Researchers Develop Revolutionary Technology for Nanoscale Assembly at Wafer Level

May 20 2008

Researchers at the NSF Nanoscale Science and Engineering Center for High-rate Nanomanufacturing (CHN) at Northeastern University, with partners UMass Lowell and University of New Hampshire, have discovered an innovative technology that will have a tremendous impact on the nanotechnology industry.

Under the direction of Ahmed Busnaina, Ph.D., researchers developed a technique to scale-up the directed assembly of single-walled carbon nanotube (SWNT) networks, from microns to inches, creating a viable circuit template that can be transferred from one substrate to another for optimum productivity. The revolutionary assembly process has the potential to change the way electronics and other applications are developed for consumers.

This leading research and the work of the CHN partner schools, UMass Lowell and the University of New Hampshire, will be on display at the upcoming NSTI Nanotech 2008 Conference in Boston from June 1-5, 2008.

Ways to create nanoscale structures, and develop a method to mass-produce those structures while ensuring that they are reliable and cost-effective, are top priorities for the nanotechnology industry.

One of four NSF funded nanomanufacturing centers in the country, the

CHN has been able to develop a novel way to assemble these nanoelements (nanotubes, nanoparticles, etc.) into nanostructures and devices that enable the mass production of atomic-scale structures and will lead to the production of devices such as biosensors, batteries, memory devices and flexible electronics very quickly and efficiently and with minimal errors.

“This technology is a platform for many applications, and the fact that it is scalable makes it easier to bring to market,” said Busnaina, William Lincoln Smith Professor and Director of the CHN. “The cost of current nanomanufacturing techniques is sky high, and our product has the potential to increase productivity tremendously without sacrificing reliability.”

The revolutionary assembly process, developed by Busnaina and his team, scales-up the nanoscale structures on a wafer level on a variety of hard and soft substrates such as silicon and polymers. In addition, the assembled structures could also be transferred to other substrates in continuous or batch processes.

Concurrently, researchers at the CHN are investigating the environmental and biological implications to ensure that these devices and techniques are safe for people and for the environment.

Source: Center for High-rate Nanomanufacturing