Nanovie

Scanning Tunnelling Microscope

Hello Nanoworld

Science is Adventure

- Where are we?
- How were they built?
- Nano-Manipulation
- Sample Preparation

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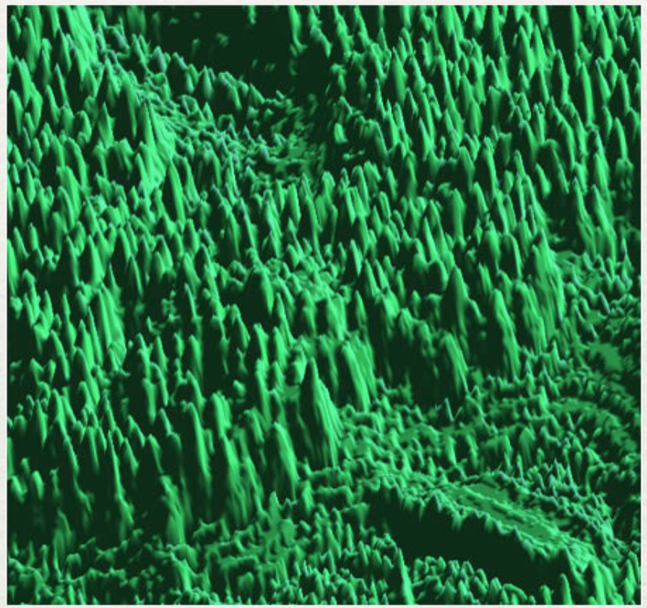
Where are we?

Hoodoos Height 1.5m ~ 45m

Formed by Frost Wedging: 200 freeze/thaw cycles per year, over a thousand years

Bryce Canyon National Park



Crystal Diameter: 15 nm

Spin deposition of PbSe Nano-Crystal

On the atomically flat surface of graphite

Invisible from visible lights of 400-nm wave length

3,000,000,000 :1 The ratio of the Earth to an ant

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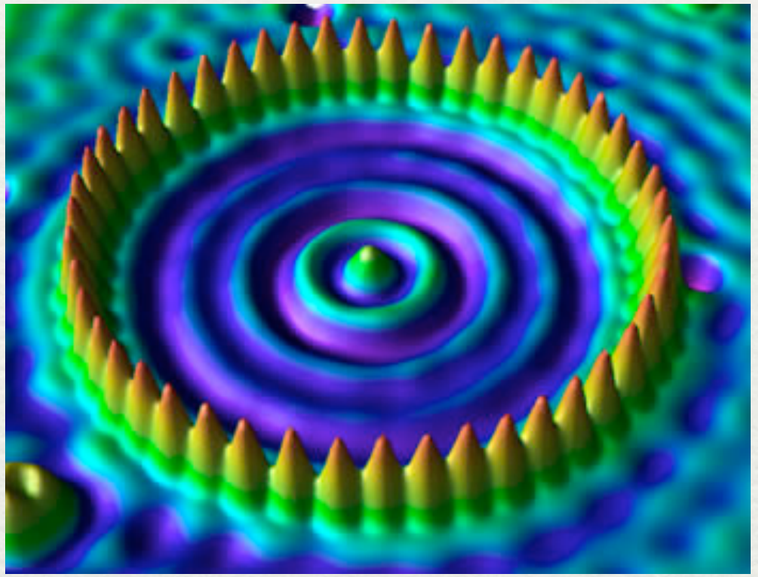
How were they built?

Stonehenge

Construction phases spanned 1,500 years

The rocks, which weigh 3 ~ 50 tons, were transported from Wales almost 400 km afar



Quantum Corral

48 iron atoms on a copper (111) surface

Created in 1993 by Lutz, Eigler, and Crommie, using the tip of a STM at IBM Almaden Centre.

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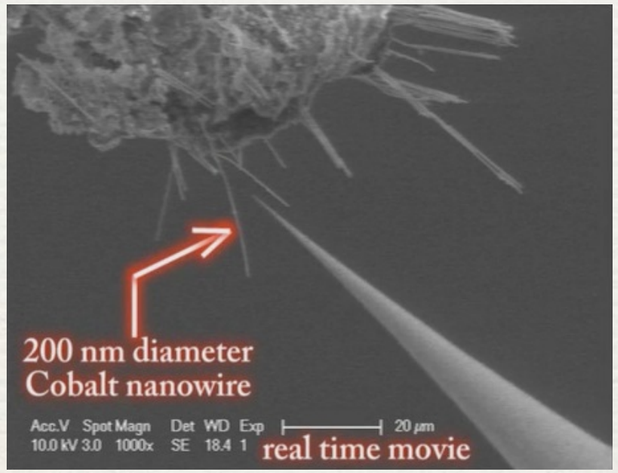
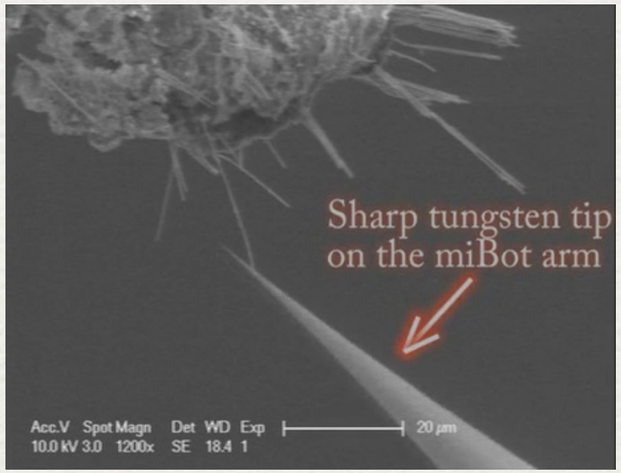
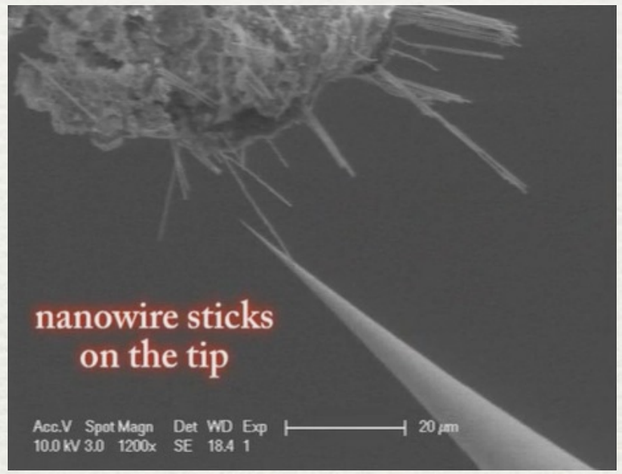
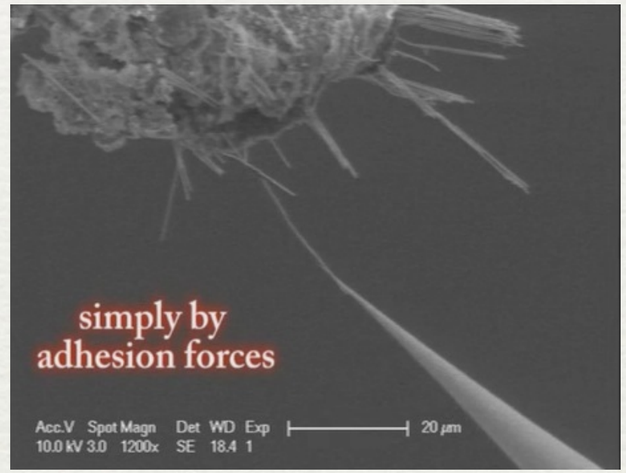
Nano-Manipulation



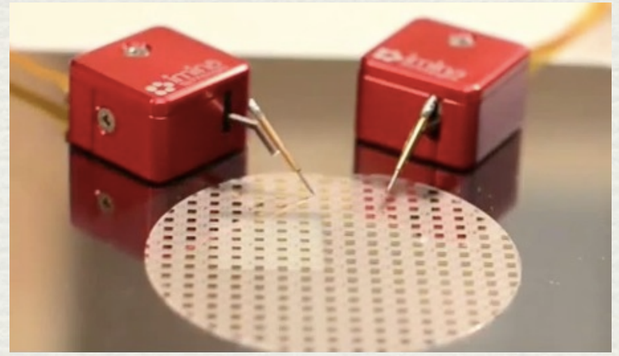






- ★ Picking, Bending, Moving, Positioning, Cutting of Nano-wires / biological tissues
- ★ AFM Tip Decoration, TEM Sample Preparation
- ★ MEMS/NEMS/LED Testing, Wafer/Thin Film Probing

  using IMINIA MiBot Nano-manipulators



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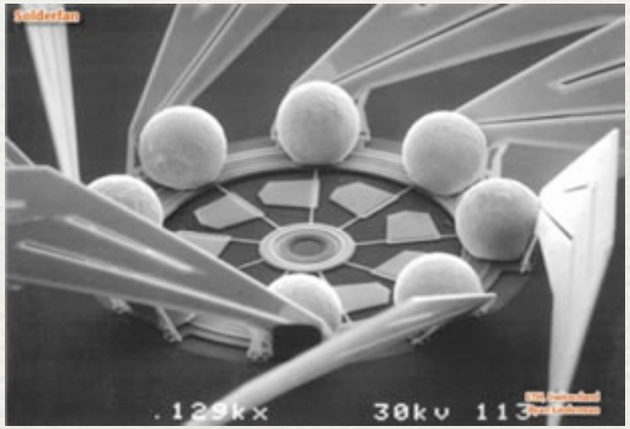
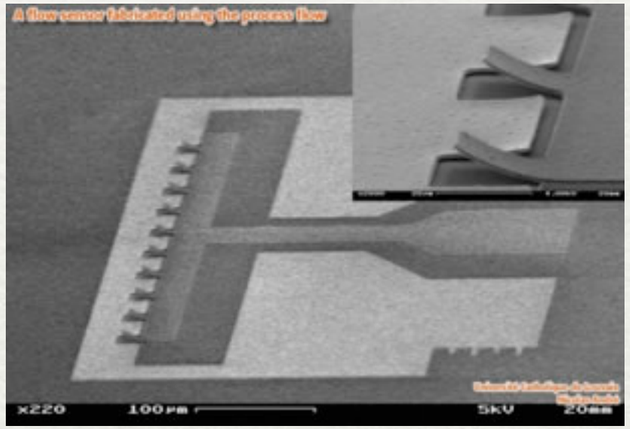
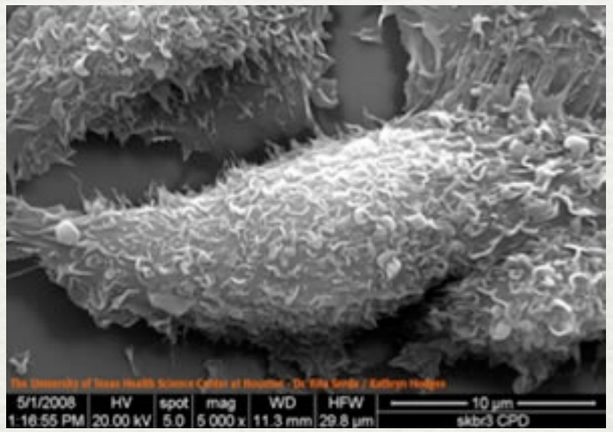
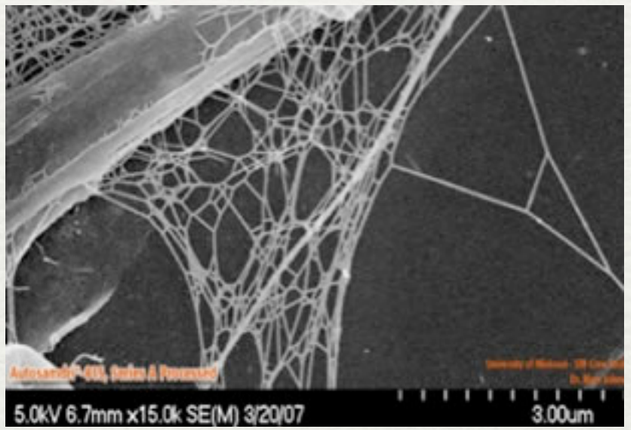
Sample Preparation



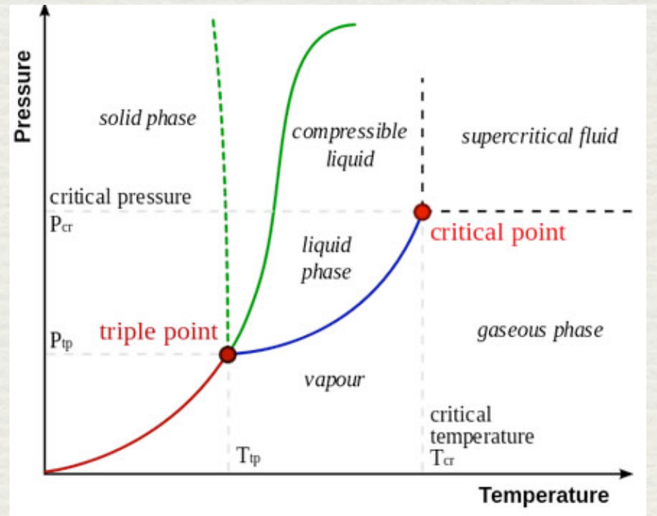






- ★ Samples may require different preparation for different microscopes.
- ★ Surface tension deforms and collapses delicate nano- and micro-structures.
- ★ When vapour–liquid critical point is reached, the specimen passes through the drying transition without being in contact with a surface, and thus remains intact.

  using TOUSIMIS Critical Point Dryer



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- Nanovie STM Educa for Education
- Nanovie Auto Tip Maker
- Nano-level Probe Tips

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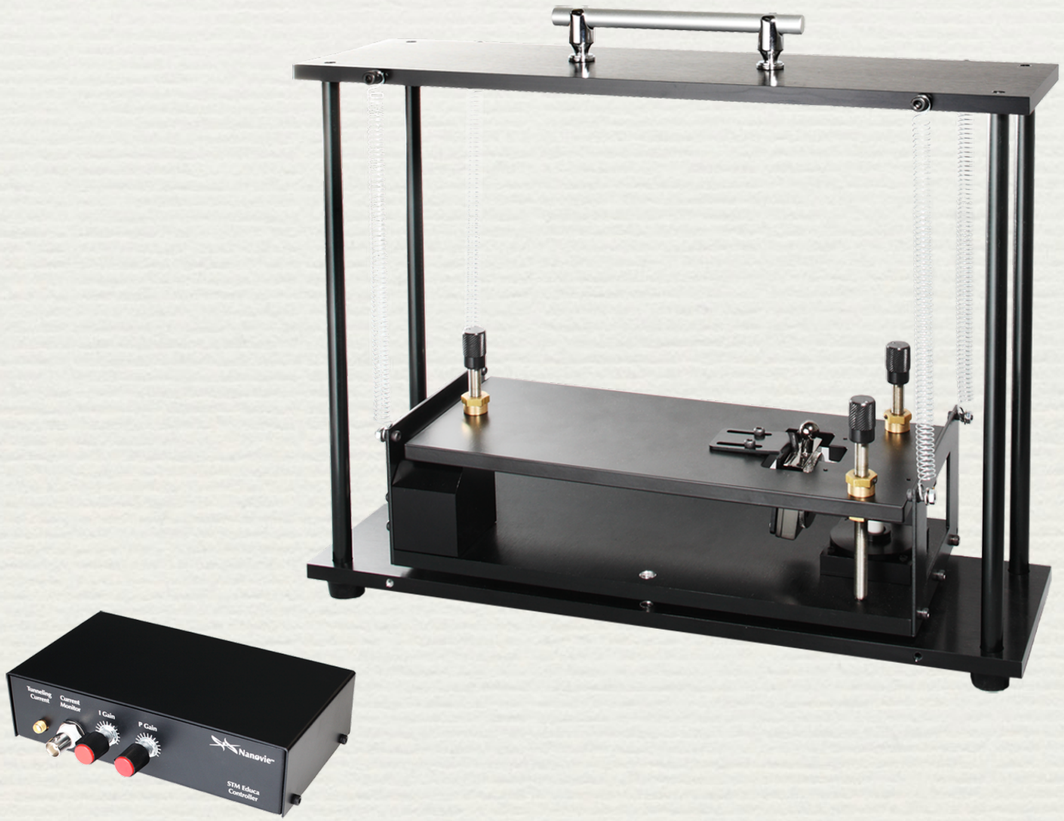
Portable 3D nanoscale microscope



A compact portable 3D nanoscale microscope for imaging in liquid as well as in air.

Every student in every school can now do their own experiments exploring the nano-world.

Heuristic operational design, allowing students to learn the principles behind.

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Nanovie STM Educa
Feature highlights

Feature Highlights

- Optimal resolution: horizontal 3 nm, vertical 0.1 nm
- In-liquid scan
- Lithography – nanoscale manipulation & in-situ rescan
- Intuitive Control Interface
- Powerful Image Analysis Software
- Manual tip-to-sample approach

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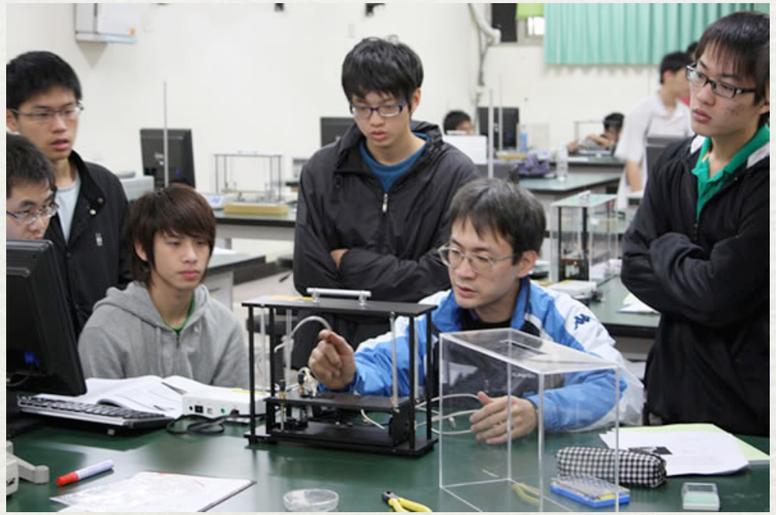
Heuristic & Innovative Experiments

Innovative Experiments



Fundamental Physics Experiments

Science Camp - Junior / Senior High

The door to nanoworld is now opened for every student and every school with this affordable and portable nano-scale explorer that can work under ambient conditions.

Nanovie STM Educa offers a 4-μm lateral scan range and a horizontal resolution of 3 nm at its optimum.

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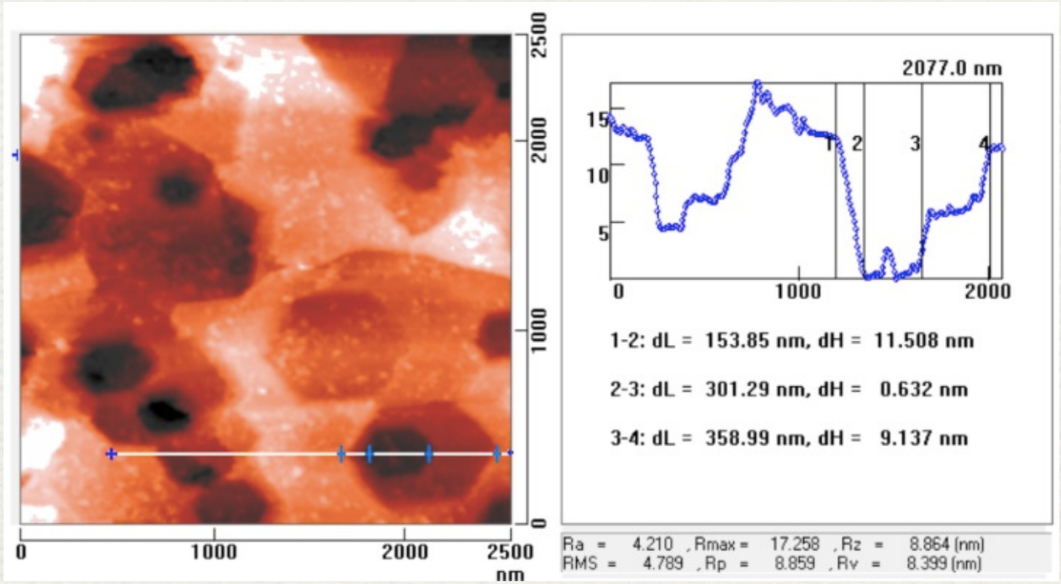
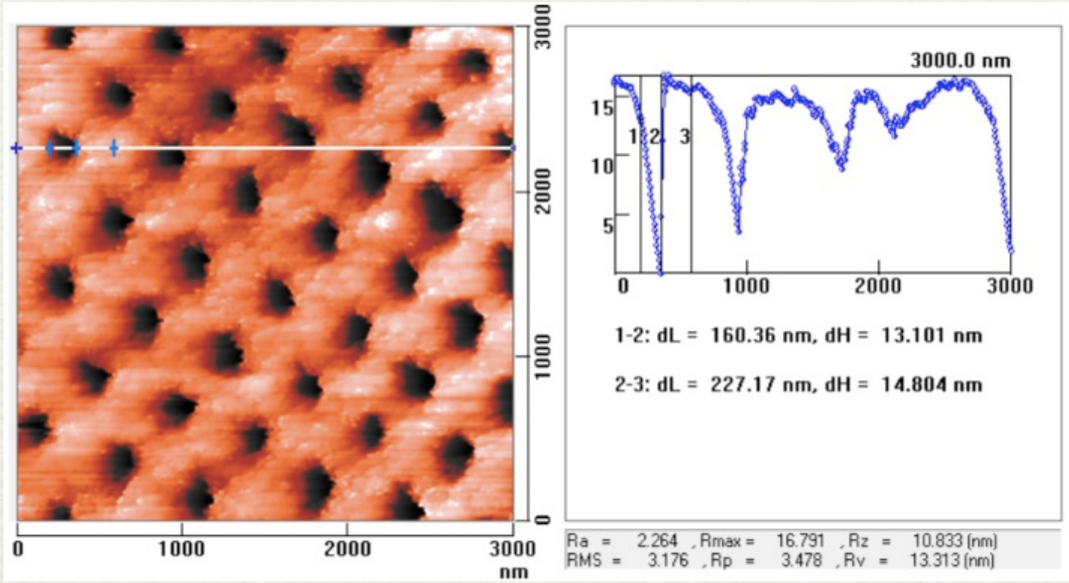
Real-life objects in nano point of view



Oxidised HOPG surface

Scan area: 2500 X 2500 nm
Cavity diameter: 300 ~ 700 nm
Cavity depth: ~ 10 nm



Hole array of DVD surface

Scan area: 3000 X 3000 nm
Hole diameter: ~ 160 nm
Hole depth: ~ 13 nm

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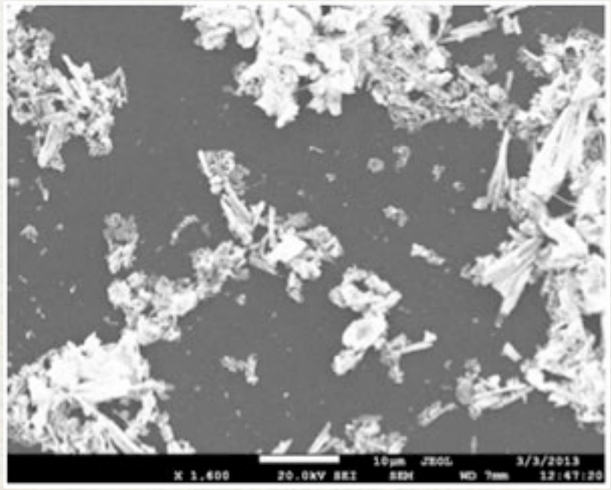
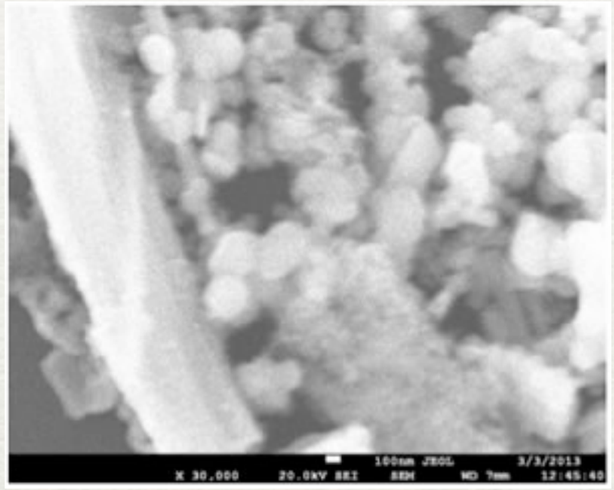
Resolution beyond SEM for everyone

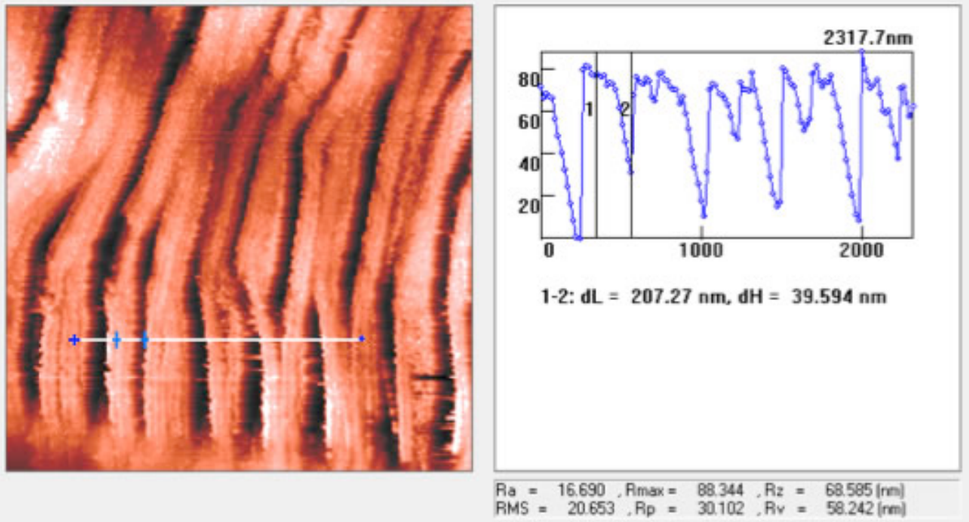


SEM 100 X 100 um



S EM 4 X 4 um

The cylinders and particles are seen but their characteristics can not be observed clearly under SEM.



Fibre sample offered by Ying-Zhu Wu at Wuyi Univ., Guangzhou

Sample Preparation 1: Supersonic Dispersion in ethanol, spreading on graphite.

Sample Preparation 2: After annealing, the subtle structures can be measured precisely under STM.

The cylinder is composed of multiple bands, each having a width of 200 ~ 400 nm & a height of 40 nm.

It appears that each band is also composed of multiple nano-wires, each with a width of about 40 nm.

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Nanovie STM Lepto
Application

APPLICATION

- Fundamental / Modern Physics Experiments
- Nanotechnology / Semiconductor / Material Science
- MEMS / Bio-MEMS Experiments
- Innovative Educational Programs:

  Science Camps, Cross-department experiments
- Student's Personal Research Topics

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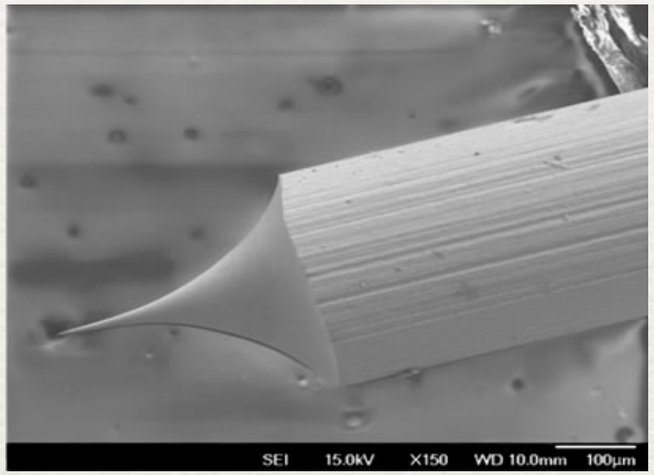
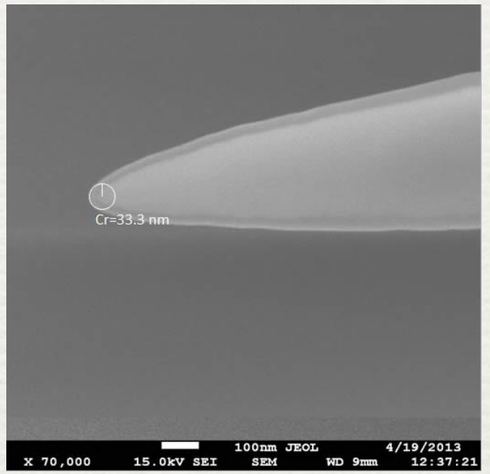
Nanovie Auto Tipmaker

Quick, Sharp, Consistent and Clean

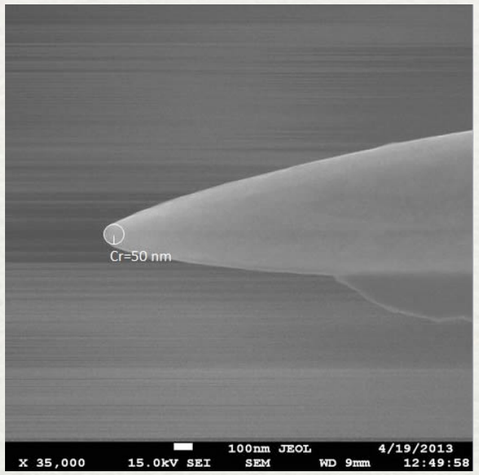
Small-batch production



Conformable tip shrinking shape



Tip Apex CR = 33 nm



Tip Apex CR = 50 nm

Capacity: 6 probe tips per 15 minutes. Excellent for intensive educational and research demands.

One button control: **Computer free.** Continuous monitoring is not required.

Tip apex curvature radius: about 50 ~ 120 nm. Compatible with commercial UHV STM's.

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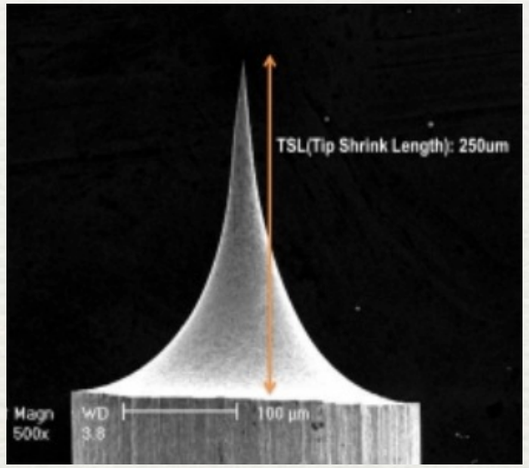
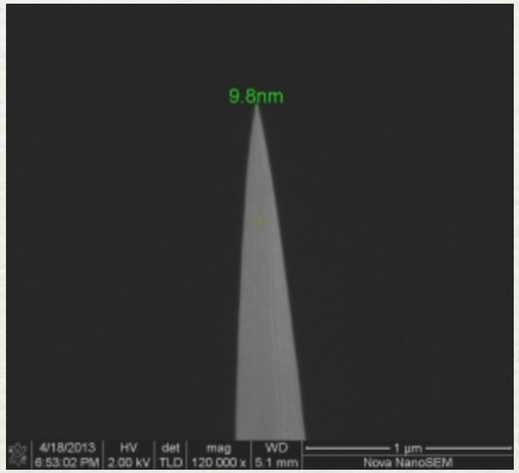
Nano-level Probe Tips

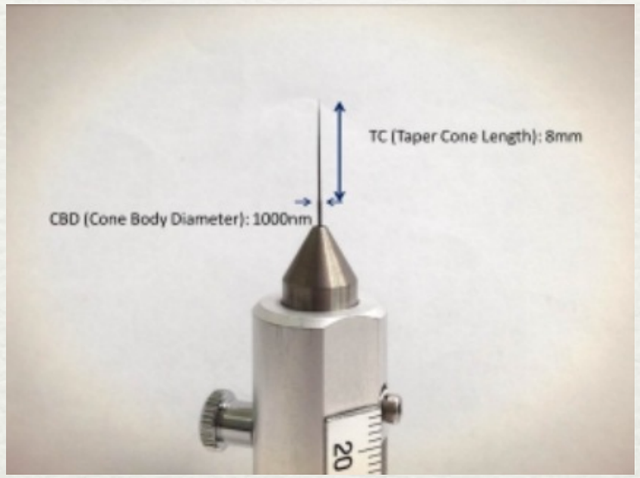
Sharpest, Preprocessed, Vacuum-Packed



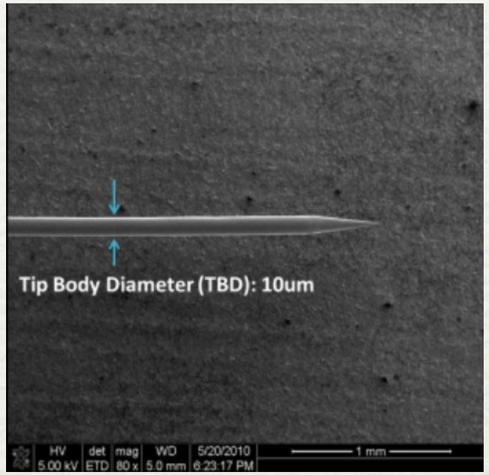
STM tips: CR < 10 nm
Tip Resistance < 50 Ω



Nano-probes: CR < 5 nm
Device Analysis / Nano Probing /
Nano Manipulation
(Zyvex, Hitachi, Jeol, DCG)



TEM Sample Preparation Tip
CR: 50 nm / 75 nm
(Omni)



Sub-micro / Micro needles
Electronic Properties Analysis for
commercial probe stations
(MM, Cascade, SUSS, FIB/SEM)

- ★ Electrochemically preprocessed; Nitrogen flushing & vacuum packaging.
- ★ Particle-free & contamination-free. Immediately ready-to-use upon unpacking.
- ★ World top-class CR technology; unique MST surface treatment.
- ★ 100% SEM & OM Inspection Pass.
- ★ Low resistance; Long storage life-time.

STM

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