 5.10-5.12 m.d. and (N -5 and N -3) 7.38-7.45 m.d. showed that Also, carbon (C-2 and C-3) bound with nitrogen is 53,640., (C-3 and C-4) -42,913-41,617 m.d. showed carbon atoms with double bond. The obtained spectra confirm the formation of corrosion inhibitor PKA-1.

Results and Discussion

NMR and PMR spectroscopic analysis of corrosion inhibitor PKA-1.

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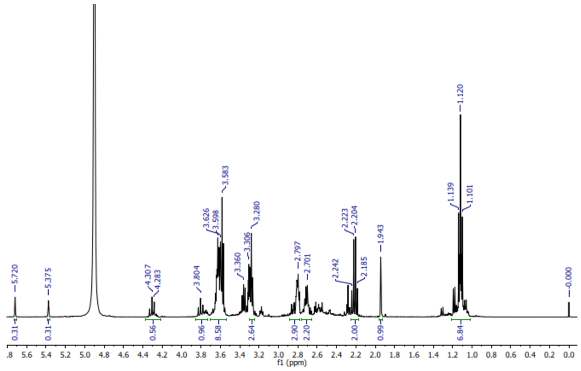

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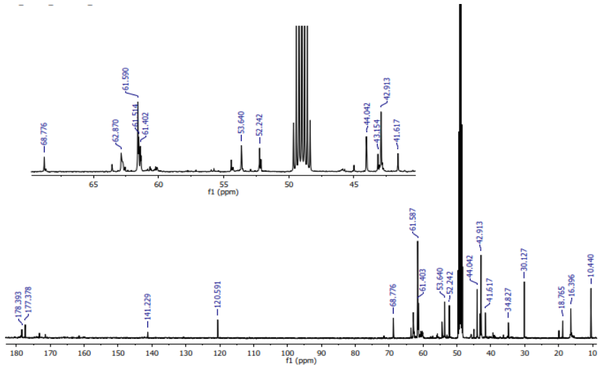

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Conclusion.

The structure of this synthesized corrosion inhibitor was proposed to be based on ^{1}H-YAMR and ^{13}C-YAMR.

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