Azo Compounds as Green Corrosion Inhibitor for Carbon Steel in Hydrochloric Acid Solution: Corrosion Inhibition and Thermodynamic Parameters

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doi: 10.20964/2017.09.33

Received: 28 April 2017 / Accepted: 30 June 2017 / Published: 13 August 2017

The influence of azo compound (L3) 2,4-dihydroxy-5-((5-mercapto-1H-1,2,4-triazol-3-yl)diazanyl)benzaldehyde on the carbon steel (CS) corrosion in 1 M HCl was investigated using mass loss (ML), Tafel polarization (TP), electrochemical impedance spectroscopy (EIS) and electrochemical frequency modulation (EFM) tests. The protection efficiency (PE) improves with raising the concentration of inhibitor, but lesser with temperature rose. The inhibitor was adsorbed on the CS surface following Langmuir's adsorption isotherm. The electrochemical results showed that the investigated compound doing as mixed-kind inhibitor. Some thermodynamic parameters for activation and adsorption processes were determined and discussed. The inhibition mechanism was debated in the light of the chemical structure of the investigated compound.

Keywords: Corrosion protection; Carbon steel; HCl; Azo compounds; Adsorption isotherm

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