Researchers seed, heat and grow carbon nanotubes in long tubing

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In less than 20 minutes, researchers at New Jersey Institute of Technology (NJIT) can now seed, heat and grow carbon nanotubes in 10-foot-long, hollow thin steel tubing.

"The work took us three years to develop and get right, but now we can essentially anchor nanotubes to a tubular wall. No one has ever done anything like this before," said lead researcher Somenath Mitra, PhD, professor and acting chair of NJIT's Dep't of Chemistry and Environmental Science. Graduate and post-doctoral students who worked on the project are Mahesh Karwa, Chutarat Saridara and Roman Brukh.

The ground-breaking method will lead to improvements in cleaner gasoline, better food processing and faster, cheaper ways to clean air and water.

The discovery was recently described in the *Journal of Material Chemistry*, June 14, 2006, by Mitra and his team in "Selective Self-assembly of Single Walled Carbon Nanotubes in Long Steel Tubing for Chemical Separation." Other journals featuring their work are *Chemical Physics Letters* and *Carbon and Analytical Chemistry*.

A carbon nanotube is a molecular configuration of carbon in a cylindrical shape. The name is derived in part from the tube's miniscule size. Scientists estimate nanotubes are 50,000 times smaller than a human hair.

Until recently researchers have relied on the nanotubes which researchers purchase as a powder. The nanotubes are said to have remarkable, if not almost magical, properties. For example, by simply mixing the powder with polymers or chemicals, films and composites can be made.

However, the method has drawbacks. "We have never been able to anchor the powder to a large surface, nor can we grow the nanotubes in a large device. Typically we could only produce them in minute amounts, if we used the powder substance," said Mitra. Now everything has changed.

Using a catalyst either prepared on the steel surface or enabled by a chemical deposition process, the NJIT inventors have created nanotubes which can stick to the walls of narrow or wide tubes. And, they can grow considerably larger amounts of them, making the process more attractive and viable for industrial usages.

Source: New Jersey Institute of Technology