Corrosion Inhibiting Effect of Cetyl Pyridinium Chloride on Aluminium in Acid Media in Presence of KI

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Kalium iodide (KI) used as a synergist in the presence of cetyl pyridinium chloride (CPC) for corrosion inhibition of aluminium in 0.3 M HCl was evaluated through electrochemical and non-electrochemical techniques. From electrochemical analysis and gravimetric techniques, the efficiency of inhibition enhances with raising the CPC concentrations (3.6×10^{-5} – 2.3×10^{-4} M) in combination with 6×10^{-4} M KI and decreases with temperature rise. Curves of polarization suggest that the synergistic formulation behave as a commingled inhibitor, predominately cathodic nature. The addition of 6×10^{-4} M KI in 0.3M HCl with 2.3×10^{-4} N CPC raises the charge transfer resistance (R_{ct}) and diminishes double layer capacitance (C_{dl}), both are confirmed by electrochemical A.C Impedance analysis. The effect of activation energy, enthalpy and entropy on aluminium corrosion rates was discussed. Langmuir and El-Awady isotherms were checked the adsorption of CPC in the presence of KI. Confirmation of functional groups and formation of protective layer through vibrational spectroscopy study. The obtained results indicate that the KI acts as a good synergist corrosion inhibition of aluminium.

Keywords: Aluminium; Electrochemical, A.C Impedance analysis, Corrosive media; Charge transfer resistance; SEM; EDX

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