

Highly Ordered Anodic Porous Alumina for Functional Nanodevices

Hideki Masuda*, Takashi Yanagishita, Toshiaki Kondo

Department of Applied Chemistry, Tokyo Metropolitan University, Japan

*masuda-hideki@tmu.ac.jp

The use of naturally occurring ordered micro&nano structures is useful for the effective fabrication of various types of functional devices. The anodic porous alumina, which is formed by anodization of Al in an acidic electrolyte, is one of candidate for the starting material for preparing functional devices due to its self-ordered structures.¹⁾ This material has unique geometrical structures composed of closed packed uniform sizes cells having central uniform size pore. One of important advantageous point of this materials is capability of forming the long-range-ordered hole array structures under the appropriate anodization conditions.²⁾ The highly ordered structures contribute to the optimization of the performance of the obtained functional devices. The expansion of the range of the hole intervals and hole sizes of anodic porous alumina while keeping the long-range ordering is very important for the functional application of this material. As an example, we have reported the preparation of highly ordered anodic porous alumina with reduces hole interval (~25 nm) and hole size (~10 nm).^{3,4)} The ordered porous alumina with reduced geometrical structures will be applied to the preparation of various functional devices, which require the ordered nanostructures. In the present report, recent progress of the preparation of the highly ordered anodic porous alumina with wide variety of hole intervals and hole sizes will be presented. In addition, the examples of the functional use of the ordered nanostructures of anodic porous alumina will be also reported.^{5,6)}

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