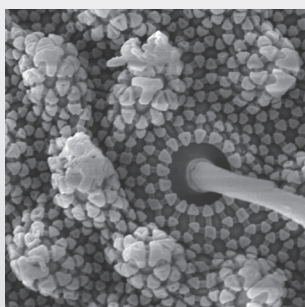
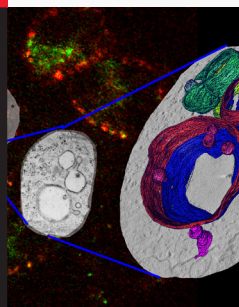


Living up to Life

**Leica**  
MICROSYSTEMS

Material  
Research



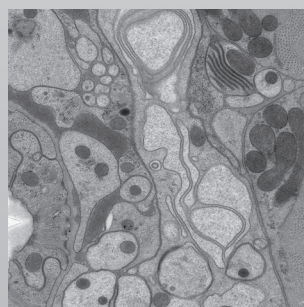
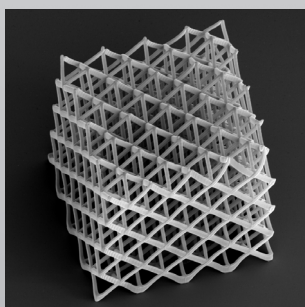
Life Science  
Research

## Application Note

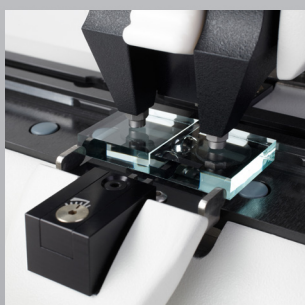
### Porous ceramics Sample Preparation for SEM

related instrument Leica EM RES102

Medical  
Research



Industrial  
Manufacturing



Natural  
Resources



## Porous Ceramics

### PROBLEM

Ceramic membrane filters with pore sizes down to a few nanometres must be investigated in cross-section with regard to the structure of the pores. The smallest pores are of special interest.

In most cases, conventional grinding methods cannot be used for such problems, as the pore structure would be distorted. This applies in particular to the pores in the nanometre range. They will be blurred by the grinding, with the result that they will no longer be recognizable in the microscope. On the other hand, the SEM investigation of this material is extremely difficult, as the structures in which we are interested lie at the limits of the resolution, and, as an insulator, the ceramic also limits the resolution.

With the use of slope cutting, a cross-section through the complete layer structure can be produced, which is then be examined in the scanning electron microscope.

### PREPARATION CONDITIONS: MECHANICAL PRE-PREPARATION

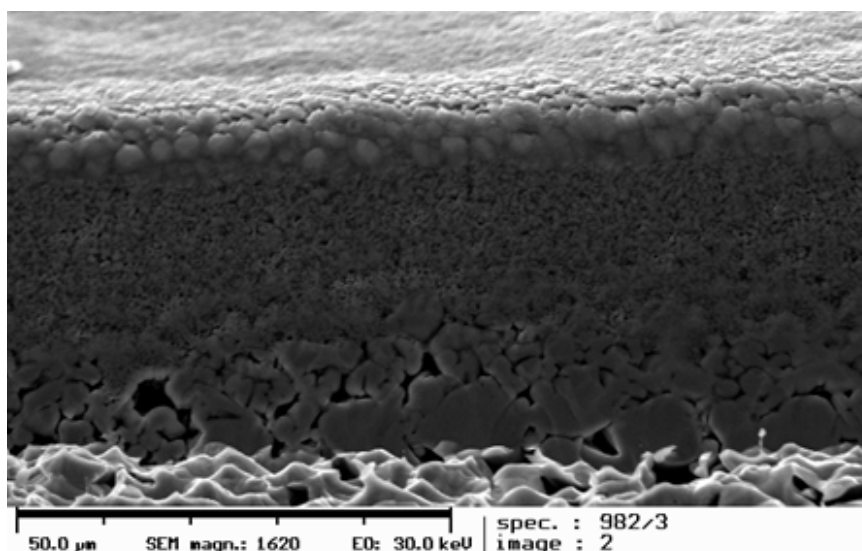
Grinding the cross section to achieve a flat surface and a 90° angle between surface and cross sectional surface.

#### Ion milling

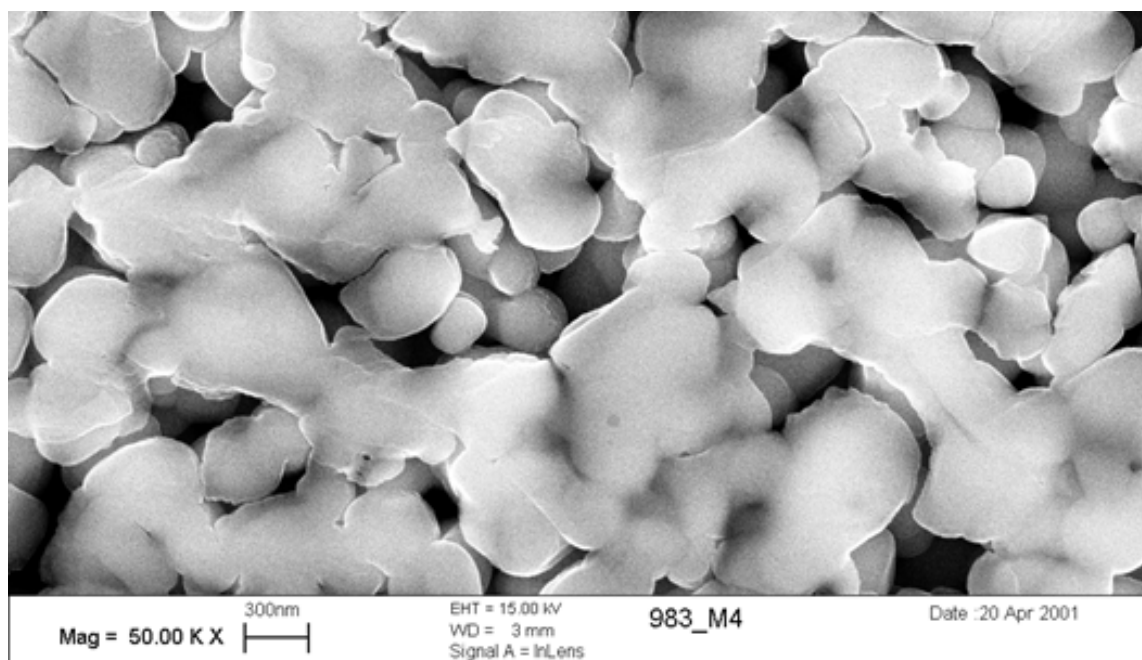
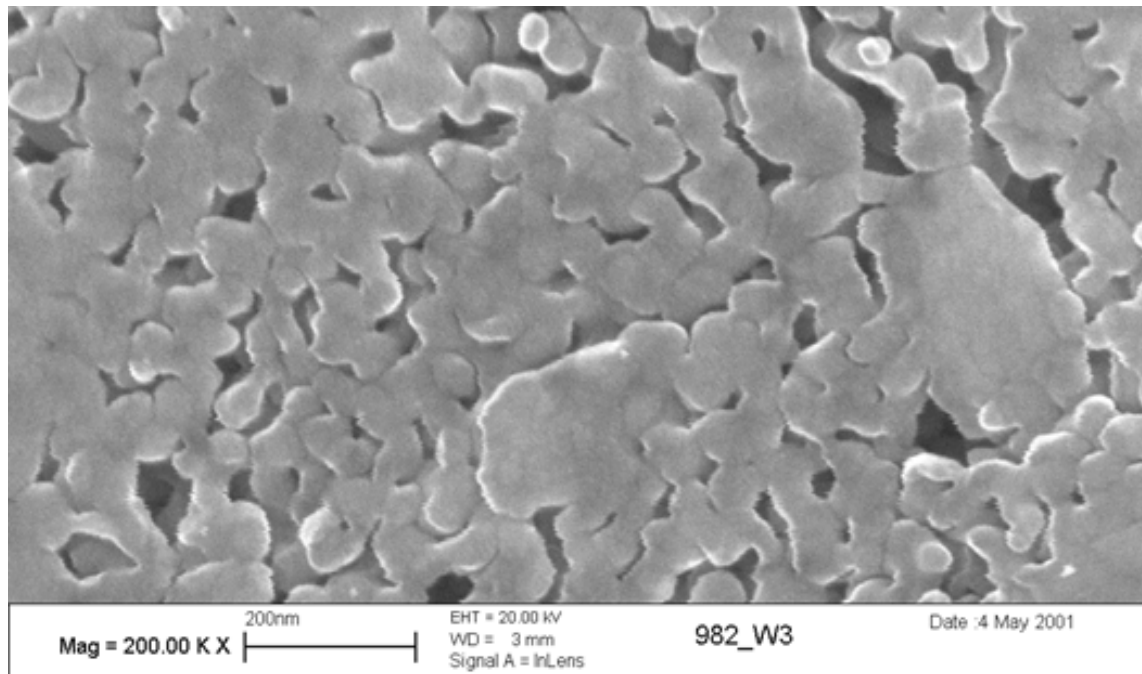
Sample holder:	45°-sloped cutting holder
Acceleration voltage:	7 kV
Milling time:	180 - 220 min
Sample movement:	Oscillation (60°)

### RESULTS

Using ion beam slope cutting, clean cuts through the complete structure of the membrane filter were successfully produced. The layer structure with the different pore sizes is clearly recognizable. The pore structure was not distorted due to the ion beam incidence, being parallel to the slope. Even pores of a few nanometres can be resolved in the scanning electron microscope.



SEM images of a 45°-angled cut into a ceramic membrane filter



Slope cut through the layer structure of a ceramic membrane filter with very small pores (M. Mangler, TU Bergakademie Freiberg, Institute for Ceramic Materials)

## RELATED PRODUCTS



Leica EM RES102

The statement by Ernst Leitz in 1907, “*With the User, For the User,*” describes the fruitful collaboration with end users and driving force of innovation at Leica Microsystems. We have developed five brand values to live up to this tradition: Pioneering, High-end Quality, Team Spirit, Dedication to Science, and Continuous Improvement. For us, living up to these values means: *Living up to Life.*

### LIFE SCIENCE DIVISION - NANO TECHNOLOGY LNT

The Leica Microsystems Nano Technology Division's focus is to provide the most comprehensive product portfolio for the preparation of biological, medical and industrial samples for investigation in the Electron and Light Microscope. Excellent Sample Preparation is a prerequisite for perfect microscopy. *Your image starts here!*

Leica Microsystems – an international company with a strong network of worldwide customer services:

Active worldwide	Tel.	Fax
Australia · North Ryde	+61 2 8870 3500	2 9878 1055
Austria · Vienna	+43 1 486 80 50 0	1 486 80 50 30
Belgium · Diegem	+32 2 790 98 50	2 790 98 68
Canada · Concord/Ontario	+1 800 248 0123	847 405 0164
Denmark · Ballerup	+45 4454 0101	4454 0111
France · Nanterre Cedex	+33 811 000 664	1 56 05 23 23
Germany · Wetzlar	+49 64 41 29 40 00	64 41 29 41 55
Italy · Milan	+39 02 574 861	02 574 03392
Japan · Tokyo	+81 3 5421 2800	3 5421 2896
Korea · Seoul	+82 2 514 65 43	2 514 65 48
Netherlands · Rijswijk	+31 70 4132 100	70 4132 109
People's Rep. of China · Hong Kong	+852 2564 6699	2564 4163
· Shanghai	+86 21 6387 6606	21 6387 6698
Portugal · Lisbon	+351 21 388 9112	21 385 4668
Singapore	+65 6550 5999	6773 0628
Spain · Barcelona	+34 93 494 95 30	93 494 95 32
Sweden · Kista	+46 8 625 45 45	8 625 45 10
Switzerland · Heerbrugg	+41 71 726 34 34	71 726 34 44
United Kingdom · Milton Keynes	+44 800 298 2344	1908 246312
USA · Buffalo Grove/Illinois	+1 800 248 0123	847 405 0164