



Research Article

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Application new chitosan derivatives as inhibitor corrosion on steel with coating method

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ABSTRACT

Steel corrosion could be inhibited with two new chitosan derivatives, carboxymethyl chitosan-urea-glutaric acid (CMChi-UGLU) and carboxymethyl chitosan-benzaldehyde (CMChi-B). The corrosion process in chloric acid and sodium chloride solution media could be inhibited by coating method. The maximum of inhibition efficiency achieved by CMChi-B is 99.79 % in 2M HCl as media and for CMChi-UGLU the maximum of inhibition efficiency is 92.59 % in 2 % NaCl solution as media.

Key words: CMChi-UGLU, CMChi-B, corrosion inhibitor, steel, coating method.

INTRODUCTION

Acid rain leads to damage on equipment from metal materials and known as corrosion process [1], this process gives disadvantage or industrial, construction, and transportation [2]. Some methods to control corrosion rate are cathodic protection, electroplating, surface passivating, lowering potential and raising pH, material upgrading and material selection [3-7]. The small quantity of chemical materials or agents can inhibit or prevent corrosion rate on metals or non metal known as inhibitor agent [8-11]. The organic chemical compounds which have pi (π) electrons or contain hetero atoms O, N or S, are potential as inhibitor agent, because this condition leads chemical compounds to attach on metal surface and prevent or decrease the metal contact with corrosion media [12-29]. Effectivity and efficiency of inhibitor agent depend on various factors, such as electron donor density and electronic structure, size-area and molecule structure and any steric hindrance, functional groups, relative mass of molecule, electron π and aromatic properties [30-39]. The method which are applied to inhibit the corrosion such as fluidization method [40].

EXPERIMENTAL SECTION

Material : steel commercial, chitosan, urea, benzaldehyde, chloro acetic acid, sodium hydroxide, ethanol, isopropanol

Equipment : EDX, FTIR, Air pump, potentiostatic Auto Lab PGSTAT 302N, fluidization bed

Procedure :

1. Synthesis of carboxymethyl chitosan (CMChi)

Synthesis CMChi was conducted by Chen-Park method [41] : CMChi can be prepared by reacting chitosan (150 g/in 150 ml of acetic acid) with 20 g NaOH. Then it is heated during 4 hours at 50°C. The reaction is finished by adding ethanol 70% 250 ml. The product characterization was conducted by FTIR, the spectra were compared with