Corrosion Inhibition of Q235 Steel in H$_2$SO$_4$ Solution by N,N-Diethylammonium O,O'-di(4-bromophenyl) dithiophosphate

Chuan Lai$^{1,2}$, Xiulan Su$^1$, Ting Jiang$^1$, Lvshan Zhou$^1$, Bin Xie$^2$*, Yulong Li$^2$, Like Zou$^2$

$^1$ School of Chemistry and Chemical Engineering, Sichuan University of Arts and Science, Dazhou 635000, PR China
$^2$ Institute of Functional Materials, Material Corrosion and Protection Key Laboratory of Sichuan Province, Sichuan University of Science and Engineering, Zigong 643000, PR China
*E-mail: xiebinsuse@163.com

doi: 10.20964/2016.11.16

Received: 10 August 2016 / Accepted: 5 September 2016 / Published: 10 October 2016

In sulfuric acid solution, the corrosion inhibition of synthesized compound of N,N-Diethylammonium O,O'-di(4-bromophenyl)dithiophosphate (Br-NOP) was investigated by electrochemical impedance spectroscopy, potentiodynamic polarization measurement, weight loss measurement and scanning electron microscopy. The results indicate that the Br-NOP is a mixed type inhibitor. The inhibition efficiency increases with Br-NOP concentration increasing, decreases with temperature and H$_2$SO$_4$ concentration increasing. The adsorption of Br-NOP on Q235 steel surface in H$_2$SO$_4$ solution belongs to chemical adsorption, and obeys Langmuir isotherm model. Br-NOP can act as an effective long-acting corrosion inhibitor, and the obtained maximum inhibition efficiency can reach up to 98.53% for Q235 steel in H$_2$SO$_4$.

Keywords: Corrosion inhibitor; O,O'-Dialkyldithiophosphate; Q235 steel; Sulfuric acid; Adsorption.

FULL TEXT

© 2016 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (http://creativecommons.org/licenses/by/4.0/).