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# ECO-FRIENDLY BIS(IMINO)PYRIDINE AS CORROSION INHIBITOR FOR IRON AND ZINC IN NaCl SOLUTION

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Corrosion of metals and alloys is a process of great importance for the industry, as it unfavorably impacts not only the economical aspects but also the human safety. Materials such as steel and zinc are very prone to corrosion but still widely used in a range of industries. One of the most practical methods for protecting metals from corrosion is use of the corrosion inhibitors.

In this study, the corrosion inhibitory activity of symmetrical bis(imino)pyridine (BIP-16) was tested by the Linear Polarization Resistance (LPR) and Electrochemical Impendence Spectroscopy (EIS) methods on zinc and iron. The investigation was carried out in a neutral and acidic medium of 0.5 M NaCl solution. The temperature-dependent (25-45 °C) inhibitory efficacy of BIP-16 on iron and zinc was tested in an acidic medium (pH 3). Under the same conditions, the time dependence of BIP-16 up to 72 h was examined . Moreover, a synergistic effect of BIP-16 with cerium acetate was also examined in time and temperature (25-45 °C) dependence on zinc (pH 7) and iron (pH 3) in 0.5 M NaCl solution at optimal concentrations. The inhibition efficiency of BIP-16 declined with time on both zinc and iron indicating physisorption. Also, kinetic and thermodynamic parameters of this process were calculated. To gain deeper insights into the inhibitory mechanism of tested compounds, DFT calculations were performed.

Taking into account higher demand for green products manufactured in accordance with green chemistry principles, environmental hazard was assessed and toxicity of the compound was estimated. The compound BIP-16 has the lowest environmental hazard toxicity estimated by QSAR method and could be used for the formulation of anticorrosive varnishes which are not classified as environmental aquatic hazardous mixtures (Eco-friendly chemical).

The obtained results follow Langmuir's isotherm and based on the free Gibbs energy it can also be concluded that BIP-16 interacts with the metal surface via physisorption and can be classified as eco-friendly compound.