

Periodic Holes with 10 nm Diameter Produced by Low-temperature Anodization

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With its high aspect ratio nanochannels, a porous anodic alumina film is a potential host for growing nanocomposites. It has been reported that long-term anodization of aluminum provides a hexagonally ordered array of nanopores with very uniform pore diameters (between 30 and 50 nm, depending on pH, acid, and potential) and pore spacings of 80 to 100 nm within a matrix of amorphous aluminum oxide. For the application to nanoelectronics, smaller diameters are highly desirable.

Using the low-temperature anodization technique, we report the method for the highly-ordered anodic alumina template with diameter as smaller as 10 nm. This opens the door to numerous applications that need small but hexagonally periodic features produced without conventional lithographic process.