

Fabrication of Functional Nanodevices Based on Highly Ordered Anodic Porous Alumina

Hideki Masuda^{1,2}

¹Department of Applied Chemistry, Tokyo Metropolitan University, 1-1 Minamiosawa, Hachioji, Tokyo 192-03, Japan,

²Kanagawa Academy of Science and Technology (KAST), 5-4-30 Nishi-Hashimoto, Sagamihara, Kanagawa 229-1131, Japan
masuda-hideki@c.metro-u.ac.jp

The use of materials with highly ordered structures is effective for the fabrication of various types of functional nanodevices. Anodic porous alumina prepared by the anodization of Al in acidic solutions is a typical material with a self-organizing structure of nanometer dimensions. The anodic porous alumina has attracted considerable interest as a starting material in nanofabrication due to its unique geometrical structure. The structure of anodic porous alumina is characterized by the close-packed array of uniform-sized cylindrical cells with a straight hole in the center. For applications of the anodic porous alumina to the device fabrication, improvement of the ordering of the hole configuration is essential to optimize the properties of the fabricated devices. We have been studying the several types of fabrication processes of highly ordered hole arrays of anodic porous alumina; naturally occurring long-range ordering under appropriate anodizing conditions [1], template process using ordered arrays of polystyrene particles [2], and pretexturing process of Al with imprinting using mold for ideally ordered hole configurations [3,4]. In the present report, the results of fabrication of highly ordered anodic porous alumina and the several recent examples of fabrication of functional nanodevices based on highly ordered anodic porous alumina are described.

References

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