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FORMATION OF CERAMIC NANOSTRUCTURED COATINGS ON ALUMINIUM FOR ENHANCED CORROSION RESISTANCE

L .Bouchama, N. Azzouz, N.Boukemouche, J.P. Chopart

Abstract : Double anodisation has been considered as a novel technique to form ceramic nanostructured coatings on aluminium alloys for corrosion protection. In this study, the anodic alumina was produced by two type anodising process (conventional anodisation and double anodisation) in 1 M sulphuric acid at constant cell potential of 25 V. The temperature was kept constant at 5°C during both anodising processes. Anodised samples exposed to 0.2 M K₂SO₄ solution for up to 24 h have been studied by means of electrochemical impedance spectroscopy (EIS). The results reveal that the EIS technique is a good tool for obtaining detailed information on the influence of the ageing process on anodised aluminium. Potentiodynamic polarization tests were conducted to assess the corrosion resistance of the coatings. Measurements of polarization resistance show that a double anodising process confers on material a clear improvement with corrosion in very aggressive medium. The analysis was completed with the aid of the SEM. It was found that the modified anodising, an environmentally friendly coating method, could produce an oxide coating with good corrosion protection for the Al–Mg alloy

Keywords : Aluminium, anodisation, Corrosion protection, Electrochemical impedance spectroscopy, nanostructured coating