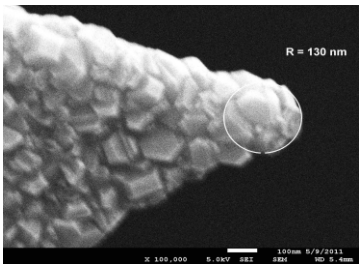
Platinum Silicide SPM-Probes

Highly conductive and wear-resistant SPM probes

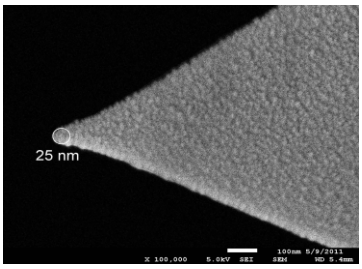
NANOSENSORS™ Platinum Silicide AFM probes are designed for conductive AFM imaging where the combinations of excellent conductivity, high wear resistance and a small tip radius are required.

Until recently scientists interested in conductive AFM could choose between two types of SPM probes for these applications: metal coated probes (mostly platinum coated) and conductive diamond coated SPM probes. These two probe types have certain advantages and disadvantages. Metal coated probes offer their user high conductivity and a relatively small tip radius. Their disadvantage is that the coating wears relatively fast. In contrast silicon probes covered with a conductive diamond coating offer a high wear resistance, however their conductivity is ten to hundred times lower than that of metal coated probes and due to the thickness of the conductive diamond coating the tip radius is relatively large.

With the introduction of the NANOSENSORS™ Platinum Silicide SPM probes we successfully combine the advantages of wear resistance, high resolution imaging and metal-like conductivity in one conductive SPM probe. While not as robust as diamond Platinum Silicide has an substantially increased hardness over platinum or other metals. The conductivity of platinum silicide is close to the conductivity of platinum and more than one order of magnitude better than diamond.



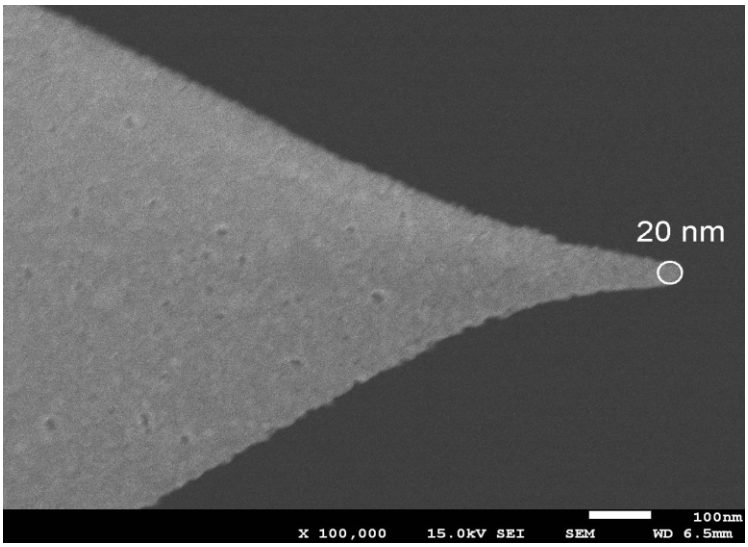
Conductive diamond probes. Advantages: hard, long-lasting coating. Disadvantages: large radius, low conductivity



Platinum (Iridium) coated probes. Advantages: relatively small radius, excellent conductivity. Disadvantage: fast wear-out

Tip Features at a Glance

- Hard, solid and conductive silicide apex versus traditional conductive probes with only a few tens of nanometers metal coating at the tip apex
- Smaller tip radius (nominal 25nm) than normal metal coated probes (nominal 30nm). About five to six times smaller radius when compared to diamond coated tips (nominal 150nm)
- Almost metal like conductivity. More than ten times better conductivity than conductive diamond probes
- Dramatically improved wear rates compared to silicon and PtIr coated tips



Platinum Silicide probe. Advantages: small radius, excellent conductivity, good wear-out behavior.

General Properties

NANOSENSORS™ Platinum Silicide probes are based on the well-known NANOSENSORS™ PointProbe® Plus Silicon SPM Probes. NANOSENSORS™ Platinum Silicide probes share all general properties of this well-known SPM probe series such as the consistent tip shape and tip radius and a support chip with alignment grooves on the backside.

For further information please refer to the NANOSENSORS™ PointProbe® Plus product flyer.

Material Features

NANOSENSORS™ Platinum Silicide SPM probes are realized by a metal deposition on the PointProbe® Plus base and a subsequent thermal treatment. This process transforms the silicon tip apex into a hard, solid and conductive platinum silicide apex.

- Monolithic design of support chip, cantilever and base tip
- Overall platinium silicide coating (PtSi) on both sides of the cantilever
- Platinum silicide is a hard coating with the capability to withstand high currents
- Tip side coating with almost metallic conductivity
- Detector side coating to enhance laser reflectivity

Field of Application

NANOSENSORS™ Platinum Silicide probes are ideally suited for

- Conductive AFM (CAFM)
- Tunneling AFM (TUNA)
- Scanning Capacitance Microscopy (SCM)
- Kelvin Probe Force Microscopy (KPFM)
- Electrostatic Force Microscopy (EFM)

Due to the small radius and high aspect ratio tip apex NANOSENSORS™ Platinum Silicide probes are not designed to withstand the high forces required for Scanning Spreading Resistance Microscopy (SSRM).

Product List

	Type	*Application*	*Force Constant [N/m] (nominal)*	*Res. Frequency [kHz] (nominal)*	*Coating (backside)*
Non-Contact	PtSi-NCH	C-AFM, TUNA	42	330	PtSi (PtSi reflective)
Non-Contact	PtSi-FM	C-AFM, TUNA, SCM EFM, KPFM,	2.8	75	PtSi (PtSi reflective)
Contact	PtSi-CONT	C-AFM, TUNA, SCM	0.2	13	PtSi (PtSi reflective)

For more details please refer to the product datasheet on our website
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