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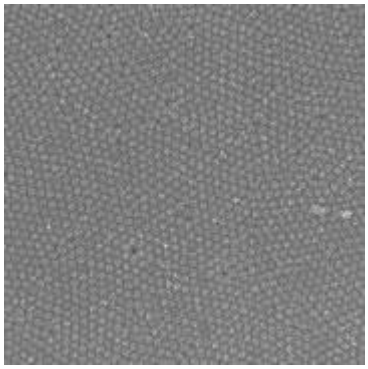
Porous Aluminium AGF7030

Tip Characterization structure



SEM image of the porous aluminium sample. Area 10x10 µm.

A thin film of porous aluminium consists of hexagonal hollow cells. The thickness of the partitions between the pores is about 5 nm. Radius of the spikes formed at the intersections of the partitions is approximately 2 nm.

Part Number	Pore depth, nm	Pitch*, nm	Active area, mm	Sample dimensions, mm	Foil thickness, µm
PA01	40	100±10	3 x 3	5 x 5	500

*The values are given for information only, not for calibration purposes.

Application

The exact shape of the scanning probe tip is very important for obtaining AFM images of high quality and accuracy. As new AFM tips with nanometer radii of curvature become widespread, periodic structures that have surface features of similar or greater sharpness should be used to estimate the parameters of the tip.

AFM images of the porous aluminium structure are presented below. The images were obtained using different probe tips: conventional tip with radius Rc ~ 10 nm (left) and a tip of nanometer radius (right). The scan size is 1 x 1 μm^2.

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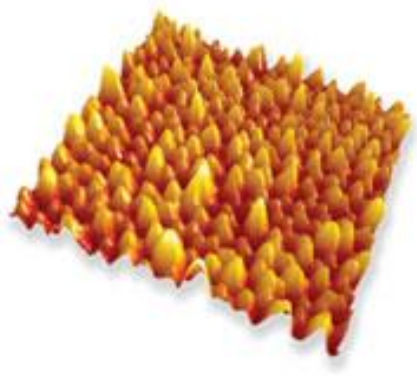
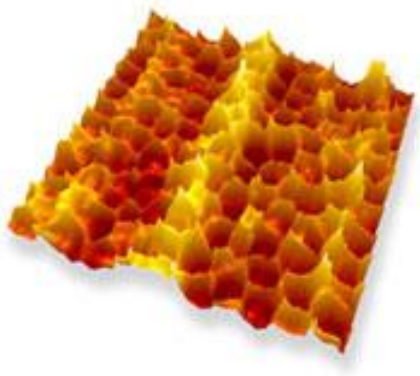


AFM image of PA01 made using conventional probe with tip radius about 10nm. Scan height 70 nm.



AFM image of the same sample made by probe with tip radius Rc < 1 nm. Scan height 80 nm.

Data obtained using a conventional probe tip (1st image) is in good agreement with those published in literature [1]. The second image reveals additional details of the surface of porous aluminium. Generally, these images are free from the convolution effect due to the finite size of the scanning tip. It was found that the form of the surface pore differs from the ideal hexagon, and there are also elevations in the nodal points of the adjacent cells. Curvature radii of the spikes made by these elevations are as small as 2-3 nm, which could not be imaged accurately by conventional tips.

In order not to break off the spikes of the grating, you should scan in tapping mode. Hard cantilevers in contact mode may break off the spikes.

1. Yu Cheng Sui, Jose M. Saniger. Characterization of anodic porous alumina by AFM. Materials Letters 48 (2001) 127-136.