Synergistic Effect of Barium Chloride on Corrosion Inhibition of Copper by Aqueous Extract of Lupine Seeds in Nitric Acid

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Synergistic effect of BaCl₂ on the corrosion inhibition efficiency of aqueous Lupine seed extract, on (Cu) in 2 M HNO₃ acid solution has been investigated using weight loss measurements, electrochemical impedance spectroscopy (EIS), electrochemical frequency modulation (EFM) and potentiodynamic polarization (PP) studies. The results show that inhibition efficiencies on Cu increase with increase in concentration of the extract and enhancement in inhibition efficiency was observed on addition of barium chloride due to synergism. The adsorptions, of extract and extract + BaCl₂ on the surfaces of the corroding metal obey Langmuir isotherms. Polarization studies revealed that lupine extract acts as a mixed type inhibitor. Thermodynamic parameters were calculated using the adsorption isotherms. A probable synergistic mechanism is proposed. The film coated on Cu specimens was analyzed by using Fourier transform infrared spectroscopy (FT-IR). The surface shape was studied by using atomic force microscopy (AFM) analysis.

Keywords: Corrosion inhibition, Lupine seed extract, HNO₃, Cu, BaCl₂, PP, EIS, EFM, AFM, FT-IR

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