

## Touches Differ

### CSG30 Probes - Specially Designed Series for Operating in Semi-Contact and Contact AFM Modes

CSG30 probes can be used both for semi-contact and nondestructive contact modes due to force constant and resonant frequency mean values.

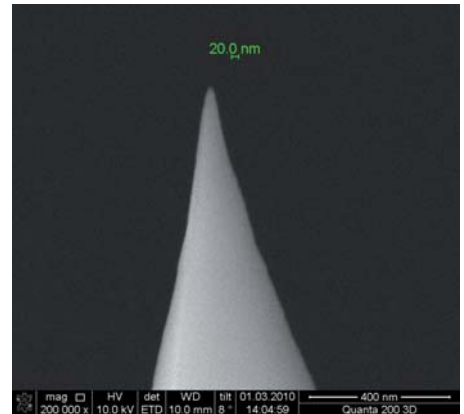
Softer probes are difficult to use in semi-contact mode meanwhile harder probes can destroy the sample surface in some cases. So CSG30 probes can be used in both semi-contact and nondestructive contact modes for measurement of certain sample types.

The CSG30 probes are designed for the following situations:

- The mode is not defined.
- The measurements should be provided on the same sample area in different modes without removing the tip.

The probes are available with PtIr conductive coating, so one can make the measurements in the most conductive contact and semi-contact modes.

CSG30 and CSG30/Pt probes can be used for surface quality nondestructive checking, e.g. after measurements of soft materials like polymers in contact mode (Conductive AFM, Force Modulation, AFAM, nanoindentation, force-distance measurements etc.). Such tips provide precise tuning of 'tip-sample' interaction to reduce sample damage in contact mode. It is possible to use these probes for phase contrast imaging of soft materials.



#### Probe specification:

Material	Single Crystal Silicon, N-type, 0.01-0.025 Ohm-cm, Antimony doped
Chip size	3.4 x 1.6 x 0.3 mm
Reflective side	Au
Cantilever number	1 rectangular
Tip curvature radius	Uncoated - typical 6 nm, guaranteed 10 nm; Coated ~ 35 nm
Available coatings	Conductive PtIr; PtIr (25 nm), Cr adhesion layer (25 A)
Available probe	Bare, tipless, with Al reflective coating

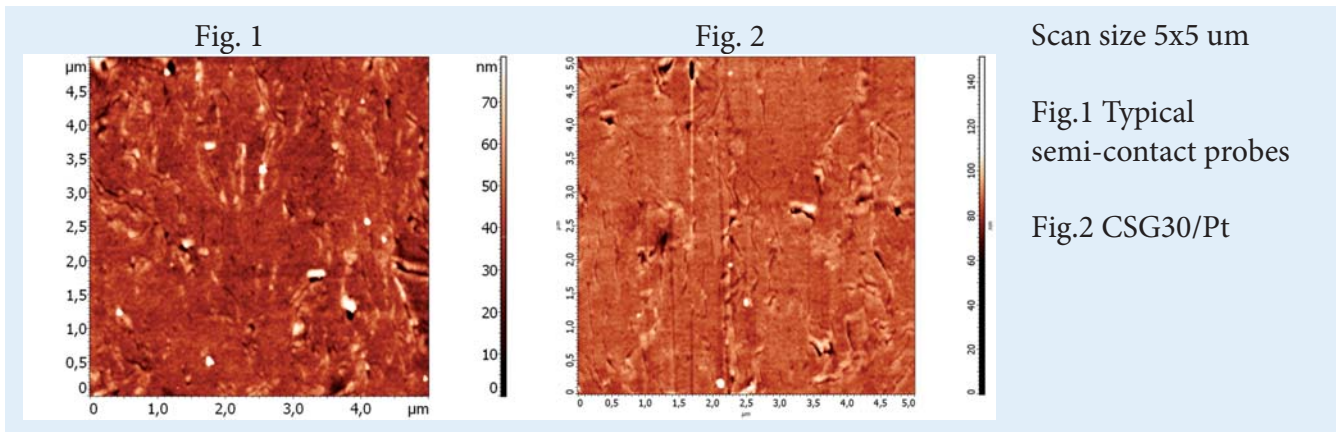
Cantilever series	Cantilever length, L±5µm	Cantilever width, W±3µm	Cantilever thickness, T±0.5µm	Resonant frequency, kHz			Force constant, N/m		
				min	typical	max	min	typical	max
CSG30	190	30	1.5	26	48	76	0.13	0.6	2

The example of CSG30 probe application:

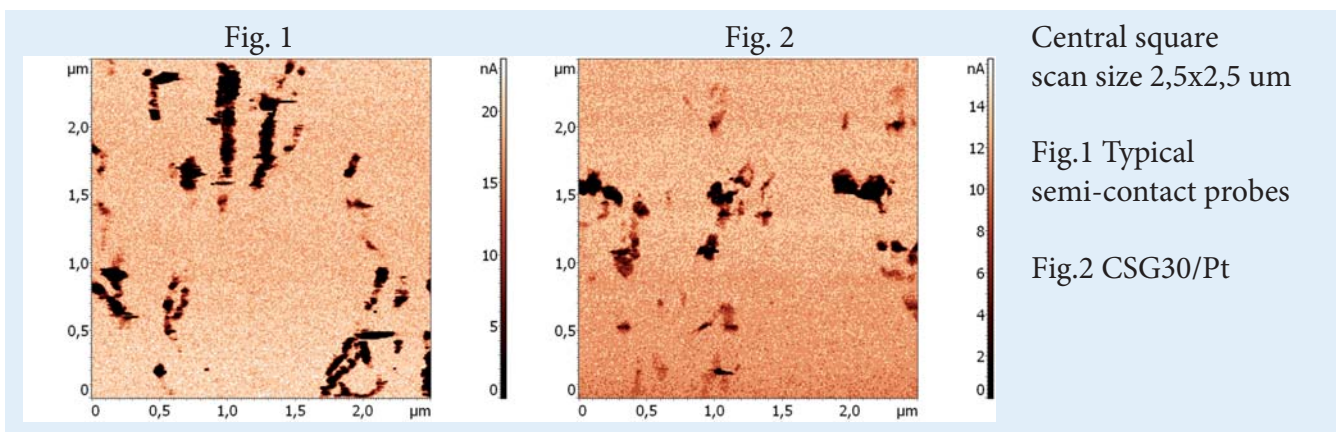
The sample is polystyrene-graphene composite (Sample courtesy of Prof. J. Loos, Prof. G. de With). Samples were prepared and measured by [NTEGRA Tomo](#).

The sample surface was measured by NSG10/Pt probes (typical semi-contact probes, force constant - 12 N/m, resonant frequency 240 kHz) and CSG30/Pt probes (force constant - 0,6 N/m, resonant frequency - 48 kHz) in 3 steps:

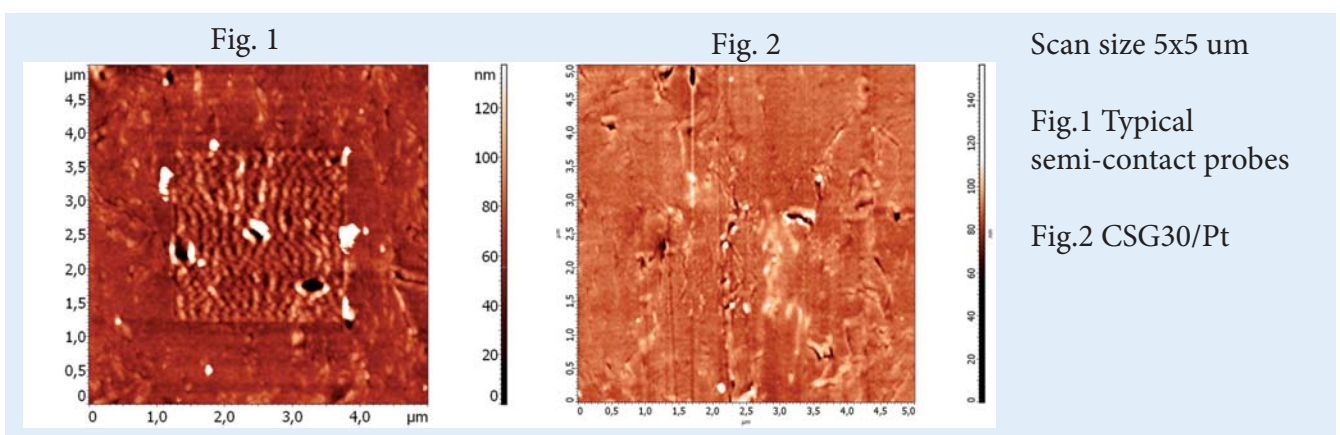
Step 1. Semi-contact mode



Step 2. Spreading resistance mode



Step 3. Semi-contact mode - checking the surface changes after the contact mode



As the result of experiment there are some surface changes after using the typical semi-contact probes for conductivity measurements, but there are no destructions after CSG30/Pt tip using.