

인가 전압에 따른 양극산화된 금속 산화물의 나노 구조 변화와 전기변색 응용
Effects of applied voltages on nano-structures of anodized metal oxides and their electrochromic applications

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초 록 : Electrochemical anodization has been interested due to its useful way for the nano-scale architecture of metal oxides obtained from a metal substrate. By using this method, it is easy to control the morphology of the oxide materials by controlling electrochemical conditions. Among oxide materials obtained from the transition metals such as Ti, V, W, etc., in this paper, the morphological study of anodized TiO₂ was employed at various voltage conditions in fluoric based electrolyte, and the effects of applied voltage (sweep rate and retention time) on the tube morphologies were investigated. Furthermore, by using anodization of tungsten substrate (W), we fabricated the porous structure of WO₃ and provided merits of tailored structure for the hybridization of inorganic and organic materials as electrochromic (EC) applications. The hybrid porous WO₃ shows multi-chromic properties during the EC reactions at specific voltage conditions. From these results, the anodization process with tailoring nano-structure is one of the promising methods for EC applications.

알루미늄 합금의 플라즈마전해산화 처리 기술
Plasma Electrolytic Oxidation Treatment of Al Alloys

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초 록 : Al alloys are being used widely for automobile, aerospace and mechanical components because of their high strength ratio to weight. However, still they suffer from abrasion or corrosion owing to insufficient resistances to friction or mechanical impact and chemical attack. Plasma electrolytic oxidation (PEO) method is one of the promising surface treatment methods for Al alloys which can render better hardness than aluminum anodic oxide (AAO) films prepared by conventional anodizing method in acidic solutions. In this presentation, some basic nature of PEO film formation and growth process on Al alloys will be presented based on the experimental results obtained and discussed in view of dielectric breakdown and reformation and the role of various anions in film breakdown and reformation of PEO films.