# Effect of anodic oxygen evolution on cell morphology of sulfuric acid anodic alumina films

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**Abstract:** The purpose of this work was to study and analyze the effect of electrolyte temperature and anodization voltage on cell morphology of thin films of sulfuric acid anodic alumina formed on substrates of different nature, such as SiO2/Si, glass-ceramic, glass substrates, and polished aluminum. The data obtained demonstrated that the thermal conductivity of the substrate in the voltage range from 12 to 14 V affected a pore diameter (dpore) in anodic films. Depending on the substrate type, dpore increased in the following order: glass > glass-

ceramic > SiO2/Si > aluminum. It was found that the anodizing voltage (Ua) of 16 V was a turning point for anodic films obtained in sulfuric acid after which the slope of the lines for both dpore and Dinter (interpore distance) vs. Ua changed. This behavior might be explained by the occurrence of the overpotential enough for the beginning of the oxygen evolution reaction. We assumed that the oxygen evolution on aluminum oxide surface at the pore bottom at Ua> 16 V results in an increase in acid concentration in the solution and, consequently, in rise in acidic nature of the electrolyte and increase in the dissolution rate of the oxide layer of pore walls.

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