**ABSTRACT**

Corrosion inhibition of mild steel in the presence of different concentrations of 1-phenylpyrazolidine-3,5dione(PPD)and4-(4-benzylidine)-1-phenylpyrazolidine-3,5-dione(BPP) in 1M H2SO4 solution has been studied using weight loss, potentiodynamic polarization and electrochemical impedance spectroscopy. The effect of temperature on the corrosion behavior of mild steel has been examined in the temperature range of 303–333 K. The inhibition efficiency increases with increasing inhibitor concentration but decreases with increasing temperature. The activation energy and free energy of adsorption for the inhibition reaction support the mechanism of physisorption. The adsorption of inhibitors on mild steel surface is endothermic, spontaneous and consistent with the Langmuir adsorption isotherm. Potentiodynamic polarization measurements indicate that PPD & BPP act as mixed inhibitors. Surface analysis of mild steel has been carried out using scanning electron microscopy (SEM) and Fourier transform infrared (FT-IR) spectroscopy which reveals the adsorption of inhibitors on mild steel surface. Quantum chemical calculations have been performed at B3LYP/6-31G(d,p) level to calculate the electronic properties of the molecules inorder to complement the experimental results. The optimized structures, position of HOMO and LUMO of the molecules are obtained.