Pengaruh suhu dan aditif etanol terhadap ketahanan korosi dan sifat mekanik lapisan oksida anodik paduan AA7075-T7351 = Effects of temperature and ethanol additives on corrosion resistance and mechanical properties of anodic oxide film formed on AA7075-T7351

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Abstrak

Paduan aluminium AA7075-T7351 merupakan paduan keras yang memiliki keunggulan sifat mekanis, ringan, dan dapat di recycle sehingga paduan ini banyak di aplikasikan sebagai material struktur. Untuk meningkatkan ketahanan korosi paduan tersebut diperlukan rekayasa permukaan sehingga umur pakai material ini menjadi lebih lama dengan cara anodisasi. Optimasi ketahanan korosi dan kekerasan mekanik diperoleh dengan variasi suhu elektrolit dan penambahan aditif etanol pada elektrolit asam sulfat. Morfologi dan ketebalan lapisan oksida yang dihasilkan diamati dari foto SEM, ketahanan korosi sampel diuji dengan metode elektrokimia, dan karakteristik sifat mekanis permukaan didapat dari uji kekerasan. Anodisasi pada suhu 0°C mampu meningkatkan ketebalan lapisan oksida hingga 46%, kekerasan mikro sampai dengan 83%, dan meningkatkan ketahanan korosi. Anodisasi pada suhu 0°C dengan penambahan etanol 10 vol% dalam elektrolit asam sulfat pada paduan aluminium AA7075-T7351 menghasilkan lapisan oksida paling tebal (75,75µm), kekerasan mikro paling besar (281.06 HV), serta ketahanan korosi paling tinggi (Icorr = 10-5 µA/cm2). .....AA7075-T7351 aluminum alloy is a hard alloy that has the advantage of mechanical properties, lightweight, and can be recycled so that this alloy is widely applied as a structural material. To improve the corrosion resistance of these alloys, surface engineering is needed so that the lifetime of this material becomes longer by anodizing. Optimization of corrosion resistance and mechanical hardness is obtained by variations in electrolyte temperature and the addition of ethanol into sulfuric acid electrolytes. The morphology and thickness of the resulting oxide layer were observed from SEM photographs, the corrosion resistance of the samples was tested by electrochemical methods, and the characteristics of surface mechanical properties were obtained from hardness tests. Anodization at 0 ° C can increase the thickness of the oxide layer by up to 46%, micro hardness up to 83%, and increase corrosion resistance. Anodization at 0 ° C with the addition of 10 vol% ethanol in sulfuric acid electrolyte in aluminum alloy AA7075-T7351 resulted in the thickest oxide layer (75.75µm), the greatest micro hardness (281.06 HV), and the highest corrosion resistance (Icorr = 10-5 µA/cm2).