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Corrosion inhibition of Zn in HCL by Nictanthes plant extract

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ABSTRACT: The natural plant product used as a medicine namely marigold were tested as corrosion inhibitor of Zn in 0.5M of HCl. The Cyclic-Voltameter, potentiometry technique data suggested that the inhibition efficiency increases with the concentration of extract. The inhibition efficiency of inhibitor interpreted as adsorption on metal surface.

Keywords: Cyclic-Voltammeter; alloy; Potentiometry.

INTRODUCTION

Zn and its alloys are used in large scale, its alloys are corrosive in nature and it easily corrodes under the mild conditions. Many researchers revealed that the HCl and other acids are mainly used for cleaning, metal extraction and in cloth industry it affects the metal like Zn and its alloys [1-6]. Therefore, the most of studies of the study were focused on the inhibition process of metal in acidic media by using natural and organic products. The corrosion inhibition properties of these compounds are found due to the pi-electrons and molecular structure [8-9].

The synthetic polymeric inhibitors are toxic in nature and harmful for the environment as well as for the ecosystems, therefore it necessary to find out and develop new environment friendly low cost inhibitors. In this way it found that the marigold plant extract has best inhibitive properties. So, in present investigation, the rate of corrosion find out in 0.5M HCl solution in presence and absence of inhibitor at different temperature has been studied by electrochemical methods.

Specimen: Zn specimens cut to size of 1.2 x 1.5 x 0.2 cm were prepared by polishing with silica carbide and coated with polymeric layer.

Preparation of plant extract: The extract of Nictanthes prepared by the flower which dried and grained. The 50 gm of powder subjected to the shoxelate extraction by using 70% methyl alcohol, the solvent can be removed by boiling at constant temperature at 62 ^{o}C in vacuumed evaporator, and finally extract of Nictanthes is collected.

MATERIAL AND METHODS

1. IR Analysis of Nictanthes Extract: The FTIR spectra analysis of plant extract is given starching vibration values at 3288.60 cm^{-1}, 2949.37cm^{-1}, 2941.80 cm^{-1}, 1657.16cm^{-1}, 2312.78cm^{-1}, 1403.33cm^{-1}, 1015.36cm^{-1}, 900-660 cm^{-1}, 671-559 cm^{-1} which suggest that the –NH and cyclic hydrocarbon ring is present in compounds therefore IR suggest that the Nictanthes compound are present in extract which shows the great ability of corrosion inhibition in acidic media.

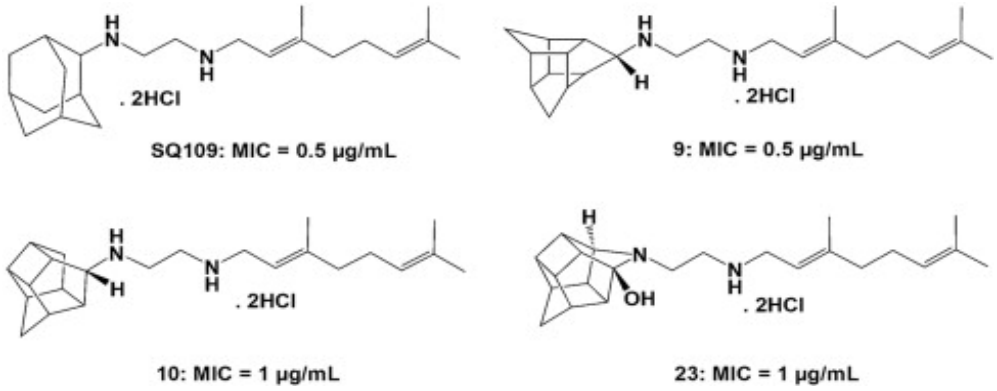

Figure 1: IR analysis of extract

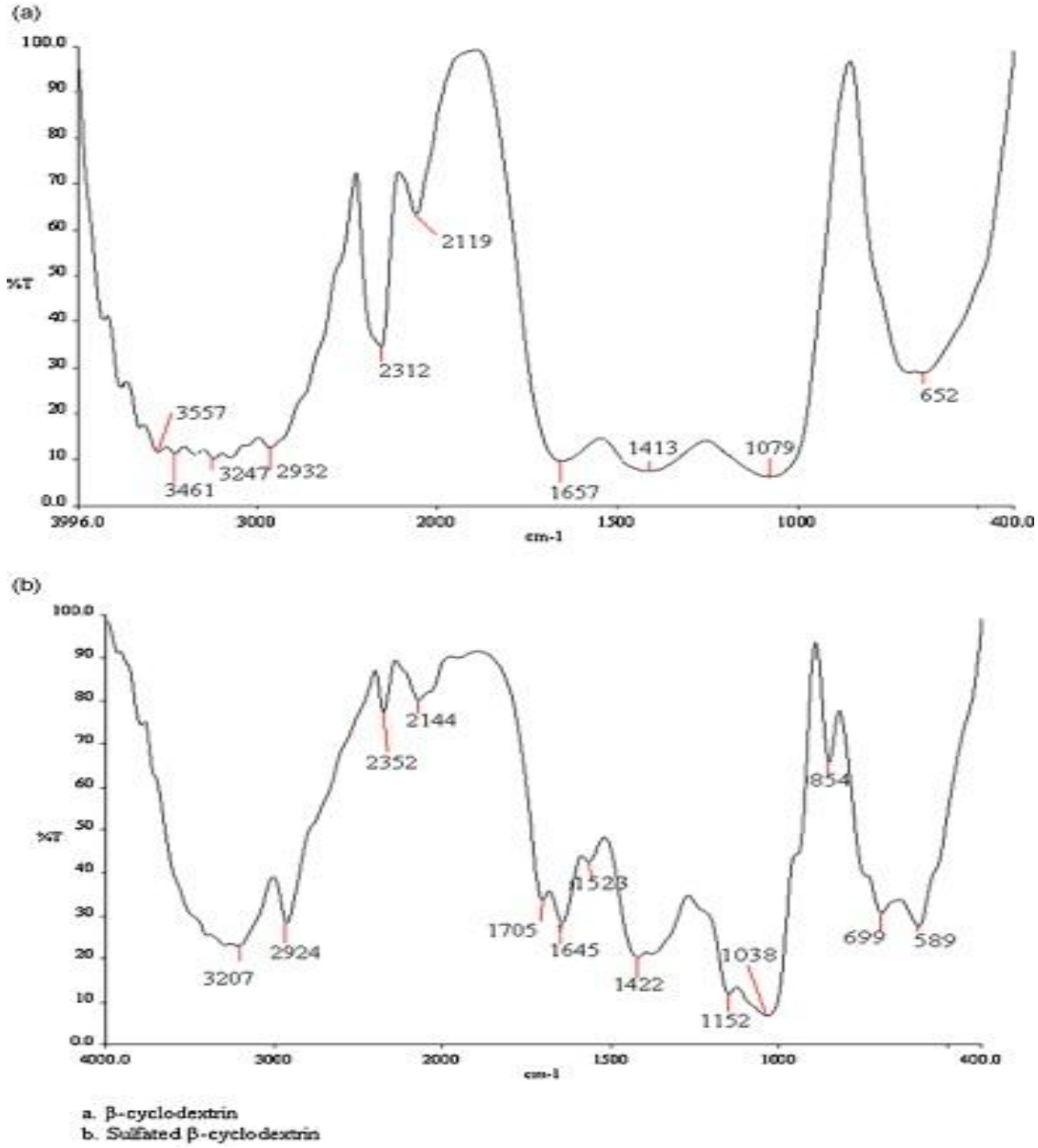

Figure 2: IR spectra of extract

2. Cyclic voltammetry and Potentiometry: The voltmmograms were obtain through the EDS001 modal fitted with current interrupted and positive feedback analyzed , the voltammeter cell contains 250 ml of electrolyte fitted with the lid. The working electrode of metal, auxiliary electrode and 4- Pt electrode were held in glass component, than the glass component placed in apparatus, the working electrode to provide radial current distribution along the electrodes. The reference electrode was maintaining the current and potential.

RESULTS AND DISCUSSION

1. Cyclic voltammetry and Potentiometry: The cyclic voltammetry analysis of corrosion analysis determine by the EDS001 potentiostate and it found that the potential change is occur with the Ag/AgCl electrode in between -05 mV to 1.5mV which showing the inhibition tendency of inhibitor.

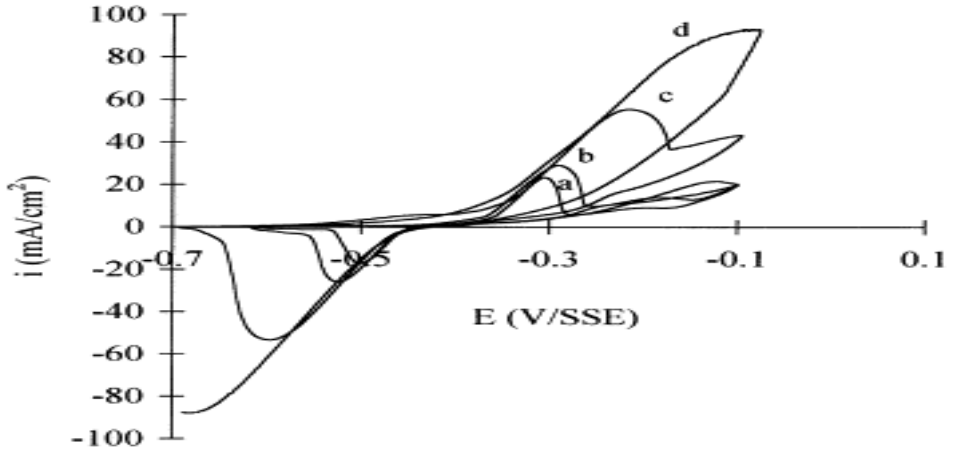

Figure 3: Cyclic Voltagram of Zn corrosion inhibition

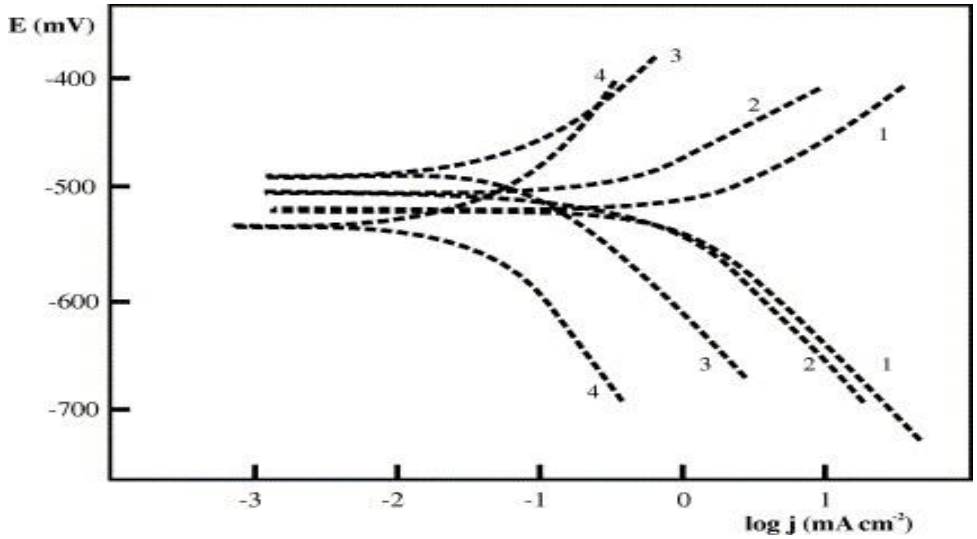

Figure 4: Potentiometry Spectra of Zn in diferrent potential for corrosion inhibition

CONCLUSIONS

1. The rate of corrosion is reduced with the increasing the concentration of inhibitor.
2. The Potentiometry and Voltametry analysis shows that the rate of corrosion inhibition.

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