

Probes for scanning near-field infrared microscopy (SNIM)

Our R&D department is developing cantilever based probes for the scanning near-field infrared microscopy. For that, the well-established Pointprobe®-Sensors are covered with a thin metal coating which is opened at the apex of the scanning tip by micro fabrication methods forming an aperture with a diameter of down to 50 nm. During the measurement the sample is locally illuminated through this aperture from the opposite side of the silicon cantilever beam to enable infrared microscopy far below the limits of diffraction.

The cantilever movement is detected by conventional laser beam deflection methods or by an optionally integrated stress sensors. For the second method the fabrication techniques of the aperture on the one hand and the integration of a piezoresistive stress gauge into the cantilever beam on the other hand have been combined.

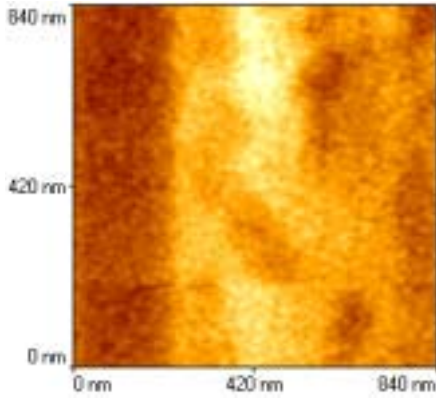
This development is based on a cooperation project supported by the German ministry of education and research. The following partners have been involved:

- Physikalisch-Technische Bundesanstalt (PTB), Braunschweig, Germany
- Fraunhofer Institute of Integrated Systems and Device Technology (IISB), Erlangen, Germany
- Surface Imaging Systems GmbH (S.I.S.) , Herzogenaurach, Germany
- Bruker Optik GmbH, Ettlingen. Germany

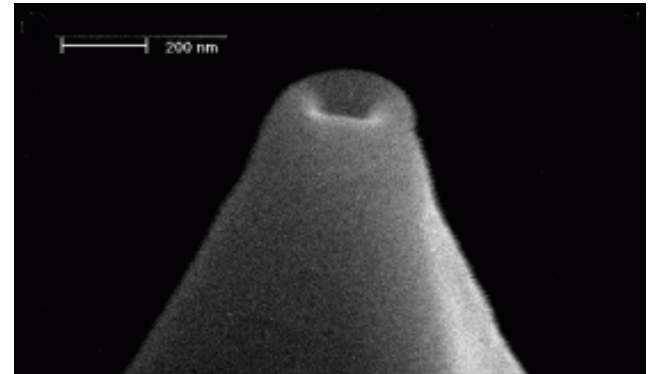
Scanning near-field infrared microscopy measurements have shown that a resolution of down to a few tens of nanometers could be achieved at a wavelength of 1064 nm.

Contact: info@nanosensors.com

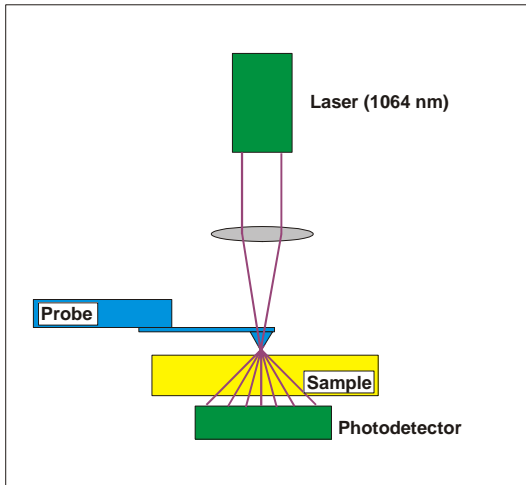
SNIM-Probes - images



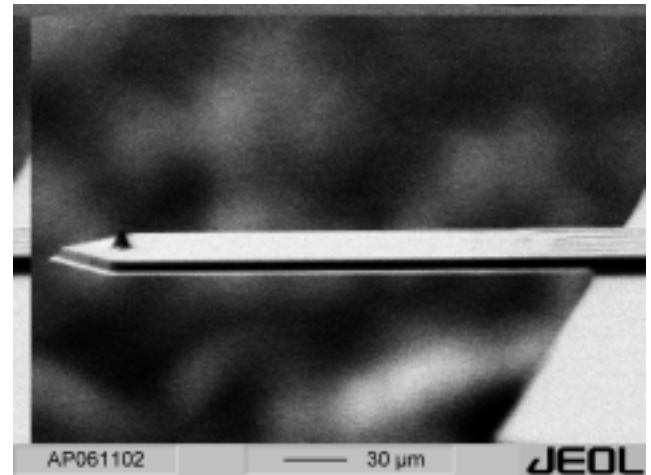
SNIM-Measurement of a Au-line on silicon



Tip apex with metal aperture



Measurement setup



Cantilever beam with integrated stress gauge and aperture tip