

Handling HDC/DLC tips – please read carefully!

nanotools high density, diamond-like carbon (HDC/DLC) tips are shipped in a specially designed gel box and vacuum sealed in an electrostatic discharge (ESD) protective shielding bag.

ESD shielding bag

As long as the ESD bag is closed, there is no risk of ESD damage. Technical specifications as well as the serial number of the delivered product can be found on the backside of the gel box.

ATTENTION:

DO NOT open the ESD bag outside of ESD-protected areas!

Before opening the ESD bag in an ESD-protected area please ensure that you are grounded (e.g. with a static dissipative wrist strap or ESD-protective footwear) and the gel box is on ground potential (e.g. by using a grounded pad).



Gel box

Before breaking the authenticity seal and opening the gel box please ensure

- the integrity of the seal,
- that the delivered tips are consistent with your order,
- that no transportation damages occurred (e.g. loose tips)

In case one or more of the above points is not satisfied, please contact nanotools immediately.



Tip handling

To pick up and handle individual **tips packed conventionally**, we recommend the usage of metal tweezers.

To pick up and handle individual **tips packed upside down**, we recommend to use carbon tweezers.

Using the recommended tweezers helps to avoid damages on the chip edges and ensures the chip remains free of particles. To load a tip cassette, we recommend to use a stereo microscope.

For further information:
+49 (0)89-121138-10
info@nanotools.com
www.nanotools.com

Using HDC/DLC tips

nanotools HDC/DLC tips are characterized by outstanding resolution capabilities, extreme durability, and chemical stability. HDC/DLC tips can be used as any other AFM tips in all conceivable scanning applications. However, in order to obtain the best results, please note the following remarks.

Imaging

HDC/DLC tips typically do not suffer from or degrade under high loading forces (in contrast to many other AFM probes). HDC/DLC shows material properties comparable to that of diamond, but also exhibits a certain degree of flexibility: HDC/DLC probes tend to elastically bend under very high loading forces. With long and extremely sharp tips this may lead to imaging artifacts, particularly when scans are performed at high frequencies and low set points, i.e. high loading forces and large scan sizes. Such imaging artifacts may be avoided by reducing the effective force between tip and substrate. For longer tips we generally recommend to reduce the scan speed.

Cleaning

Generally, HDC/DLC tips do not tend to contaminate during scanning, since most materials adhere poorly on HDC/DLC. If HDC/DLC tips are used on highly adhesive samples or are deeply immersed into a soft sample, some contaminations might occur. In such cases we recommend to carefully immerse the probe into a proper solvent (e.g. double distilled water, isopropanol or acetone) and blow dry with compressed nitrogen or compressed air. While HDC/DLC itself is not attacked by most solvents, we strongly advise you not to apply plasma cleaning or any physical etching.

Inspection

In general, every electron imaging system does contaminate the sample under investigation – even those working under very high vacuum conditions. The HDC/DLC tip itself is easily and very rapidly contaminated. Contamination generally changes the tip shape geometry and drastically affects the unique material properties of HDC/DLC. Therefore, we strongly recommend you not to perform any kind of tip imaging in electron beam systems. For our certificates, i.e. high-resolution images, we use a modified SEM working under inert gas atmosphere and ultra-high vacuum conditions in combination with low electron energies and minimum dwell times. Only these imaging conditions allow for a non-destructive imaging process on non-planar carbon structures such as HDC/DLC tips.

For further information:
+49 (0)89-121138-10
info@nanotools.com
www.nanotools.com