

ELECTROCHEMICAL STUDY OF THE INHIBITORY EFFICACY OF TWO SCHIFF BASES SYNTHESIZED TOWARDS THE CORROSION OF STEEL IN CONCRETE.

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Abstract : Corrosion of Reinforcement is a major factor limiting the life of reinforced concrete buildings. The steel in concrete can corrode when many aggressive substances penetrate into the pores of concrete containing oxygen. Various methods exist to protect the steel against corrosion. These methods include the use of corrosion inhibitors which is a means of protection very easy and effective. The research on the protection of steel against corrosion showed that a large number of inhibitors are organic species containing in their structure elements such as nitrogen, oxygen and sulfur. Schiff bases whose applications are very numerous are recently used and the results are very satisfactory in the solution simulating the pore water in interface (frame / concrete). For this and for the same purpose, we synthesized, characterized and studied the inhibitory power of two Schiff bases and their initial products of synthesis: • 1, 2-dehydroacetic acid ethylene diamine (H2 L1) ; • 1, 2-dehydroacetic acid amino naphthol (H2 L2) ; • Dehydroacetic acid (DHA) • 3-amino -2-Naphthol (Amine) towards the corrosion of construction steel. The electrochemical parameters and characteristics of the corrosion were determined by cyclic voltammetry exploiting Tafel curves by Volta Masters 4 software. The study of the corrosion inhibition by these organic compounds has led to the conclusion that they have high level of inhibition rate. Compounds (H2 L1) and (H2L2) which are original and their starting materials of synthesis show an inhibition rate close to 70% at a concentration of 10⁻⁶M for each of them in the concrete environment after four months. After seven months of immersion of rebar in concrete, the results of mechanical tests show that the compound (H2L1) improves the mechanical strength of the concrete structure but DHA affects it. This behavior can be explained by the formation of bonds between metal sites and the free electron pairs of oxygen and nitrogen. The results confirm that the structure of these heterocyclic compounds do not affect the effectiveness of inhibition of corrosion of steel in concrete.

Keywords : Schiff bases, corrosion, inhibitor, concrete, 1, 2-dehydroacetic acid ethylene diamine, 2-dehydroacetic acid amino naphthol, DHA, 3-amino -2-Naphthol