

Corrosion Inhibition of Brass in Phosphoric Acid Solution by 2-(5-Methyl-2-Nitro-1H-Imidazol-1-yl) Ethyl Benzoate

Authors : R. Khrifou, M. Galai, R. Tourir, M. Ebn Touhami, Y. Ramli

Abstract : A 2-(5-methyl-2-Nitro-1H-imidazol-1-yl)ethyl benzoate (IMDZ-B) was synthesized and characterized using elemental analyses, NMR, and Fourier transform infrared (FTIR) techniques. Its effect on brass corrosion in 1.0 M H_3PO_4 solution was investigated by using electrochemical measurements coupled with X-ray diffraction analysis (XRD), Scanning electron microscopy (SEM) and Energy-dispersive X-ray spectroscopy (EDX). The polarization measurements showed that the IMDZ-B acts as a mixed-type inhibitor. Indeed, it is found that the IMDZ-B compound is a very good inhibitor, and its inhibition efficiency increases with concentration to reach a maximum of 99.5 % at 10^{-3} M. In addition, the obtained electrochemical parameters from impedance indicated that the IMDZ-B molecules act by adsorption on metallic surfaces. This adsorption was found to obey Langmuir's adsorption isotherm. However, the temperature effect on the performance of IMDZ-B was also studied. It is found that the IMDZ-B takes its performance at high temperatures. In addition, the obtained kinetic and thermodynamic parameters showed that the IMDZ-B molecules act via two adsorption modes, physisorption and chemisorptions, and its process is endothermic and spontaneous. Finally, the XRD and SEM/EDX analyses confirmed the electrochemical obtained results.

Keywords : low concentration, anti-corrosion brass, IMDZ-B product, phosphoric acid solution, electrochemical, SEM/EDX analysis

Conference Title : ICC 2024 : International Conference on Chemistry

Conference Location : Guangzhou, China

Conference Dates : February 01-02, 2024