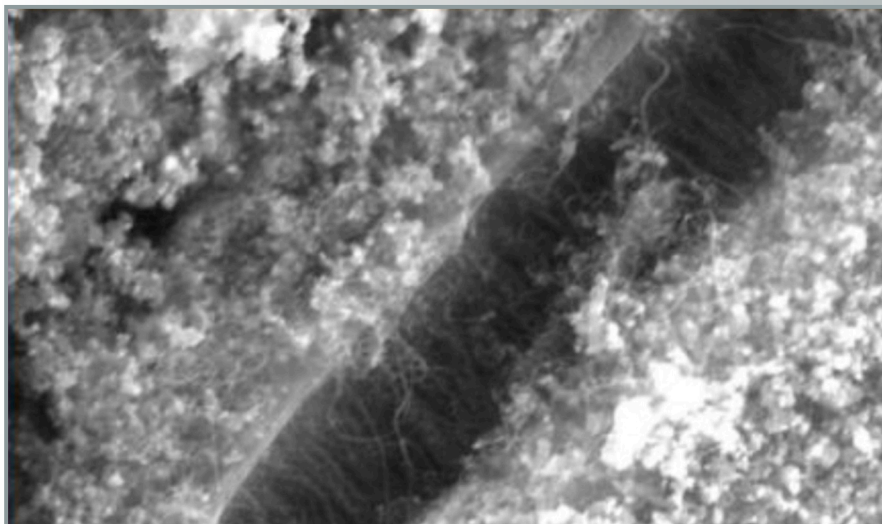


Carbon Nanotubes Grown on Various Fibers

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Technology Summary

ORNL researchers invented a method for growing carbon nanotubes on the surfaces of various fiber materials, including quartz, carbon, and activated carbon fibers. These materials may have significant applicability for a variety of advanced fiber composites and products, such as aviation structural materials and military armor. The materials could also contribute to carbon fiber-reinforced materials used in energy, environmental, and protection system applications.

The ORNL method employs metal salt solutions and metal catalyst species to form a base for carbon nanotube growth. The nanotubes are then separated by using concentrated acids to oxidize the support media and metal catalyst.

In each case, a chloride solution of iron, aluminum, and nickel is used to coat the various fibers prior to exposing them to 600 degrees Celsius in flowing argon-hydrogen with an ethanol vapor feedstock. This process promotes chemical vapor deposition growth of carbon nanotubes.

Advantages

- Chemical vapor deposition growth of carbon nanotubes
- Proven production on a variety of fiber materials
- Potential for enhanced material properties

Potential Applications

- Advanced fiber composites and products
- Fibers for transportation structures
- Fibers with enhanced strength or conductivity
- Lower cost carbon fiber for energy projects

Patent

Paul A. Menchhofer, Frederick C. Montgomery, and Frederick S. Baker, *Carbon Nanotubes Grown on Bulk Materials and Methods for Fabrication*, U.S. Patent Application 12/417,887, filed April 3, 2009.

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