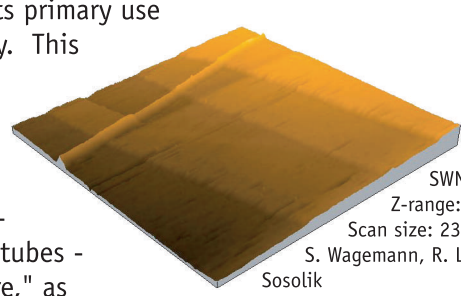
Carbon Nanotubes on HOPG

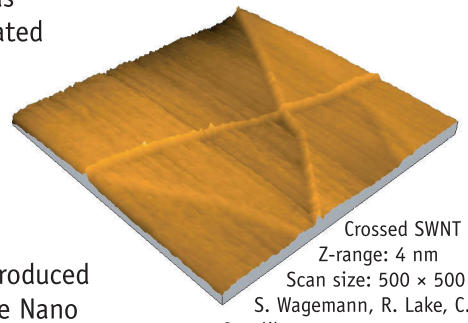
Nanosurf® easyScan E-STM Application Note

The Nanosurf easyScan E-STM often finds its primary use in teaching students about nanotechnology. This application note shows that it can be just as useful a tool for research.



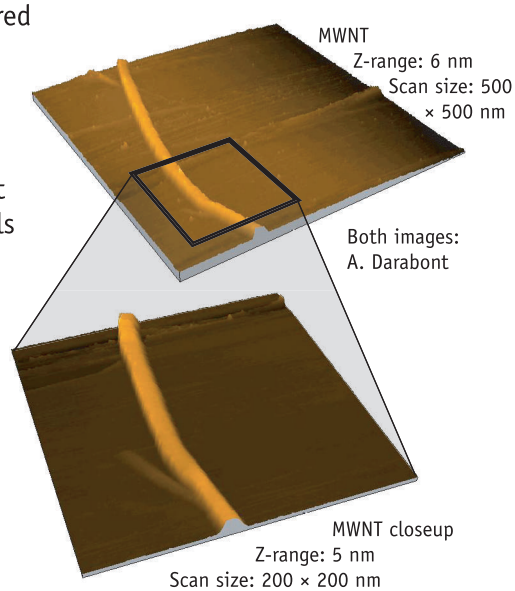
SWNT
Z-range: 4 nm
Scan size: 230 × 230 nm
S. Wagemann, R. Lake, C. E. Sosolik

Ever since they were first discovered in 1991 by Dr. Sumio Iijima at the NEC Fundamental Research Laboratories, carbon nanotubes - "graphite filaments having tubular structure," as described in US patent 5,747,161 - have generated high expectations for their application in fields as diverse as transistors, fuel cells, big TV screens, ultra-sensitive sensors, high-resolution AFM probes, catalysts, and pharmaceuticals.



Crossed SWNT
Z-range: 4 nm
Scan size: 500 × 500 nm
S. Wagemann, R. Lake, C. E. Sosolik

The first two images shown to the right are reproduced courtesy of Chad E. Sosolik's Surface & Interface Nano Science group at Clemson University, USA. Scotty Wagemann and Russell Lake imaged a single-walled nanotube laid across steps on the graphite substrate and two crossed single-walled nanotubes. The measurements were taken using .25mm tungsten wire tips, etched in-house. The easyScan E-STM proves to be an invaluable tool for evaluating the dispersion technique used to prepare these individual nanotubes on the desired substrate.



MWNT
Z-range: 6 nm
Scan size: 500 × 500 nm

Both images:
A. Darabont

MWNT closeup
Z-range: 5 nm
Scan size: 200 × 200 nm

The bottom two images come courtesy of Prof. Alexandru Darabont at the University Babes-Bolyai in Cluj-Napoca, Romania. Researchers at the Department of physics of advanced materials and technology imaged large multi-walled carbon nanotubes, also on an HOPG substrate. That a cut tip was used can be seen upon close inspection by the slightly asymmetrical cross-section of the nanotube.

That different research groups on different continents are currently using the Nanosurf easyScan E-STM to image carbon nanotubes on HOPG underscores the impact an affordable yet powerful instrument can have on the dissemination of science and technology.

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