Corrosion inhibition of C38 steel in the 1M hydrochloric acid medium by polymer (PGEPPP)

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Abstract

The corrosion of carbon steel by aggressive media especially acid solutions causes serious losses on the economy and potential problems in industrial equipment safety [1]. Therefore, many different methods have been used in order to protect this metal against corrosion. The use of inhibitors has been found to be one of the best available methods for the protection of metals against corrosion [2]. Several studies reveal that the use of polymers as corrosion inhibitors attracted considerable attention recently due to their inherent stability and cost value. Moreover, polymeric compounds have been successfully investigated applied as potential inhibitors for the corrosion of metals in aggressive media. [3]

The results obtained reveal that polymer reduces the corrosion rate. The inhibition efficiency increases with the increase of inhibitor concentration. Potentiodynamic polarization studies clearly reveal that the presence of the inhibitor does not change the mechanism of the hydrogen evolution reaction and acts as mixed-type inhibitor. The impedance results show a change the corrosion mechanism of carbon steel in the presence of inhibitor. Appropriate electric equivalent circuit model was used to calculate the impedance parameters. SEM studies confirm the presence of protective POMPP film on the alloy surface; the inhibitory efficiency reaches a value of 94%. The adsorption of inhibitor products on the mild steel surface was found obey to Langmuir's adsorption isotherm.

PGEPPP

References

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