

A Novel Tool for Combined AFM, SEM, and Electrical Probing of Nanostructures

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The FusionScope

Correlative AFM & SEM
Acc. Voltage 3.5 – 15 kV
Schottky Emitter

AFM
Scan Range XY: 22 x 22 μm
Scan Range Z: 10 μm
Cantilever: Piezoresistive

Compact Vacuum chamber:
Pumping time < 5 min

Joint coordinate system



Main benefits of correlative AFM & SEM microscopy:

- FusionScope is an easy-to-use correlative microscopy platform designed from the ground up to add the benefits of AFM, SEM, EDS, Nanoprobing and more
- Position the AFM precisely at your region of interest, even on complex and challenging sample surfaces
- Perform a complete suite of characterization techniques by analyzing topographical, nanomechanical, chemical, electrical, and magnetic properties with the power of correlative AFM & SEM microscopy



Integration of Nanoprober

SEM

Nanoprober

Sample

AFM

- Nanoprobers can be easily integrated into FusionScope
- Up to 4 Nanoprobers can be integrated simultaneously

Combined AFM, SEM & Electrical Probing

Correlative EFM on topography during bias flip

279 nm

0

24 μA

0

30

20

10

0

Current (μA)

Distance (μm)

- Electrical Probing of individual electrodes
- Measure Conductivity & EFM signal

Analysis of individual Nanowires

20.0 μm

0.67 μm

-0.20 μm

Y: 4.7 μm

X: 9.0 μm

Force Distance Curve Nanowire

Deflection (μm)

Distance (μm)

— Approach — Retraction

164 nm

140

120

100

80

60

40

20

0

500 nm AFM

500 nm TEM

500 nm TEM

plasmonic nanowire activity

~24 nm high

~48 nm wide

needed for simulations

only accessible via AFM!

0.20 μm

0.00 μm

25

20

15

10

5

0

height (μm)

distance (μm)

cross-sectional profile

X: 3.0 μm

Y: 3.0 μm

- Measure topography & mechanical properties of individual Nanowires
- Access 50 nm Au Nanowire on 5 nm thin TEM membrane
- Measure cross-sectional profile and correlate with TEM

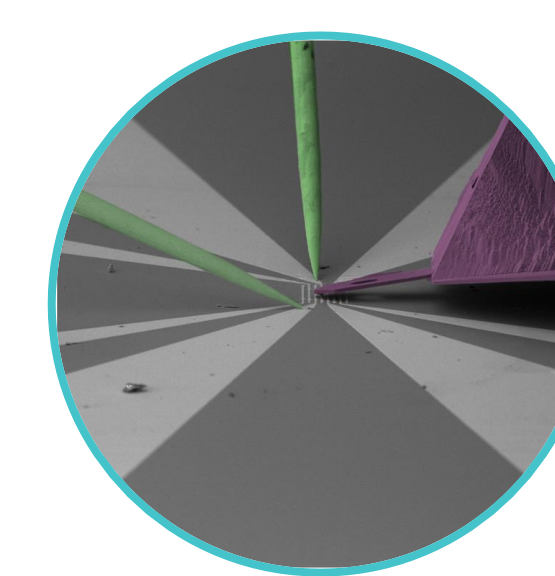
Reisecker et al., *Adv. Funct. Mater.* 2310110 (2023)

Summary



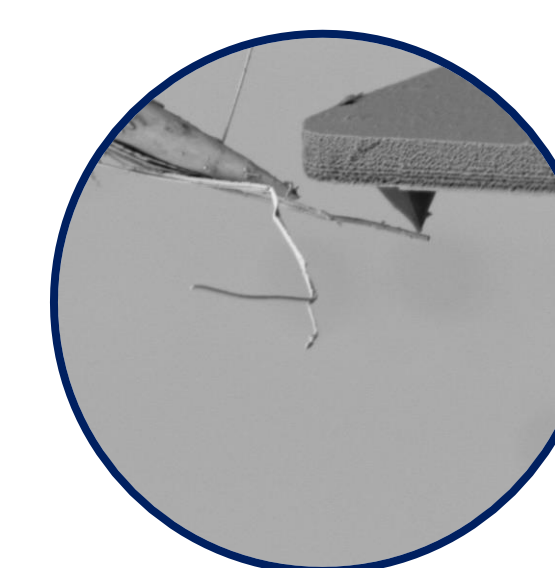
FusionScope

Unique combined AFM & SEM tool for interactive correlative analysis on the nanoscale



Electrical Probing

Perform Electrical Probing and measure conductivity and EFM signal



Analyze of Nanowires

Perform correlative SEM and AFM analysis of individual nanowires

www.fusionscope.com