

Anodic Aluminum Oxide (AAO) for Nanotechnology Applications

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Recently, a self-organizing process that occurs during the anodization of aluminum in acidic electrolytes has attracted a vast amount of research attentions, coupled with the ever-increasing demand for the development of effective, inexpensive and technologically simple methods for the synthesis of low-dimensional nanostructures over a macroscopic area overcoming many of the drawbacks of conventional lithographic techniques. In this presentation, recent progress in the fabrication of ordered nanoporous anodic aluminum oxide (AAO), including conventional anodization techniques, newly developed pulse anodization, hard anodization processes, and generic approaches to three-dimensional pore structures with periodically modulated diameters. Discussion will also cover the applications of AAO for the development of structurally well-defined extended arrays of low-dimensional nanostructures, such as nanodots, nanotubes, and nanowires, which could be model systems in investigating a diverse range of research problems in chemistry and physics and also be starting materials in realizing advanced electronic devices.