Study on the Corrosion Inhibition Effect of 2,3-Dimercapto-1-propanol on Copper in 0.5mol/L H₂SO₄ Solution

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In this paper, the inhibition performance of 2,3-Dimercapto-1-propanol (DIP) in 0.5 M sulfuric acid were studied by polarization curves, impedance spectroscopy, scanning electron microscopy, atomic force microscopy and theoretical calculations. The results of electrochemical experiments manifest that DIP is a cathode corrosion inhibitor that can produce a compact protective membrane on the surface of copper, which can effectively reducing the corrosion current density. Field emission scanning electron microscope (FE-SEM) and atomic force microscopy (AFM) certificated that a conservational membrane was produced on the surface of the inhibited sample. In addition, the adsorption of the inhibitor was found to be consistent with the Langmuir isotherm. Molecular dynamics simulations and quantum chemical calculations were applied to elucidate the adsorption mode of inhibitor molecules on copper surfaces.

Keywords: Electrochemical test, Quantum chemical calculations, Corrosion inhibitor, copper

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