Electrochemical and corrosion behaviors of lead-acid battery in the presence of polyaniline hydro-soluble in 0.5 M H_2SO_4 medium

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Abstract. The effect of polyaniline hydro-soluble on the current collector in lead-acid battery is performed in order to improve the life of the battery and to protect the collector against corrosion. The polyaniline used in this study is commercial. The electrochemical behavior of the current collectors in the absence and in the presence of PANI hydro-soluble is evaluated by electrochemical techniques: Cyclic Voltammetry, Electrochemical Impedance Spectroscopy (EIS) and polarization curves (Tafel plots) recorded in 0.5 M H_2SO_4 aqueous solution. Long-terme cycling is performed by cyclic voltammetry in 0.5 M H_2SO_4 medium. From the results, it's found that the use of polyaniline hydro-soluble in 0.5M H_2SO_4 protects the lead metal within good anticorrosion proprieties. The peaks matching to the oxidation of lead to lead sulfate obtained by voltammetry is decreased for the lead electrode in the presence of polyaniline hydro-soluble compared to the lead electrode without PANI hydro-soluble in acidic solution.

Keywords: Lead acid-battery, polyaniline hydro-soluble, corrosion, electrochemical techniques.