

Cysteine as a green corrosion inhibitor for carbon steel in CO₂ aerated 1% NaCl solution with buffer control-pH

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Abstract

Corrosion on the exterior pipes can inhibited by coating or cathodic protection, but not in the interior sides. It can only be solved by the addition of corrosion inhibitor. In this research, cysteine as a green corrosion inhibitor of carbon steel in CO₂ aerated 1% NaCl solution with buffer pH adjustment has been studied by means of electrochemical impedance (EIS) and polarization (Tafel plot). Cysteine was found to be an effective carbon steel inhibitor, even at 10 ppm and low pH of media. Percentage inhibition efficiency (IE%) calculated by both Tafel plot and EIS, ranged from 90% to 98%. Cysteine was found to affect both the anodic and cathodic processes and act as mixed-type inhibitors. Mechanism of inhibit corrosion by adsorption mechanism leads to the formation of a protective chemisorbed film on the metal surface film which suppresses the dissolution reaction and the hydrogen evolution reaction is activation controlled.

Keywords: *cysteine, corrosion inhibitor, carbon steel, electrochemical method, Tafel, EIS.*