Inhibition Effects of a Quaternary Ammonium-Based Ionic Liquid on Steel in Acid Solution: Electrochemical and Surface Analyses

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The present work reports the performance of N-dimethyl-N-di(cocoalkyl) ammonium methyl sulfate (DCA), as a corrosion inhibitor of API-X52 carbon steel exposed to a 1M HCl solution. The EIS technique was used to assess the inhibition efficiency. Surface analyses were performed by XPS and GIXRD. The addition of DCA to the corrosive solution promoted the formation of an interfacial protective layer, which can include corrosion products such as FeO(OH) and FeCl₂·nH₂O. The long term stability of DCA was ascertained by the ICP-OES technique. The inhibition efficiency subsequent to 1 month of solution immersion was 97 %.

Keywords: Ionic-liquid; Acid media; EIS; XPS; Corrosion inhibitor.

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