Investigation of 1,1-didecyl-4,4-bipyridine and 1,1-didecyl-2,2-bipyridine as Corrosion Inhibitors for Carbon Steel in Hydrochloride Acid Solution

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Bipyridine surfactants (BPSs) were analyzed as corrosion inhibitors for mild steel in 1 mol·L⁻¹ HCl. The corrosion behavior was evaluated using weight loss method, potentiodynamic polarization, and electrochemical impedance spectroscopy. The results show that the anticorrosive efficiency increased with increasing concentration of BPSs. In addition, BPSs behaved as a mixed-type inhibitor based on the anode. The surface of steel was examined by scanning electron microscopy, atomic force microscopy, and X-ray phosphorescence spectroscopy. The elemental analysis of the chemical states on the surface indicated that BPSs adsorbed on mild steel surface to prevent corrosion.

Keywords: mild steel; corrosion inhibitor; bipyridine; electrochemical

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