

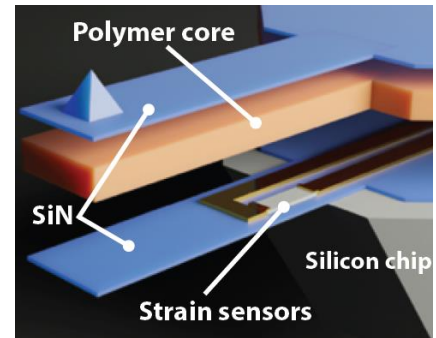
Conductive Trilayer Cantilever Probes

Silicon Nitride-Polymer AFM probes: for KPFM/C-AFM

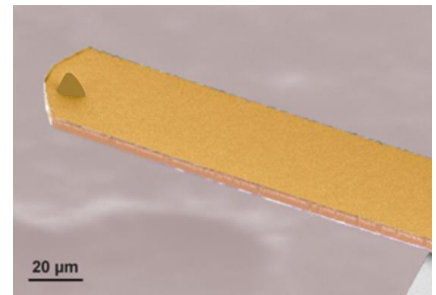


General description

The Trilayer Cantilevers (TLC) feature a unique structure with Silicon Nitride films and a polymer core, resulting in increased thickness without excessive stiffness. This design significantly amplifies force sensitivity ($\mu\text{V}/\text{nN}$), surpassing standard single-crystalline Si cantilevers by a factor of 4x. Due to the low Q-factor of less than 250 (even in a vacuum). The TLC enables scanning speeds up to 10x faster than those achievable with Si or SiN-CL. Additionally, the electrical insulation of electronic sensors within the SiN/Polymer interface ensures robustness and reliability even in harsh conditions. Coated tip with 100 nm Pt metal and connected to an external signal enables the use of TLCs for conductive AFM (C-AFM) and KPFM applications.



Schematic of the trilayer cantilever (TLC)



SEM image of the TLC (top-view)

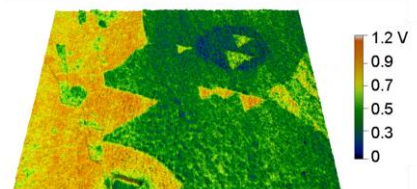
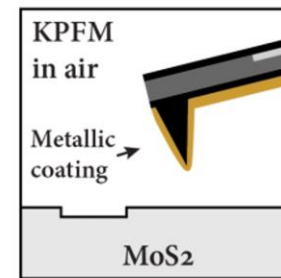
Specifications			
Model	Conductive Trilayer cantilevers		
Material	SiN with a polymer core		
Tip material	Silicon		
Pt metal coating	on the tip (100 nm thickness)		
Modes	static and dynamic modes		
Possible dimensions*	Res. Freq.	Spring constant	Deflection sensitivity**
$\mu\text{m} \times \mu\text{m} \times \mu\text{m}$	KHz	N/m	$\mu\text{V}/\text{nm}$
220x40x4	80	2.5	1.5
180x40x4	120	4.5	2.5
150x40x4	170	8	3.5
120x40x4	270	15	5
Deflection sensing	on-chip piezoresistive bridge		
Actuator	external shaker		
Electrical connections	bonded on a PCB or unbonded		
* Nominal values. For more dimensions, contact us.			
** Not amplified (signal direct at the chip), 1 V bridge supply.			

Applications:

- Kelvin Probe Force Microscopy (KPFM).
- Conductive AFM (C-AFM) and electrical probing.
- Integration on standard AFM scanner, high-speed AFM.
- Force or deflection measurements.

What about your application? Contact us!

References: Hosseini et al., Nature Electronics, 2024 (accepted)



KPFM measurements on layered MoS₂: Measurement principle (metal-coated tip), Topography measurement and line profile, Superposition of topography and surface potential map

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