

ELECTRODEPOSITION OF POLYPYRROLE ON ALUMINUM ALLOY 6061-T6

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

1 ICEMS - DEQB, Inst. Superior Técnico, TULisbon, Lisboa, Portugal

2 Inst. Sup. de Eng. de Lisboa, Dept. de Eng. Mecânica, Lisboa, Portugal

Publicado em:
*Livros de Resumos do
X Iberic Meeting of
Electrochemistry,
Coimbra, 12 a 14 de
Abril de 2007.*

Due to their low cost, light weight and high mechanical resistance, aluminium alloys have been widely used in aerospace industry. In order to improve the corrosion resistance of these metals, different procedures can be adopted. Among them pre-treatments based on the use of chromates were widely investigated in the past. However, they have been classified as hazardous to environment and human health. Thus, much effort has been undergoing to develop new friendly and non-polluting coating systems.

Inherently conducting polymers (ICP) are attracting attention as possible components of corrosion-resistant coating systems in alternative to chromate-based treatments. These polymers can be deposited on the substrate by electropolymerization from a monomer solution. Among ICP's investigated for corrosion protection, polypyrrole is one of the most studied.

The present study reports the production of films of polypyrrole on aluminium alloy 6061-T6 by electropolymerization of pyrrole (0.5M) in a solution 0.5M H₂SO₄ and the assessment of their electrochemical behaviour. The electrodeposition was carried out by cyclic voltammetry or by potentiostatic methods. Electrochemical activity and corrosion protection properties of these films were investigated via dc polarization, electrochemical impedance spectroscopy and cyclic voltammetry. The morphology of the films was studied by scanning electron microscopy.

The results show that the polypyrrole films produced in aluminium alloy 6061-T6 are homogeneous and with a globular morphology but they don't confer significant corrosion protection to the metal.