An Electrochemical Evaluation of Synthesized Coumarin-Azo Dyes as Potential Corrosion Inhibitors for Mild Steel in 1 M HCl Medium

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The anti corrosion properties of mild steel were studied in 1.0 M HCl medium with azo-coumarin dyes inhibitor by electrochemical impedance and potentiodynamic polarization measurements. The azo-coumarin dyes 8-10 were synthesized by coupling reaction between diazonium salt of aniline derivatives with 4-hydroxycoumarin under basic condition. The result showed that inhibition efficiency was found to increase (shown average $IE > 80\%$), with increasing the concentration of azo-coumarin dyes, and their adsorption over mild steel surface found to obey Langmuir adsorption isotherm. Furthermore, the Langmuir adsorption isotherm parameters made evident that corrosion inhibition proceeds through physisorption mode of interaction. After corrosion evaluation, mild steel's surface morphology was screened via SEM - EDX analysis which showed an improved surface in the presence of azo-coumarin dye derivatives.

Keywords: Corrosion inhibitor; Azo-coumarin dyes; Mild steel; Electrochemical impedance.

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