ARYLDIAZONIUM DERIVATIVES APPLIED BY ELECTROCHEMICAL GRAFTING ONTO SAE1018 CARBON STEEL: PERFORMANCE AS NON- METALLIC COATINGS

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This research proposes a new methodology for designing anticorrosive coatings on SAE1018 carbon steel. This procedure consisted of surface modification of an electrode by electrochemical reduction of aryldiazonium salts. Through cyclic voltammetry (CV) experiments, the surface modification process was performed using 1 mM benzenediazonium, which was synthesized *in situ* in aqueous medium of HCl and $NaNO_2$ at 5°C. Using electrochemical impedance spectroscopy (EIS) and potentiodynamic polarization with Tafel curves, corrosion inhibition efficiency in 3% NaCl solution was evaluated. The modified surface was found to have lower corrosion rate relative to the same unmodified carbon steel surface, demonstrating corrosion inhibition efficiency of 61.4%. These results are attributed to the presumably formation of a monolayer of covalently bound molecules through Fe- C bonds. These molecules form an effective coating on the surface as they constitute a physical barrier that prevent the transport of corrosive species such as chlorides. the effect of the volume and presence of other functional groups will be studied. The monolayer of molecules bound by microscopic and spectroscopic techniques (SEM, XPS) was characterized, in order to propose a mechanism to explain the formation of Fe- C bonding onto SAE 1018 carbon steel.

Keywords: electrografting, aryldiazonium salts, anticorrosive coatings

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