**ABSTRACT**

 The corrosion inhibition of mild steel in 1 M H2SO4 using acenaphtho[1,2-b]quinoxaline and acenaphtho[1,2-b]pyrazine at 303–333 K have been investigated. The study was performed using weight loss method, potentiodynamic polarization, and electrochemical impedance spectroscopy (EIS). Polarization measurements proved that the inhibitors behave as mixed-type. EIS data showed that the charge transfer resistance of mild steel increases in acid solution containing inhibitors. The surface morphology was evaluated using scanning electron microscope (SEM), atomic force microscopy (AFM) techniques. Density functional theory (DFT) at the B3LYP/6-311G(d,p) basis set level was performed. Excellent correlation was found between experimental and theoretical results.