

Prof.  
Aharon Gedanken

## *Converting Dirt into Silver*

Institute for  
Nanotechnology

*"We have come up with a process that removes silver and other heavy metal ions from the water." The two-fold result: clean water and the production of nano-silver.*

**P**rof. Aharon Gedanken, of the Department of Chemistry, has the "silver" touch. "I have discovered how to convert metallic wastes, or *shmutz* (dirt), into money," exclaims Prof. Gedanken. "In my modest laboratory, my research team and I have found simple, cheap ways to recycle waste materials, create marketable items, and produce new elements for industry."

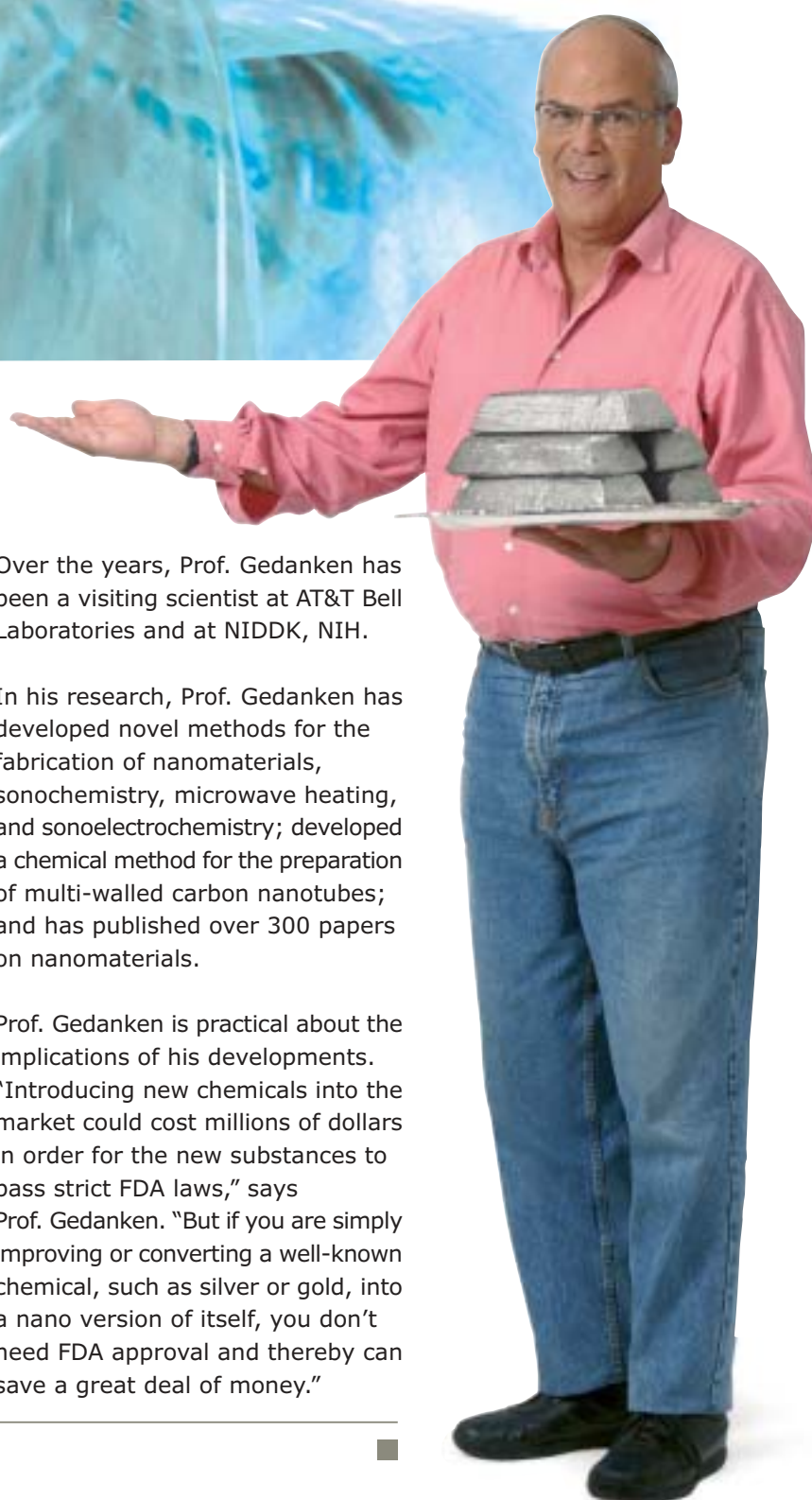
Prof. Gedanken and his research team (which includes Prof. E. Tel-Or and Dr. Benny Chefetz from the Hebrew University) have developed a process that removes silver and other heavy metal ions from the rivers or other water sources into which they are dumped. "In Israel many places, such as the Kishon River, are heavily polluted with heavy metal ions due, for example, to silver-manufacturing plants disposing silver 'waste' in the rivers," says Prof. Gedanken. "We have come up with a process that removes silver and other heavy metal ions, such as lead, copper, cadmium, among others,



from the water." The two-fold result: clean water and the production of nano-silver, which is a marketable item.

The process is based on the combination of aquatic plants and a microwave oven. The team has patented a three-minute water-cleaning "flow" process using an aquatic plant and a domestic microwave oven. "When the leaves of these plants are then burned in argon the result is nano-silver, gold or lead, depending on which of these 'waste' items are in the water," says Prof. Gedanken. "Needless to say, this by-product is useful for industry." Bar-Ilan University is presently looking for an investment partner to build a mini-industrial plant to make a water flow system 100 times bigger than the domestic microwave.

Prof. Gedanken has also developed a simple, cheap method of producing nano-tungsten carbide – the main chemical element in tool-cutting equipment (in one of the Israeli



market's recent financial coups, Warren Buffet purchased ISCAR, a manufacturer of tungsten carbide cutting tools). Prof. Gedanken calls his method RAPET (Reactions Under Autogenic Pressure at Elevated Temperatures). Theoretically, the production of nano-tungsten carbide rods and tubes should improve the quality and strength of the cutting tools.

Prof. Gedanken completed his undergraduate studies (*magna cum laude*) at Bar-Ilan University in 1965 and went on to receive his MSc degree in 1967. He continued his graduate studies at Tel Aviv University under Joshua Jortner and received his PhD in 1973. After a brief postdoctoral period with Prof. Otto Schnepp at USC in Los Angeles, he returned to Bar-Ilan in 1975 as part of the senior faculty, where he served as chairman of the Department of Chemistry from 1982-85. With over 410 scientific papers and 15 patents to his credit, he is the recipient of the prestigious Minerva Fellowship.

Over the years, Prof. Gedanken has been a visiting scientist at AT&T Bell Laboratories and at NIDDK, NIH.

In his research, Prof. Gedanken has developed novel methods for the fabrication of nanomaterials, sonochemistry, microwave heating, and sonoelectrochemistry; developed a chemical method for the preparation of multi-walled carbon nanotubes; and has published over 300 papers on nanomaterials.

Prof. Gedanken is practical about the implications of his developments. "Introducing new chemicals into the market could cost millions of dollars in order for the new substances to pass strict FDA laws," says Prof. Gedanken. "But if you are simply improving or converting a well-known chemical, such as silver or gold, into a nano version of itself, you don't need FDA approval and thereby can save a great deal of money."