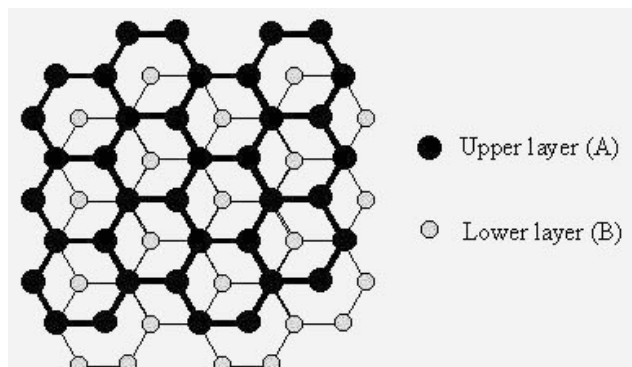
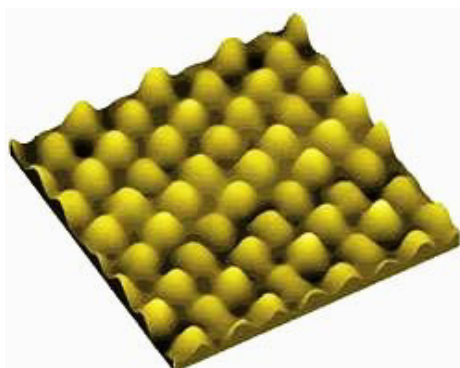


SEM, TEM, STM Supplies 10

AFM/STM/SPM Accessories

Highly Ordered Pyrolytic Graphite



HOPG – Highly Ordered Pyrolytic Graphite, is a very pure of synthetic graphite characterised by the mosaic spread angle. HOPG is a laminar material and consists of layered polycrystals resembling a mosaic of monocrystal grains which are slightly disorientated with respect to each other. The size of the individual crystals varies from 1-10um. A lower mosaic spread angle represents a better alignment of the graphite crystals. The best HOPG samples have a mosaic spread value of less than 1 degree (1°). The freshly cleaved HOPG substrates provide atomically flat areas which are used as a specimen substrate and for magnification calibration in scanning probe microscopy techniques (AFM, SPM, STM). Similar to mica, fresh surfaces can be made by cleaving the samples. HOPG is made by annealing graphite under pressure at temperatures over 3000°C. This conductive material is stable up to 2000°C. Available in three qualities with 0.4, 0.8 and 3.5 degrees mosaic spread. Sample size is 10 x10mm and thickness is 1 or 2 mm. The samples are all double sided which means that the full thickness can be used and they can be cleaved from both sides.

Grade	ZYA	ZYB	ZYH
Product Code	G260/ & G260/A	G260/B	G260/C & G260/D
Mosaic Spread	0.4°	0.8°	3.5°
Accuracy	0.1°	0.8°	1.5°
Sides	Double	Double	Double
Thickness	1 or 2mm	1mm	1 Or 2mm
Chip Size	10 x 10mm	10 x 10mm	10 x 10mm
Application	SPM, STM, AFM, X-ray	SPM, STM, AFM, X-ray	SPM, STM, AFM, X-ray

G260 H.O.P.G. ZYA, 0.4° mosaic spread, double sided piece approx. 10 x 10 x 1mm chip

G260/A H.O.P.G. ZYA, 0.4° mosaic spread, double sided piece approx. 10 x 10 x 2mm chip

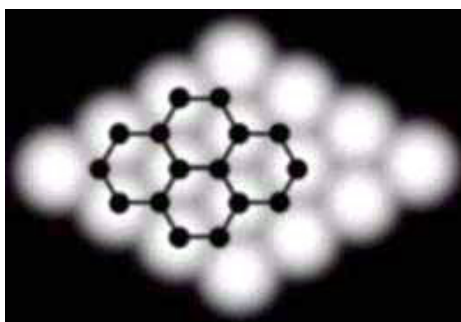
G260/B H.O.P.G. ZYB, 0.8° mosaic spread, double sided piece approx. 10 x 10 x 1mm chip

G260/C H.O.P.G. ZYH, 3.5° mosaic spread, double sided piece approx. 10 x 10 x 1mm chip

G260/C/5 H.O.P.G. ZYH, 3.5° mosaic spread, double sided piece approx. 10 x 10 x 1mm chip (pack of 5)

G260/D H.O.P.G. ZYH, 0.4° mosaic spread, double sided piece approx. 10 x 10 x 2mm chip

G260/D H.O.P.G. ZYH, 0.4° mosaic spread, double sided piece approx. 10 x 10 x 2mm chip (pack of 5)



AFM/SPM Metal Specimen Discs

Magnetic metal specimen support discs are used on the AFM and SPM systems which employ a button magnet to hold the metal disc. Our metal specimen discs are made of a magnetic type 430 stainless steel with a nominal thickness of 0.90mm and a tolerance of +/- 0.08mm. The smooth edges and flat surfaces of the discs ensure secure retention by the button magnet. Specimens can be mounted directly onto the metal discs with double sided tape, epoxy or conductive paste. If a mica specimen support is needed, the mica discs can be easily mounted on the metal support discs. The metal AFM/SPM specimen support discs are currently offered in:

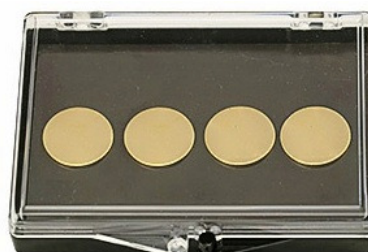
Bright stainless steel They are cleaned after manufacture to remove the dull grey oxide layer often found on some AFM/SPM discs. Available in the most popular 5 diameters: 6, 10, 12, 15 and 20mm. Packaged in a plastic tube of 50 each.

Gold plated metal with 1µm of pure gold. Gold is an inert metal with high electrical and thermal conductivity and resists electro migration as a chemically inert material. Available in 4 diameters: 10, 12, 15 and 20mm. Packaged in a disc storage box.



Magnetic Metal Support Discs

- D266 AFM/SPM stainless steel support discs 6mm Ø pack of 50
- D267 AFM/SPM stainless steel support discs 10mm Ø pack of 50
- D268 AFM/SPM stainless steel support discs 12mm Ø pack of 50
- D269 AFM/SPM stainless steel support discs 15mm Ø pack of 50
- D270 AFM/SPM stainless steel support discs 20mm Ø pack of 50



Gold Plated Support Discs

- D271 AFM.SPM gold plated support discs 10mm Ø pack of 4
- D272 AFM.SPM gold plated support discs 12mm Ø pack of 4
- D273 AFM.SPM gold plated support discs 15mm Ø pack of 4
- D274 AFM.SPM gold plated support discs 20mm Ø pack of 4

Magnetic Pick-up Tool



A convenient magnetic tool for for picking up and manoeuvring discs without damage to the specimen.

- T543 AFM support disc magnetic pick-up tool

AFM/SPM Disc Gripper Tweezers

Our disc gripper tweezers are designed to pick up stainless steel AFM/SPM discs. The shape of the tips fits around the edge of the discs and are ideal when picking up the AFM/SPM discs from a flat surface after mounting a sample. The tips are not coated and have straight, fine edges for a better grip. Available for the popular Ø12mm and Ø15mm AFM/SPM discs. Made from anti-magnetic stainless steel with a satin surface; 115mm long.



- T707 12mm Ø AFM/SPM disc gripper tweezers, anti-magnetic stainless steel 115mm long



- T708 15mm Ø AFM/SPM disc gripper tweezers, anti-magnetic stainless steel 115mm long

AFM Specimen Disc Storage Boxes

Our magnetic AFM disc storage boxes have a transparent hinged lid and are manufactured from polystyrene with a magnet base to hold the magnetic stainless steel AFM discs sample holders. The magnetic base is a medium strength ferrite sheet which holds the AFM discs firmly in place. **Ideal for storage, archiving and transporting AFM discs.:**



B591 Magnetic disc storage box for **1 - 4** AFM discs. 35L x 40W x 29mm high



B592 Magnetic disc storage box for **4 - 8** AFM discs. 75L x 40W x 22mm high



B593 Magnetic disc storage box for **6 - 12** AFM discs. 35L x 40W x 29mm high

Muscovite Ruby Mica Discs and Sheets

Our mica discs and sheets are intended for use with scanning probe microscopy, electron microscopy and thin film applications. [This mica is the muscovite sheet or ruby mica in the highest grade V-1 quality, selected for its excellent cleavability and lack of inclusions or bubbles.](#) It is transparent or translucent with a shade of ruby to pink. Mica is a natural mineral and mined from various deposits. The density is 2.7-3g/cm³ with the chemical formula $KAl_3Si_3O_{10}(OH)_2$. It is sourced from one of the highest quality muscovite sheet mica deposits in India.

To use mica, it must be freshly cleaved to produce a clean substrate. The freshly cleaved surfaces are clean, even and atomically flat and are therefore ideal for carbon filming, AFM substrate, thin film applications, particle spraying and growing cell cultures. The standard thickness of the muscovite mica discs and sheets varies from 0.15-0.21mm and yields multiple thinner sheets (0.02mm) of freshly cleaved mica. Mica is a dielectric material, stable in water, inert to most acids, alkalis, solvents and oil. Maximum operating temperature is 500-600°C.

Mica can be cleaved by either inserting a sharp blade into the edge to peel off a fresh sheet or by placing double sided tape on the surface to peel of a fresh sheet starting at the edge.

M470 V-1 grade Muscovite mica [discs 10mm Ø](#), 0.15-0.21mm thick, pack of 10

M471 V-1 grade Muscovite mica [discs 12mm Ø](#), 0.15-0.21mm thick, pack of 10

M472 V-1 grade Muscovite mica [discs 15mm Ø](#), 0.15-0.21mm thick, pack of 10

M473 V-1 grade Muscovite mica [discs 20mm Ø](#), 0.15-0.21mm thick, pack of 5

M474 V-1 grade Muscovite mica [discs 25mm Ø](#), 0.15-0.21mm thick, pack of 5

M475 V-1 grade Muscovite mica [sheets 15 x 15mm](#) 0.15-0.21mm thick pack of 10

M476 V-1 grade Muscovite mica [sheets 25 x 25mm](#) 0.15-0.21mm thick pack of 10

M477 V-1 grade Muscovite mica [sheets 25 x 50mm](#) 0.15-0.21mm thick pack of 10

M478 V-1 grade Muscovite mica [sheets 50 x 50mm](#) 0.15-0.21mm thick pack of 10

M479 V-1 grade Muscovite mica [sheets 25 x 75mm](#) 0.15-0.21mm thick pack of 10

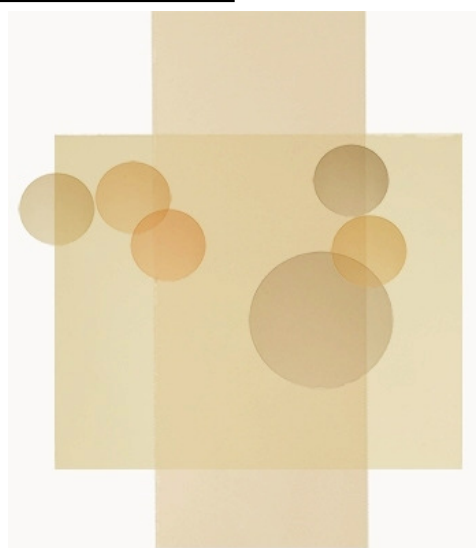
M480 V-1 grade Muscovite mica [sheets 50 x 75mm](#) 0.15-0.21mm thick pack of 10

M481 V-1 grade Muscovite mica [sheets 100 x 75mm](#) 0.15-0.21mm thick pack of 10

M482 V-1 grade Muscovite mica [sheets 25 x 25mm 0.25-0.35mm thick](#) pack of 10

M483 V-1 grade Muscovite mica [sheets 25 x 25mm 0.5-0.6mm thick](#) pack of 10

M484 V-1 grade Muscovite mica [sheets 160 x 120mm 0.25-0.35mm thick](#) pack of 10



90° Sample Holders for AFM and SPM

Our 90° sample mounts are intended for mounting or clamping AFM/SPM samples at 90 degrees to enable easy imaging of cross section or the sides of a sample. They are made from magnetic stainless steel (alloy 430) and can be used on AFM/SPM systems which include a magnet in the sample stage (the same systems which use magnetic metal specimen support discs).

S799 Holds the cross section against the vertical side of the mount. Use an SEM glue to adhere to the side. Avoid double sided tape since the sample could still move which would cause imaging artefacts. Dimensions are 12mm Ø x 4.5mm high with base thickness of 1mm on the thinner side.

S800 The sample is securely held by a small set screw. This method is quicker and keeps the sample and holder free from adhesives. Can be used for samples up to 4mm or for multiple thinner sample clamped together. Dimensions are 12mm Ø x 4.5mm high with a 4mm slot.

S801 S-Clip Holds the sample or cross section securely up to a maximum thickness of 2mm. Ideal for thin sections or cross sections of silicon chips. Dimensions are 12mm Ø x 4.5mm high with base thickness of 1mm on the thinner side.

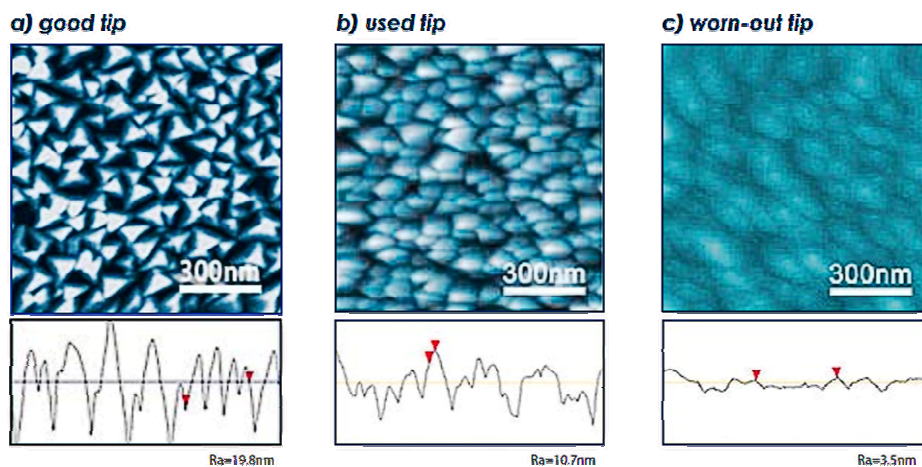


TipCheck Sample for Checking AFM Tips

When imaging a sample surface by AFM, it may be difficult to know whether the surface is imaged accurately or if it is affected by a blunt or broken tip. Blunt or broken tips will dramatically distort measurements like surface roughness or feature dimensions. To be certain that a proper AFM tip is used, they must be renewed regularly or checked by SEM imaging; both methods are time consuming and expensive.

An easier solution is to use the TipCheck sample for quick and convenient determination of the AFM tip condition. A single scan is often enough to clearly show the condition of the AFM tip; Tipcheck offers a quick and easy way to compare and categorize different AFM probes with respect to tip parameters like apex, shape and sharpness.

You can easily check whether the AFM tip is still good, is starting to show showing wear or is blunt or broken without the need of scanning an entire image or performing an SEM inspection of the tip. Additionally, the TipCheck sample works well with Auto Tip Qualification and Tip Characterisation software currently available on the market.



Comparison between different tip conditions measured with the TipCheck sample. Scan size is 1x1µm for all images; height scale is 100nm

The TipCheck sample consists of an extremely wear-resistant thin film coating deposited on a silicon chip. The thin film shows a granular, sharply peaked nanostructure which is ideal for reverse imaging of the AFM probe tip apex.

T709 AFM TipCheck sample 5 x 5mm mounted with electrically conductive epoxy resin on a 12mm metal AFM disc.

AFM/SPM Calibration Standards and Test Gratings

Atomic Force Microscopy (AFM) has become a valuable tool for imaging and accurate measurements at the micro and nanometer scales. In order to validate results, the AFM system needs to be correctly calibrated. Below is a selection of affordable and accurate AFM calibration standards for Z-axis and X-Y axis calibration:

The HS series with 20nm, 100nm and 500nm calibrated Z height also offering X-Y calibration for larger scanners in the 40-100µm range.

The CS calibration standard with 20nm Z height also enables X-Y-axis calibration at a smaller scanner size in the µm range.

The CS and HS series AFM calibration standard structures are all fabricated on a Si chip which is mounted on a 12mm stainless steel AFM disc with electrically conductive epoxy resin.

The HS-20MG is predominantly a height calibration standard with a 20nm calibrated height. It consists of silicon dioxide structures on a 5 x 5mm silicon chip. The fabrication process guarantees excellent uniformity of the structures across the chip. The calibration area is located in the centre of the silicon chip and consists of a larger square of 1 x 1mm with square pillars and holes with a 10µm pitch. In the centre of this square is a smaller square of 500 x 500µm with circular pillars and holes with a 5µm pitch.

This design also allows for X/Y axis calibration for larger scanners in the 10-40µm range. The structure symmetry of the HS-20MG enables calibrating your AFM system in one step without rotating the sample in between X and Y axis calibration.

The HS-20MG can be supplied mounted on a 12mm metal AFM disc using electrically conductive epoxy resin or unmounted. The exact height value is stated on the label of the HS-20MG.

S802 HS-20MG AFM XYZ calibration standard 20nm Z mounted on 12mm AFM disc

S802/AH HS-20MG AFM XYZ calibration standard unmounted

The HS-100MG is also a predominantly a height calibration standard with a 100nm calibrated height. It consists of silicon dioxide structures on a 5 x 5mm silicon chip. The calibration area is located in the centre of the silicon chip and consists of a larger square of 1x1mm with square pillars and holes with a 10µm pitch. In the centre is a smaller square of 500 x 500µm with circular pillars and holes with a 5µm pitch.

This design also allows for X/Y axis calibration for larger scanners in the 10-40µm range. The structure symmetry of the HS-100MG enables calibrating the AFM system in one step without rotating the sample in between X and Y axis calibration.

The HS-100MG is either supplied as mounted on a 12mm metal AFM disc using electrically conductive epoxy resin or unmounted. The exact height value is stated on the label of the HS-100MG.

S803 HS-100MG AFM XYZ calibration standard 100nm Z mounted on 12mm AFM disc

S803/A HS-100MG AFM XYZ calibration standard unmounted

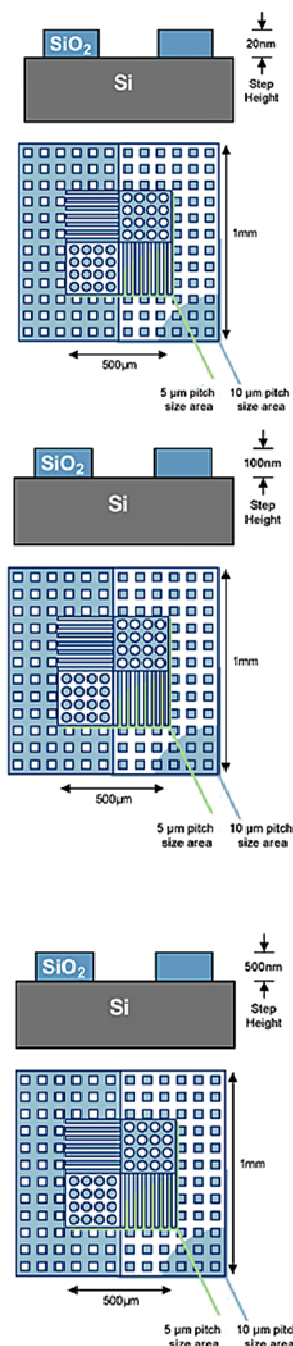
The HS-500MG is also a predominantly a height calibration standard with a 500nm calibrated height. It consists of silicon dioxide structures on a 5 x 5mm silicon chip. The calibration area is located in the centre of the silicon chip and consists of a larger square of 1 x 1mm with square pillars and holes with a 10µm pitch. In the centre is a smaller square of 500 x 500µm with circular pillars and holes with a 5µm pitch.

This design also allows for X/Y axis calibration for larger scanners in the 10-40µm range. The structure symmetry of the HS-500MG enables calibrating the AFM system in one step without rotating the sample in between X and Y axis calibration.

The HS-100MG is either supplied as mounted on a 12mm metal AFM disc using electrically conductive epoxy resin or unmounted. The exact height value is stated on the label of the HS-100MG.

S804 HS-500MG AFM XYZ calibration standard 500nm Z mounted on 12mm AFM disc

S804/A HS-500MG AFM XYZ calibration standard unmounted



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AFM/SPM Calibration cont.....

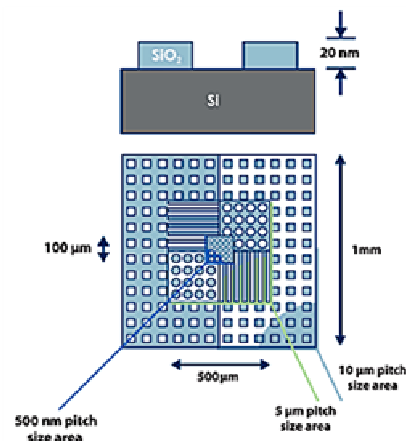
The CS-20NG is an XYZ calibration standard with a 20nm calibrated height. It consists of silicon dioxide structures on a 5 x 5mm silicon chip. The fabrication process guarantees excellent uniformity of the structures across the chip. The calibration area is located in the centre of the silicon chip and consists of a larger square of 1 x 1mm with square pillars and holes with a 10µm pitch. In the centre is a medium square of 500 x 500µm with circular pillars and holes with a 5µm pitch. The small square in the centre has a size of 100 x 100µm and contains circular holes with a 500nm pitch.

This design of the nanogrid allows for both lateral and vertical scanner calibration. The structure symmetry of the CS-20NG enables calibration an AFM system in one step without rotating the sample in between X and Y axis calibration.

The CS-20NG is supplied either mounted on a 12mm metal AFM disc using electrically conductive epoxy resin or unmounted. The exact height value is stated on the label of the CS-20NG.

S805 CS-20NG AFM XYZ calibration standard, 20nm Z, mounted on 12mm AFM disc

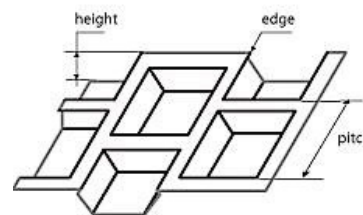
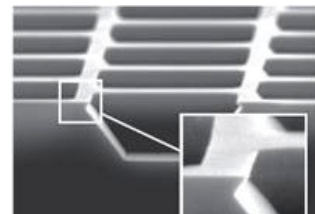
S805/A CS-20NG AFM XYZ calibration standard, 20nm Z, unmounted



TGX AFM/SPM calibration grating, 3µm pitch, undercut edges. The TGX calibration grating with an undercut edge is made by two-dimensional anisotropic etching along the (111) crystallographic planes of silicon. Typical radius of the edges is 5nm. The TGX calibration grating is intended for lateral calibration of SPM scanners, but is equally useful for detection of lateral non-linearity, hysteresis, creep, cross-coupling effects and determination of the tip aspect ratio. Calibrated pitch is 3µm with a non-calibrated step height of 1µm. Chip size is 5 x 5 x 0.3mm with an active area of 1 x 1mm. Supplied either unmounted or mounted on a 12mm AFM disc.

S806 AFM/SPM calibration grating, 3µm pitch, undercut edges mounted on 12mm AFM disc

S806/A AFM/SPM calibration grating, 3µm pitch, undercut edges, unmounted



TGF11 AFM/SPM calibration grating, 10µm pitch, trapezoid structure. The TGF11 calibration gratings exhibit one-dimensional arrays of trapezoid steps. These steps are etched into a silicon substrate along the (111) planes in mono-crystalline silicon. The result is a planar structure with smooth sidewalls on the trapezoid at an angle of 54.74°. The TGF11 grating is useful for assessment of scanner non-linearity in the vertical direction. Calibration of the lateral force can be obtained by analyzing the contact response on the flat and sloped planes. Calibrated pitch is 10µm with a non-calibrated step height of 1.75µm. Chip size is 5 x 5 x 0.3mm with an active area of 3 x 3mm. Supplied either unmounted or mounted on a 12mm AFM disc.

S807 TGF11 AFM / SPM calibration grating, 10µm pitch, trapezoid structure, mounted on 12mm AFM disc

S807/A TGF11 AFM / SPM calibration grating, 10µm pitch, trapezoid structure, unmounted

