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## Blacksburg company to bring nanotechnology to high school students

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Earth science, biology, chemistry and ... nanotechnology?

Using a new kit developed by a Blacksburg company, middle and high school students could soon get the chance to dabble in the cutting-edge study of atoms and molecules.

Nanotechnology is a broad - and still growing - science that involves manipulating molecules to create new materials. Possible applications range from the fanciful - nanobots that would patrol inside the body and search out infections - to the already realized - photovoltaic cells that convert sunlight to energy.

"There's a lot of talk about nanotechnology today - nano this and nano that," said Kristie Cooper of NanoSonic Inc., the company that's creating the kits. "But there's no real connection to the education program."

The study of nanotechnology is becoming more and more popular at the university level. Last fall, Cooper and NanoSonic founder Rick Claus started talking about bringing it into secondary school classrooms.

"Really, science education hasn't changed that much over 30 years, and technology has," Cooper said.

The kits, which will sell for about \$100, will walk students through a process called electrostatic self-assembly, the same process that's used in NanoSonic's lab. It starts with cleaning a piece of base material, such as glass, with a special process that leaves it with an electrical charge. Then the material is dipped alternately into water-based solutions of positively and negatively charged nanoparticles. The oppositely charged particles attract and stick to one another, building layers.

Depending on the materials used, the resulting coatings display different properties: optical, electrical, magnetic, mechanical. Materials created in this way can be used in areas including medical research and microchip design.

The students will create optical thin films, similar to those used in optical fiber communication systems. The kit also will include a workbook, a CD-ROM demonstration video and a teacher's guide that will provide lesson plans and guidance in integrating nanotechnology into the state's Standards of Learning.

"That's the first thing we pulled out - the SOLs," Cooper said. "It can't just be cool. It has to be educational."

NanoSonic's work is funded through a \$60,000 grant from the Department of Education, awarded through the Small Business Innovation Research program. The money runs out at the end of February, and NanoSonic will apply for another federal grant of as much as \$300,000 to finish the work.

The kits are still in the prototype stage. Virginia Tech students are evaluating sample kits now, and next month Suzan Mauney, who teaches eighth-grade physical science at Blacksburg Middle School, will test a kit in her classroom. She said she's always looking for ways to give her students a closer look at the latest technologies.

"Textbooks aren't published yearly," Mauney said. "You can imagine, with the way things are moving so rapidly ... a textbook that might have been considered cutting-edge this year could be out of date next year."