

Evaluation of Life Span for Al₂O₃ Nano Tube Formed by Anodizing with Current Density

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초 록: Surface modification is a type of mechanical manipulation skills to achieve extensive aims including corrosion control, exterior appearance, abrasion resistance, electrical insulation and electrical conductivity of substrate materials by generating a protective surface using electrical, physical and chemical treatment on the surface of parts made from metallic materials. Such surface modification includes plating, anodizing, chemical conversion treatment, painting, lining, coating and surface hardening; this study conducted cavitation experiment to assess improvement of durability using anodizing. In order to observe surface characteristics with applied current density, the electrolyte temperature, concentration was maintained at constant condition. To prevent hindrance of stable growth of oxide layer due to local temperature increase during the experiment, stirring was maintained at constant speed. In addition, using galvanostatic method, it was maintained at processing time of 40minutes for 10 to 30mA/cm². The cavitation experiment was carried out with an ultra sonic vibratory apparatus using piezo-electric effect with modified ASTM-G32. The peak-to-peak amplitude was 30 μ m and the distance between the horn tip and specimen was 1mm. The specimen after the experiment was cleaned in an ultrasonic bath, dried in a vacuum oven for more than 24 hours, and weighed with an electric balance. The surface damage morphology was observed with 3D analysis microscope. As a result of the study, differences were observed surface hardness and anti-cavitation characteristics depending on the development of oxide film with the anodizing process time.

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