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# Preparation and Characterization of Anodic Alumina Films with High-saturation Structural Colors in a Mixed Organic Electrolyte

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**Abstract:** Porous anodic alumina films with high-saturation and wide-color-gamut structural colors were successfully prepared in a mixed organic acidic electrolyte added with propylene glycol using a high voltage. The experiment result shows that the color of the anodic alumina films changes slowly, and thus the fine regulation of the color could be achieved just by shortening time intervals. Scanning electron microscope (SEM) measurement shows that the sample from the organic experimental group has a granular surface. This granular surface has a greater scattering of aluminum substrate reflected light, and this produces a higher-saturation structural color. It is also observed that underlying pores are not obvious on the surface of the organic experimental group sample. The mechanism behind this observation is in a good agreement with Acidic Field-assisted Dissolution Mechanism. Additionally, the samples from the organic experimental group appear a strong reflection in their red-spectrum area, which agrees with the samples' overall optical appearance of being reddish. The film with brilliant color may have potentials in color display, decoration and anti-counterfeiting technology.

**Keywords:** Anodic alumina; Organic electrolyte; Structural color; High-saturation

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