

Corrosion Inhibition of Mild Steel by Calcium Gluconate in Magnesium Chloride Solution

Authors : Olaitan Akanji, Cleophas Loto, Patricia Popoola, Andrei Kolesnikov

Abstract : Studies involving performance of corrosion inhibitors had been identified as one of the critical research needs for improving the durability of mild steel used in various industrial applications. This paper investigates the inhibiting effect of calcium gluconate against the corrosion of mild steel in 2.5M magnesium chloride using weight loss method and linear polarization technique, calculated corrosion rates from the obtained weight loss data, potentiodynamic polarization measurements are in good agreement. Results revealed calcium gluconate has strong inhibitory effects with inhibitor efficiency increasing with increase in inhibitor concentration at ambient temperature, the efficiency of the inhibitor increased in the following order of concentrations 2%g/vol, 1.5%g/vol, 1%g/vol, 0.5%g/vol. Further results obtained from potentiodynamics experiments had good correlation with those of the gravimetric methods, the adsorption of the inhibitor on the mild steel surface from the chloride has been found to obey Langmuir, Frumkin and Freudlich adsorption isotherm. Scanning electron microscopy (SEM) observation confirmed the existence of an absorbed protective film on the metal surface.

Keywords : calcium gluconate, corrosion, magnesium chloride, mild steel

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