

PECULIARITIES OF INHIBITORY ACTION OF SECONDARY AMINES ON STRUCTURAL STEEL CORROSION IN ACID CHLORIDE MEDIUM

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The influence of the degree of protonation of the molecule on the efficiency of structural steel corrosion inhibition in acid chloride medium by secondary amines with triazoloazepinmethyl and aryl substituents was considered in this work [1]. It was shown by quantum-chemical calculations that for investigated secondary amines with different radicals (R = H, F, Cl, I) in benzene ring showed different form of the existence of molecules in a solution depends on the pH of the medium, and its greatest influence is found within the pH range from 0 to 2. It has been established that for all investigated compounds, the inhibition efficiency (IE) in the range of pH 0...2 changing in waves (Fig. 1). It is caused by the complication of the adsorption of the compounds on the metal surface due to the redistribution of charges on the main adsorption reaction centers and consistent with [2]. The highest inhibition efficiency (88.58% - 96.09% at a concentration of 1 mmol/l) of these compounds is found in solution of hydrochloric acid pH = 0.7–1.0 (Fig. 1). In this pH the molecules are mainly protonated by a nitrogen of triazole cycle, that shown with quantum-chemical calculation.

Using polarization measurements (Fig. 2) and Auger electron spectroscopy it has been concluded that the highest inhibition efficiency of the compound with a para-iodinebenzene substitute is explained by the formation of a strong protective inhibitor layer on the steel surface. Film thickness is up to 10 nm [3].

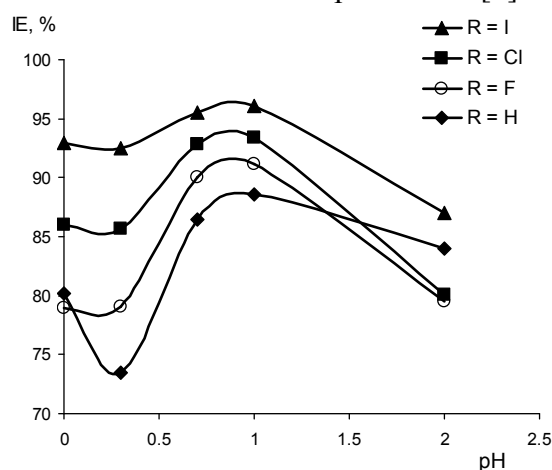


Fig. 1. Dependence between inhibition efficiency of secondary amines and pH of solutions of hydrochloric acid

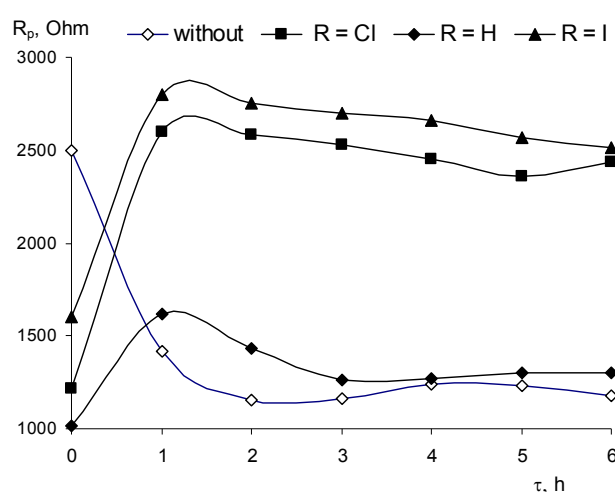


Fig. 2. Dependence between polarization resistance and sample soaking time in 0.2 M HCl solution (pH = 0.7)

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