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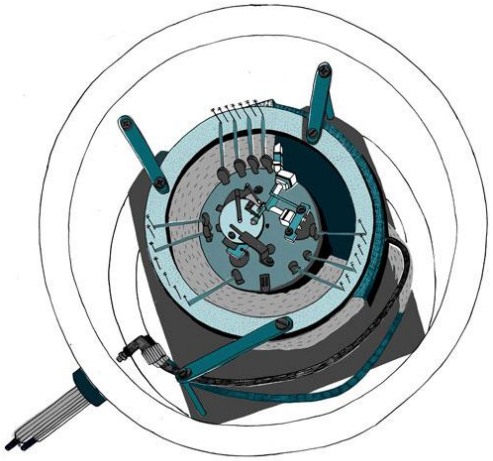
Scanning Tunneling Microscope

Burger, Martha

Scanning tunneling microscopes allow nanotechnology researchers to individually look at and work with atoms. Carbon nanotubes, an important nanotechnology structure, are very stable and may serve as insulators, conductors, or semiconductors depending on how they are produced. They can help us transition to a new energy age by making fuel cells more effective or by catalyzing chemical reactions in order to minimize pollution. They revolutionize the production of materials and are very promising source of ecological solutions. However, new technologicies may have unexpected consequences or lead to mismanagement. Politicians and society must keep this in mind and carefully consider the advantages and disadvantages of each new innovation.

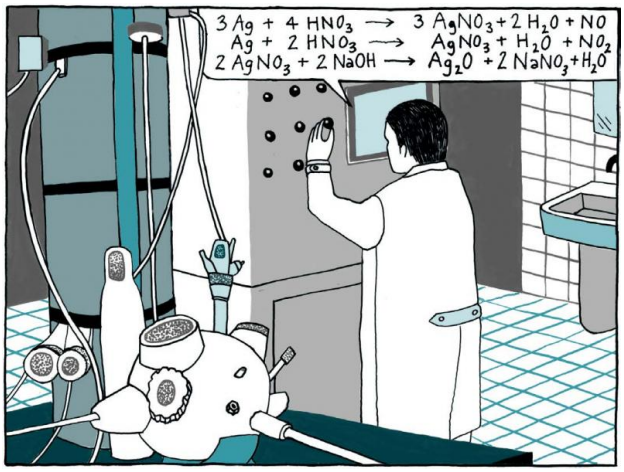


Scanning tunneling microscope / Nanotechnology by Gerd Binnig und Heinrich Rohrer
Martha Burger

Milli, Micro, Nano: Scanning Tunneling Microscope

Text and images by Martha Burger
University of the Arts (UdK), Berlin

Milli, Micro, Nano
"The typical synthesis methods of silver particles are based on..."



"The oxidized silver that forms on the surface of the particles through the process releases ions, and because of that, nanosilver has an antibacterial effect."

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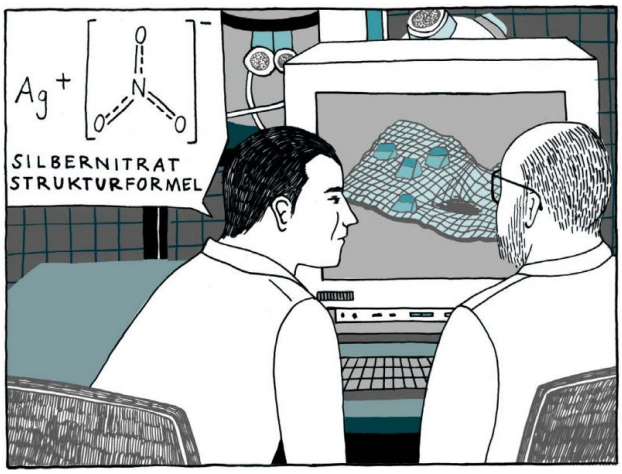

Silver Nitrate
Structural Formula

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"Look, Mr. Steinberger, this piece of clothing looks like it could be interesting for us!"
Meanwhile, the industry is pushing the development of everyday products that use nanotechnology.

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"Nano-sized silver particles can prevent the build-up of odor, thanks to their anti-microbial effect."
"Amazing! We can use this to make odor-free socks and revolutionize the textile industry!"

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"Oh. It says here that the nano particles can get into water treatment plants through water from the wash and that it's still unclear how that might affect the environment."
"Rapidly rising shares; Finally without the disgusting smell of body odor. Awesome."

NanoTec Sportswear
Finally, no more sweaty feet.
"Yeah, I don't know, would you buy them?"

Author's comment:

Although I had never heard of it and my knowledge of physics is limited, I attempted to illustrate the functionality and importance of the scanning tunneling microscope in a comic. I discovered that the results of nano-research are already being implemented in the medical field as well as in numerous other things that we use on a daily basis. However, we still do not know what the long-term consequences of the manmade nanoparticles are.

How to cite

Burger, Martha. "Milli, Micro, Nano: Scanning Tunneling Microscope." Environment & Society Portal, Multimedia Library, 2014. http://www.environmentandsociety.org/node/6640/.

The comic also appears in Alexandra Hamann, Reinhold Leinfelder, Helmuth Trischler, and Henning

Wagenbreth, eds., *Anthropozän – 30 Meilensteine auf dem Weg in ein neues Erdzeitalter. Eine Comic-Anthologie* (Munich: Deutsches Museum, 2014).

Further readings:

- Sources and Literature for the Anthropocene Milestone Comics

Related links:

- Welcome to the Anthropocene. The Earth in Our Hands. Special exhibition at the Deutsches Museum http://www.deutsches-museum.de/en/exhibitions/special-exhibitions/archive/2015/anthropocene/
- Welcome to the Anthropocene. The Earth in Our Hands. Virtual exhibition on the Environment & Society Portal https://www.environmentandsociety.org/exhibitions/welcome-anthropocene
- Scanning Tunneling Microscope (STM) (Encyclopædia Britannica) http://www.britannica.com/technology/scanning-tunneling-microscope
- Comic-Anthology, Deutsches Museum Website http://www.deutsches-museum.de/sammlungen/entdecken/comics/

Websites linked in image captions:

- http://www.deutsches-museum.de/sammlungen/meisterwerke/meisterwerke-ii/rastertunnelmikroskop/