

Non-Confidential Description - PSU No. 4010
“Aluminum-Single-Wall Carbon Nanotubes”

Keywords:

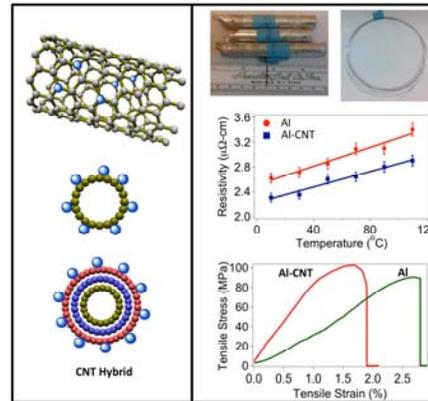
Carbon nanotubes, conductors, high performance, composite, metal matrix

Links:

[Inventor Website](#)

Inventors:

Kofi Adu



Background

Numerous advances have been made in the development of aluminum-based metal matrix composites that possess high stiffness, wear resistance, high elastic/tensile properties, and high thermal conductivity. Nanostructures have become attractive additives to aluminum due to their unique properties, especially with the advancement of carbon nanotubes (CNTs). These Al-CNT composites have been shown to improve thermophysical and mechanical properties; however it has not been shown to enhance electrical conductivity. Lack of uniform dispersion of the CNT in the aluminum-matrix continues to impede advances in the conductivity of these composites. Uniform dispersion of CNTs would lead to a conductor material with a room-temperature resistivity much lower than that of aluminum, copper, and silver, which would have large technological and economic implications.

Invention Description

The technology uses carbon nanotube hybrid as reinforcement in the aluminum. This hybrid allows for an enhanced electrical conductivity, enhanced mechanical properties, enhanced thermal conductivity, and a reduced coefficient of thermal expansion while maintaining the unique lightweight properties of aluminum. These properties can be obtained by using an *in situ* inductive heating stirring mechanism to achieve uniform dispersion of the carbon nanotubes in the aluminum matrix. These nanocomposites can be used in electrical wires as a possible substitute for copper. This technology demonstrates the ability to improve the electrical, mechanical, and thermophysical properties of aluminum, thereby making it comparable to or better than copper.

Advantages/Applications

- Enhances electrical, thermal and mechanical properties.
- Maintains lightweight properties of aluminum.
- Potential application includes the automobile, the aerospace/space, the structural, the electronic and the sports industries.
- PCT Application filed

Contact: Bradley A. Swope
 Sr. Technology Licensing Officer
 The Pennsylvania State University

Phone: (814) 863-5987
Fax: (814) 865-3591
E-mail: bradswope@psu.edu