Directional Pore Arrays on Anodic Aluminum Oxide Template

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One directional pore arrays were formed on an anodic aluminum oxide template by roller-pressing and scrubbing an aluminum foils prior to anodizing processes.

Even though the geometry of anodic porous alumina may be generally represented as a honeycomb structure with their fine channels in depth direction[1], we could produce the 30 nm wide pore channels on the AAO template surface.

Unlike most published AAO pore arrays had both individual circular shape and hexagonal periodicity or had irregular distribution[1-3], our AAO templates showed linear arrays of elliptical pores side by side.

Briefly, a thin aluminum foil (99.8 %) was degreased by acetone and then anodized at a constant potential(40 V) in 0.3 M oxalic acid at 19 ¡É. After anodizing for 3 hours, this process resulted in the growth of a porous aluminum oxide layer on the surface of the aluminum. Nanoporous alumina template was immersed in a solution of phosphoric acid (6 wt%) and chromic acid (1.5 wt%) at room temperature for 5 minutes, then washed with ultrapure water and dried at room temperature in air. The pore arrays of these AAO template were determined using a scanning electron microscopy.

More details on the nano channels on the anodic aluminum oxide template will be discussed.

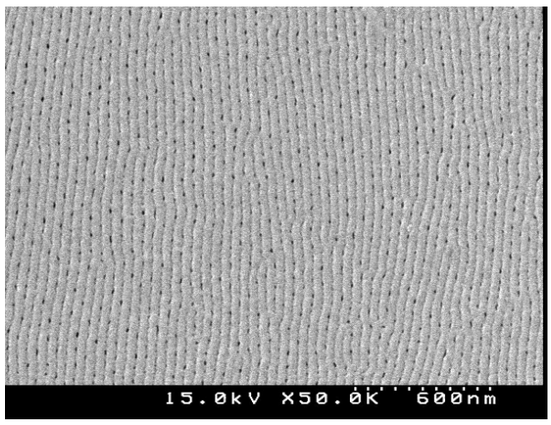

Fig. 1. SEM image of a typical anodic aluminum oxide template having one directionally aligned pore array. Note all the pores are elongated into elliptical shape and aligned along one direction (up to downward direction in this figure).

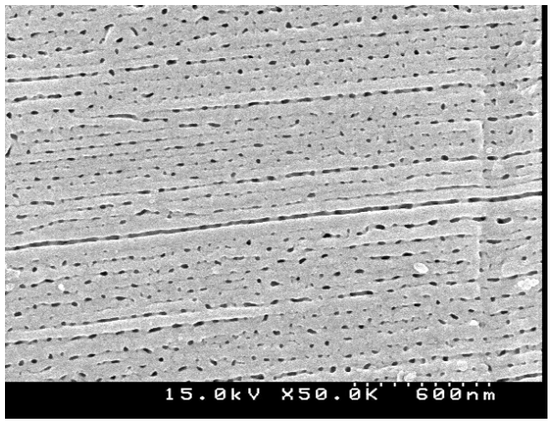

Fig. 2. SEM image of a typical pore channel on AAO template having one directionally aligned 30 nm wide pore array (right to left side in this figure). Note some linear channels made by connecting pores side by side along the elongated direction.

References

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