

QUICK SELECTION TABLE

	Application	Type	Coating	Tip Shape	Force Constant	Res. Frequency
Contact	Contact Mode	CONT	None	Standard	0.2 N/m	13 kHz
		CONTR	Reflex			
		CONTPt	PtIr5			
	Contact Mode, Seiko or Zeiss	ZEILR	Reflex	Standard	1.6 N/m	27 kHz
Non-Contact / TappingMode™	Non-Contact / TappingMode™ (high frequency)	NCH	None	Standard	42 N/m	330 kHz
		NCHR	Reflex			
		NCHPt	PtIr5			
		SSS-NCH	None	SuperSharpSilicon™		
		AR5-NCHR	Reflex	High Aspect Ratio (5:1)		
		AR5T-NCHR	Reflex	Tilt Compensated High Aspect Ratio (5:1)		
		AR10-NCHR	Reflex	High Aspect Ratio (10:1)		
		DT-NCHR	Diamond and reflex	Diamond		
	CDT-NCHR					
	Non-Contact / TappingMode™ (long cantilever)	NCL	None	Standard	48 N/m	190 kHz
		NCLR	Reflex			
		NCLPt	PtIr5			
		SSS-NCL	None	SuperSharpSilicon™		
		AR5-NCLR	Reflex	High Aspect Ratio (5:1)		
		DT-NCLR	Diamond and reflex	Diamond		
CDT-NCLR						
	Non-Contact / TappingMode™ (Zeiss Veritekt step mode)	ZEIHR	Reflex	Standard	27 N/m	130 kHz
	Non-Contact / TappingMode™ (Seiko Non-Contact mode)	SEIHR	Reflex	Standard	15 N/m	130 kHz
		SSS-SEIH	None	SuperSharpSilicon™		
Special Applications	Force Modulation Mode	FM	None	Standard	2.8 N/m	75 kHz
		FMR	Reflex			
		DT-FMR	Diamond and reflex	Diamond		
		CDT-FMR				
	Lateral Force Microscopy	LFM	None	Standard	0.2 N/m	25 kHz
		LFMR	Reflex			
		Electrostatic Force Microscopy	EFM	PtIr5	Standard	2.8 N/m
	Magnetic Force Microscopy	MFMR	Hard magnetic and reflex	Standard	2.8 N/m	75 kHz

For further information please visit our website at www.nanoworld.com

ABOUT NANOWORLD® AG:

Nanotechnology is our field. Precision is our tradition. Innovation is our key instrument. That's why we are located in Switzerland, one of the most powerful and innovative areas in Europe.

Our location in Neuchatel is next to the IMT (Institute of Microtechnology, University of Neuchâtel) and the CSEM (Swiss Center of Electronics and Microtechnology). From this perfect infrastructural surrounding we support our customers with high precision Scanning Probes for their success in atomic force microscopy (AFM).

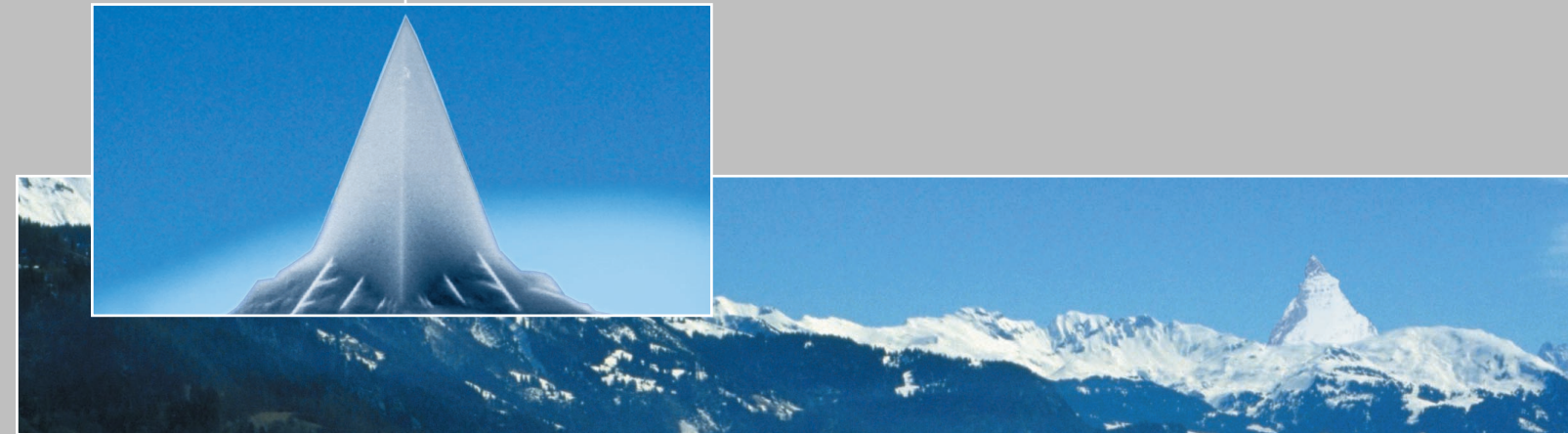
Using our knowledge as well as our high precision Scanning Probes, our clients are able to get the best results they need for atomic force microscopy (AFM).



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POINTPROBE® SILICON-SPM-SENSORS

General

- SPM sensor for very high resolution imaging
- fits to all wellknown commercial SPMs
- cantilever and tip are supported by a single crystal silicon holder
- monolithic design of holder, cantilever and tip

Material Features

- highly doped, single crystal silicon (resistivity 0.01 - 0.025 Ohm*cm)
- no intrinsic stress and absolutely straight cantilevers
- chemically inert silicon for application in fluids or electrochemical cells

Cantilever

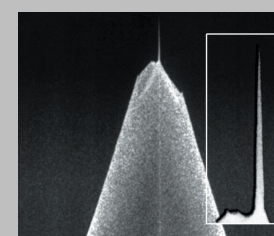
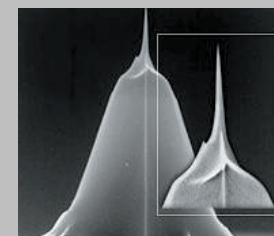
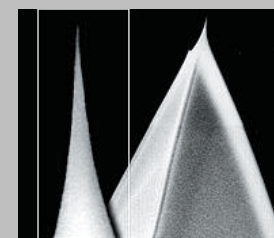
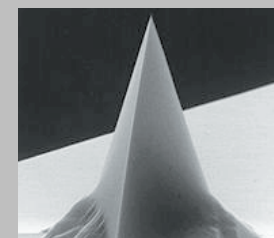
- rectangular cantilever with trapezoidal cross section
- wide detector side for easy laser adjustment
- small width at the tip side reduces the damping

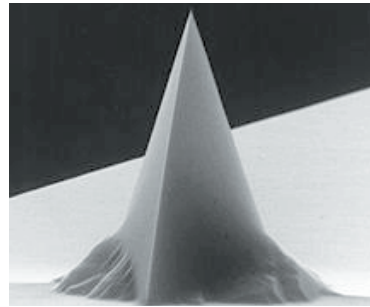
Holder

- cantilever is fixed to a silicon holder
- dimensions of the holder are very reproducible (1.6 mm x 3.4 mm)
- replacement of sensor without major readjustment

Package sizes

- Small packages of 10, 20 or 50 sensors
- Full wafer of 380 up to 388 sensors, depending on the product.

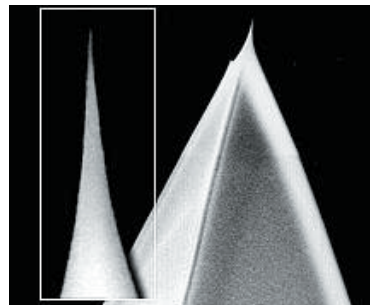




Standard Tip

Pointprobe® Tip (Standard)

The standard Pointprobe® Tip is shaped like a polygon based pyramid. Its macroscopic halfcone angle is 20° to 25° viewed along the cantilever axis, 25° to 30° when looking from the side and virtually zero at the very tip end. The Pointprobe® Tip is 10 – 15 μm high and shows a tip radius of typically better than 10nm. We guarantee at least 15 nm.



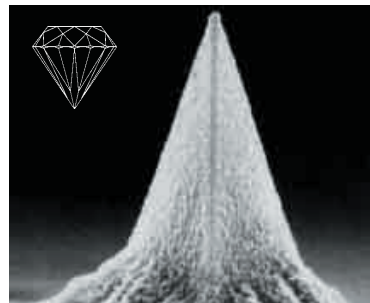
SuperSharpSilicon™ Tip (SSS)

SuperSharpSilicon™ Tip (SSS)

For enhanced resolution of microroughness and nanostructures we have developed an advanced tip manufacturing process leading to a further improvement of the tip sharpness with tip radii as low as 2 nm. With these tips we have pushed back the frontiers of technology.

Tip Features

The tip height is 10 – 15 μm and the typical radius of a SuperSharpSilicon™ Tip is about 2 nm. We guarantee a tip radius of smaller than 5 nm (guaranteed yield: 80%). The half cone angle is better than 10° at the last 200 nm of the tip.



Diamond Coated Tip (DT, CDT)

Diamond Coated Tip (DT), Conductive Diamond Coated Tip (CDT)

For SPM applications that require hard contact between probe and sample we recommend our Diamond Coated Tip (DT). Some typical applications are friction force measurements, measurement of the elastic properties of samples, as well as wear measurements or nanostructuring. The conductive Diamond Coated Tip (CDT) additionally offers a conductive, non passivated coating.

Tip and Coating Features

True polycrystalline diamond coating on the tip side of the cantilever with the unsurpassed hardness of diamond. The tip height is 10 – 15 μm and the thickness of the diamond layer is approximately 100 nm. The macroscopic tip radius is in the range of 100 – 200 nm, but the tip often exhibits a nanoroughness in the 10 nm regime. In case of the CDT the conductivity is in the range of 0.003 - 0.005 Ωcm.

High Aspect Ratio Tip (AR5 and AR10)

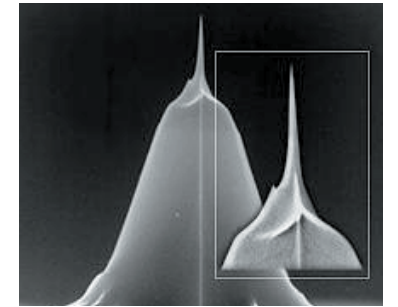
For measurements on samples with sidewall angles approaching 90°, e.g. deep trench measurements or other semiconductor applications, we offer two different types of High Aspect Ratio Tips showing near vertical sidewalls. These tips have an overall height of 10 – 15 μm which allows measurements on highly corrugated samples. At the last few micrometers the tips show a high aspect ratio portion that is symmetric when viewed from the side as well as along the cantilever axis. The tip radius is typically 10 nm. We guarantee at least 15 nm.

Tip Features AR5

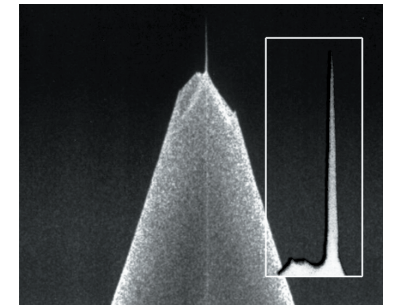
The high aspect ratio portion of the AR5 Tip is larger than 2 μm and shows an aspect ratio of typically 7:1. We guarantee a minimum aspect ratio of 5:1. Resulting from this the half cone angle of the high aspect ratio portion is typically smaller than 5°.

Tip Features AR10

The high aspect ratio portion of the AR10 Tip is larger than 1.5 μm and shows an aspect ratio of typically 12:1. We guarantee a minimum aspect ratio of 10:1. Resulting from this the half cone angle of the high aspect ratio portion is typically smaller than 2.8°.



High Aspect Ratio Tip (AR5)



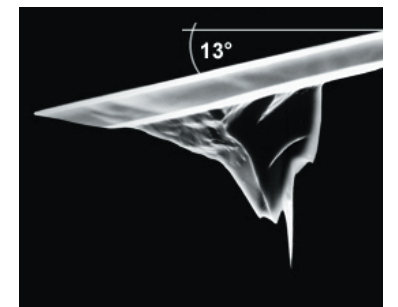
High Aspect Ratio Tip (AR10)

Tilt Compensated High Aspect Ratio Tip (AR5T)

Our Tilt Compensated High Aspect Ratio Tip (AR5T) is similar to our High Aspect Ratio Tip (AR5). However, the high aspect ratio portion of the tip is tilted 13° with respect to the center axis of the tip. This compensates the tilt angle of the cantilever that results from mounting the sensor to the AFM head. This unique feature allows absolutely symmetrical imaging of near vertical sidewalls. Therefore these tips can be perfectly used to characterize the slope of steep sidewalls.

Tip Features AR5T

With an overall tip height of 10 – 15 μm these tips allow measurements on highly corrugated samples. The tip radius is typically 10 nm. We guarantee at least 15 nm. The tip has a high aspect ratio portion that is larger than 2 μm. This portion is symmetric when viewed from the side as well as along the cantilever axis and shows an aspect ratio of typically 7:1. We guarantee a minimum aspect ratio of 5:1. Moreover the high aspect ratio portion is tilted 13° with respect to the center axis of the tip allowing absolutely symmetrical imaging.



Tilt compensated High Aspect Ratio Tip (AR5T)

AVAILABLE COATINGS

Reflex Coating

- 30 nm thick aluminum coating on the backside of the cantilever
- enhances reflectivity of the laser beam by a factor of 2.5
- prevents light from interfering within the cantilever

Hard Magnetic Coating

- 40 nm thick cobalt alloy coating on the tip side
- permanent magnetization of the tip
- tip needs to be magnetized by means of an external strong magnet

Diamond Coating

- 100 nm thick coating of polycrystalline diamond on the tip side
- unsurpassed hardness of the tip

PtIr5 Coating

- 25 nm thick double layer of chromium and platinum iridium5
- coating on both sides of the product
- enhances the conductivity and allows electrical contacts
- detector side coating enhances the reflectivity of the laser beam by a factor of 2
- stress compensated and wear resistant