

Changhong Ke relies on unique instrumentation to conduct his nanotube experiments, including a special tool he installed in his laboratory on an advanced electron microscope.

An honor from the Air Force

Changhong Ke was among just 43 researchers nationwide chosen for the Air Force's Young Investigator Research Program in 2010.

Ke's project will focus on low-density, high-strength materials that could allow the Air Force to reduce the weight of vehicles such as fighter planes and spacecraft. His studies involve two materials, both of which have hollow, tube-like structures. One is made of carbon and the other is made of boron nitride, which is far less common.

Both are called nanotubes because their wall thickness and diameter can be measured in nanometers. Several thousand of these tubes put together would still be thinner than a single strand of hair.

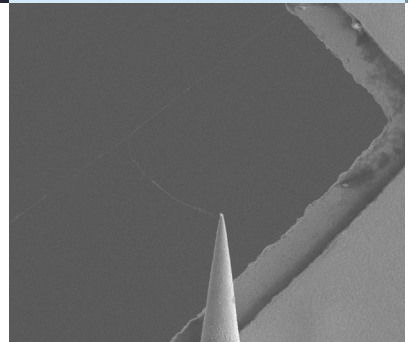
"They are both light and strong," Ke says. "They have similar mechanical properties but different electrical properties. The carbon nanotubes can be conductors or semiconductors, while the boron nitride tubes are insulators. Both dissipate heat quickly, which is good for aerospace applications."

Ke plans to investigate not only how carbon nanotubes and boron nitride

nanotubes perform individually, but also what happens when small bundles are made from the two. What happens at the places where they touch? How strong is the interface between them?

The Air Force program supports scientists and engineers who received a PhD in the last five years and show exceptional ability and promise for conducting basic research. Grants of \$120,000 annually for three years fund creative basic research, enhance early career development and increase opportunities for the researchers to recognize the Air Force mission and related challenges in science and engineering. Competition for the awards is stiff, with fewer than 20 percent of applicants receiving funding.

Ke, who joined the mechanical engineering department at Binghamton in 2007, earned his doctorate from Northwestern University, where he received his first patent. He did his undergraduate work at Beijing Institute of Technology.



This "finger" has a sharp tip that allows him to grab one nanotube at a time and move it precisely.