**Abstract**

During the chemical cleaning process using acids, in many electroplating and other descaling industries, there exists the problem of heavy metal loss. Hence there is always a need for abatement of this metal loss. A critical (steady state) value of the resistivity to corrosion of two organic compounds, 5-[2-(4-methoxyphenyl)-vinyl]-3-phenyl isoxazole (MVI) and 5-[2-(4-methoxyphenyl)-vinyl]-1,3,8-triaza-cyclopenta[a]indene (MCI) were determined by a combination of non-electrochemical and electrochemical monitoring techniques. The behavior of organic compound, on a metallic alloy, i.e., mild steel, was investigated over a temperature range of 30 to 70°C. Efficiency of MVI and MCI were determined by correlating the electrochemical response of the compound (by electrochemical impedance and potentiodynamic polarization) in 1M HCl and 0.5M H2SO4 solution with their structural features. EIS measurement predicted the physical adsorption of both MVI and MCI on the metal surface from PZC calculation. Polarization studies proved that the inhibitors retard both the electrode process during inhibition. The integrity of the inhibitors efficiency with respect to time was assessed from mass loss measurements at different immersion period. Mass loss measurements proved that both MVI and MCI inhibit corrosion of mild steel in 1M HCl with a maximum efficiency of 91.07% and 78.23% at 20 ppm in HCl and H2SO4 respectively for MVI, 97.72% and 88.64% at 20 ppm in HCl and H2SO4 respectively for MCI. Hence MVI and MCI were found to be effective inhibitors for acid cleaning process in industries. The mechanism of the inhibition process was discussed in the light of the chemical structure and quantum chemical calculations of the investigated inhibitor. MVI and MCI were modeled in order to assess its absorbability using density functional theory (DFT) and revealed remarkably high interaction energies, which corroborate the experimental findings.