

# Get Ready for New 'Nano' Products

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WASHINGTON -- Scientists are wrestling with individual atoms to develop molecule-sized computers, tiny cancer-fighting robots that travel the bloodstream ... and stain-resistant trousers.

Nanotechnology -- the science of manipulating materials billionths of a meter wide -- has emerged as a promising new field that could lead to stunning advances in years to come.

Boosters claim that nanotech-derived products may some day cure disease, slow the aging process and eliminate pollution.

But for now, the human race will have to settle for tennis balls that keep their bounce longer, flat-panel displays that shine brighter and wrinkle-free khaki slacks that resist coffee stains.

"People are saying, 'Geez, this isn't *Star Trek* yet; this is just pants that don't stain,' but you've got to start somewhere," said Howard Lovy, news editor of the nanotech industry journal *Small Times*. "I'm wearing nanopants as we speak."

Those stain-resistant pants and bouncy tennis balls have their advantages, thanks to a fundamental principle of small science: Different scales lead to different results. Just as a silver necklace may sparkle against your skin but tiny silver particles in your bloodstream will turn your skin blue, common substances like sunscreen and rubber take on entirely different characteristics when assembled at a molecular level.

Sunscreen makers have found that zinc oxide -- the dense white cream lifeguards put on their noses -- turns transparent and silky when made from smaller particles, which cover the skin more thoroughly and do not reflect light. Procter and Gamble has added tiny zinc oxide particles to its Olay Complete UV Protective Moisture Lotion, a product aimed at mall matrons rather than beach bums.

"It goes on really light and sheer and doesn't leave a residue, so therefore people are much more apt to use it on a daily basis," said Maria Burquest, a Procter and Gamble product spokeswoman.

Wilson's Double Core tennis balls claim to retain their air pressure twice as long as normal tennis balls because of a rubber core that uses tiny "nanoclay" particles to form an airtight seal.

On the ski slopes, VailSoft's Cerax "racing polymers" claim to provide greater speed and control than conventional ski waxes due to a nanotech structure that holds up in a wide variety of snow conditions.

Eastman Kodak's EasyShare LS633 digital camera features a brighter, more power-efficient display built from specially designed carbon-based molecules. Such "OLED" displays should soon show up as television sets, computer screens and eventually printed on flexible plastic sheets that can be woven into clothing.

Probably the most visible nanotech product to date are the stain- and wrinkle-resistant slacks developed by Greensboro, North Carolina-based Nano-Tex LLC and sold by Eddie Bauer, Lee Jeans and several other retailers.

Billions of tiny whiskers create a thin cushion of air above the cotton fabric, smoothing out wrinkles and allowing liquids to bead up and roll off without a trace.

The whiskers are added by dipping cotton fabric in a proprietary chemical solution before the fabric is cut, said Nano-Tex spokeswoman Dolores Sides. Because the particles are so small, they easily penetrate the fabric and coat each cotton thread completely without changing the way it looks or feels, she said.

The company has developed similar stain-resistant products for synthetic fibers and upholstery. One new product wraps synthetic fibers in an organic, cotton-like substance to create a garment that combines the longevity of polyester with the comfortable feel of natural fabric, she said.

The "nano-care" pants have sold well since they were first introduced in 2001, an Eddie Bauer spokeswoman said, even though they cost \$10 more than ordinary khakis. The company now offers nano-care shirts as well, and plans to introduce stain-resistant jackets in the fall, she said.