Chemical synthesis of polyaniline and study of its effectiveness corrosion inhibition of API 5L Gard X60 steel in acid medium

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Abstract. The objective of this work is the synthesis of polyaniline PANI, then the study of its effectiveness corrosion inhibition of API 5L Gard X60 steel in acid medium, The polymer synthesis was carried out chemically from aniline. The radical polymerization reaction is initiated by ammonium persulfate. The synthesized polymer is characterized by FTIR spectroscopy and UV / Visible and DRX. Electrochemical tests: linear polarization resistance, Tafel and impedance tests were performed to evaluate the corrosion inhibition efficiency of poly aniline. The characterization indicates that the polyaniline form obtained is emeraldine salt, it is the form doped with chloridic acid , with a semi-crystalline structure. The results of the electrochemical tests obtained show that this polymer acts as an anodic inhibitor by forming a protective film on the anode surfaces by blocking the electrochemical reaction of dissolution of the metal. The corrosion rate and the corrosion current decrease with the increase of the PANI mass in sulfuric acid medium, while the polarization resistance and the protective efficiency increase. A maximum efficiency 97% for a mass of 0.4g PANI; these results allow the possibility of using this type of polymer in the protection of pipes and tanks for storing hydrocarbons against corrosion.

Keywords: Polyaniline, Polymerization, Corrosion.