

Benzyl Triethyl Amonium Chloride (BETAC) As Inhibitor Corrosion On Steel

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Abstract

Inhibition test on the iron corrosion using solution of benzyl triethyl amonium chloride (BETAC) was performed. The iron of plate was soaked on 0.5 M of sulfuric acid solution and added BETAC solution with concentrations 0.1; 0.25 and 0.5 M during 7, 14, 21 and 28 days, respectively. The highest of inhibition efficiency is 74.22% at day 7th.

Key words: BETAC, corrosion, steel

1 Introduction

Corrosion is a process metal damage caused by many chemistry phenomena environmental. Many factors caused corrosion on metals includes: temperature, humidity, air pollution and some chemicals. Corrosion has some disadvantage for examples replace industrial equipment, bridge maintenance, disturb of production process and transportations (Trethewey and Chamberlin, 1988). Many methods were used to inhibit of metal corrosion, such as adsorption mechanism, precipitation and passive inhibitors. The inhibition of adsorption is caused by phenyl and heteroatom groups which are bounded on metal surface (Zhang et al., 2003). Crown ethers and ammonium salts phase transfer catalyst can be used as corrosion inhibitor (Weber and Vogtle, 1978; Vasanth, 1996). In this present paper, we describe BETAC as inhibitor corrosion on steel.

2 Methodology

2.1 Material

Steel plate, benzyl chloride, triethylamine, acetone, sulfuric acid, nitric acid and aquadest.

2.2 Synthesis of benzyl triethyl ammonium chloride (BETAC)

Benzyl chloride (200 mL) was mixed with acetone (100 mL), triethylamine (260 mL) in 1 L of

Erlenmeyer and shake thoroughly. Acetone (100 mL) was added and shake many times, further put acetone (200 mL). The Erlenmeyer was closed and placed in dark room for a week. If the crystal was formed, then the solution was filtered and washed with 250 mL of acetone immediately.

a. Rate of Corrosion test

Two of steel plates (2cm x 2cm) was soaked in 0.5M of H₂SO₄ solution in two glass chambers. One chamber was added with BTEAC and the other as negative control. The concentration of BTEAC are 0.1 ; 0.25 and 0.5 M, whereas time variation of soaked are 7, 14, 21 and 28 days. All the treatments were repeated three times. The rate of corrosion was calculated using NACE equation (Nace, 1973) and was than determined of inhibition efficiency.

3 Result

The BETAC are needle crystals, colorless and yield 37,094 %. The FTIR spectrum of BETAC was compared with spectrum of standard from Sigma Aldrich as shown in Table 1.

| The vibrations | Wave number of product BETAC (cm ⁻¹) | Wave number of standard BETAC (cm ⁻¹) |
|-----------------------|--|---|
| N - H | 3460 | 3470 |
| C - H sp ³ | 2925 | 2983 |
| C - N | 1167 | 1212 |

The Table 1 showed that spectra of BETAC research product and BETAC standard are same. The correlation of inhibitor concentration with value of inhibition efficiency can be followed in Table 2.