

Electrochemical studies of corrosion inhibition of mild steel

Abstract

The corrosion inhibition of steel in 1 M sulfuric acid by some triazole derivatives namely, 4-amino-1,2,4-triazole-3-thiol(ATT), 4-amino-5-methyl-1,2,4-triazole-3-thiol (AMTT) and 4-amino-5-ethyl-1,2,4-triazole-3-thiol (AETT) has been studied using potentiodynamic polarization, electrochemical impedance spectroscopy (EIS) and Scanning electron microscopy (SEM). The results revealed that the inhibition efficiency increases as the inhibitor concentration increases and follows the order (ATT < AMTT < AETT). The adsorption of the triazole derivatives onto the steel surface obeys Langmuir adsorption isotherm with small negative values of the standard free energy of adsorption (less than 20 kJ) which ensures the spontaneous physical adsorption process. The surface examination using scanning electron microscopy confirms the extraordinary efficiency of the used inhibitors in protection of steel from corrosion as indicated by electrochemical measurements.