Study on 1-allyl-3-butyylimidazolium Bromine as Corrosion Inhibitor for X65 Steel in 0.5 M H₂SO₄ Solution

Li Luo¹, Shengtao Zhang^{1,*}, Yujie Qiang^{1,2,**}, Nanxi Chen¹, Shenyong Xu^{1,4}, Shijin Chen³

¹School of Chemistry and Chemical Engineering, Chongqing University, Chongqing 400044, P.R. China

²Sichuan University of Science and Engineering, Zigong, Sichuan 643000, P.R. China

³Bomin electronics Ltd, Meizhou, Guangdong 514021, P.R. China

⁴School of Chemistry and Chemical Engineering, Yibin University, Sichuan 644000, P.R. China

*E-mail: stzhang_cqu@163.com, 20141802032@cqu.edu.cn

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In this paper, the anti-corrosive effect of an ionic liquid named 1-allyl-3-butyylimidazolium bromine for X65 steel in 0.5 M H₂SO₄ has been systematically studied via various electrochemical techniques, containing weight loss experiments, electrochemical tests, scanning electron microscope (SEM), theoretical calculations. The results obtained from weight loss experiments and electrochemical tests displayed that [ABIm]Br served as a mixed-type inhibitor primarily controlling cathode corrosion process and the anti-corrosive efficiency (up to 90.38% at 10 mM) improved with the increase of the concentration. Besides, it was found that the adsorption of the organic molecules on X65 steel substrate followed the Langmuir adsorption isotherm and surface topography of X65 steel was characterized using Scanning electron microscopy (SEM). In addition, theoretical calculations suggested that investigated inhibitor was flat-lying adsorbed on the X65 steel surface.

Keywords: X65 steel, Ionic liquids, Weight loss, Electrochemical tests, Theoretical calculations

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