

Environmentally safe corrosion inhibition of Pb in aqueous solutions

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- Abstract

- The corrosion and corrosion inhibition of lead in aqueous solutions with different pHs (2, 7 and 12) were investigated. The corrosion rate was calculated in the absence and presence of the corrosion inhibitor using polarization and impedance techniques. Amino acids have been used as environmentally safe corrosion inhibitors. The inhibition efficiency of the different amino acids at a concentration of 0.025 M was calculated. Corrosion inhibition efficiency up to 87% was recorded with glutamic acid in neutral solutions. The experimental impedance data were fitted to theoretical values according to an equivalent circuit model to explain the behavior of the metal under different conditions. The corrosion inhibition process was found to depend on the adsorption of the amino acid molecules on the metal surface; and the adsorption free energy in each case was calculated. The free energy of adsorption of glutamic acid on Pb was found to be equal to -2.9 kJ/mol, which reveals that the inhibitor is physically adsorbed on the metal surface. The results are obeying Langmuir adsorption isotherm.