

ELECTRODEPOSITION OF POLYANILINE ON ALUMINIUM ALLOY AA 6061-T6: ELECTROCHEMICAL ACTIVITY AND CORROSION PROTECTION PROPERTIES

Martins, N.C.T.¹; Moura e Silva, T.^{1,2}; Fernandes, J.C.S.¹

¹ Inst. Superior Técnico, Dept. of Chemical Eng., Lisboa, Portuga

² Inst. Superior Eng. Lisboa, Dept. of Mechanical Eng., Lisboa, Portugal

The use of pre-treatments on aluminium alloys prior to painting or adhesive bonding is an essential technology in many industrial sectors (e.g. aerospace industry). However, most of the pre-treatments currently used are based in chromates, which have been classified as hazardous to environment and human health. Thus, much effort has been undergoing to develop new coating systems. Since the publication of DeBerry's results on the corrosion protection properties of polyaniline on stainless steel [1], inherently conducting polymers (ICP) have been receiving increasing attention as possible components of corrosion-resistant coating alternative to chromate-based treatments. These polymers can be deposited on oxidisable electrodes by electropolymerization, which can simultaneously form and deposit polymer coatings on the substrate from a monomer-electrolyte solution. Among ICP's investigated for corrosion protection, polyaniline (PANI) has received the most attention. Nevertheless, the adhesion of the electrosynthesized PANI films is generally poor [2]. The present study covers the production of films of polyaniline on aluminium alloy AA 6061-T6 (used in aeronautical industry) by electropolymerization of aniline (0.5 M) in a solution 0.5 M H₂SO₄ and the investigation of their protective behaviour. The electropolymerization was done making use of cyclic voltammetric or potentiostatic methods. Electrochemical activity and corrosion protection properties of the films were investigated by polarization curves, electrochemical impedance spectroscopy and cyclic voltammetry and compared with the electrochemical behaviour of the bare alloy.

Publicado em:

Livro de Resumos das Jornadas de Electroquímica e Inovação 2006, p. 23, 20 de Outubro 2006, Porto, Portugal