Office of Technology Transfer

Auburn University

Thin Film Nanocomposites of Carbon Nanotubes & Biomaterials

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Reference: Bio-nanocomposites

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Reference

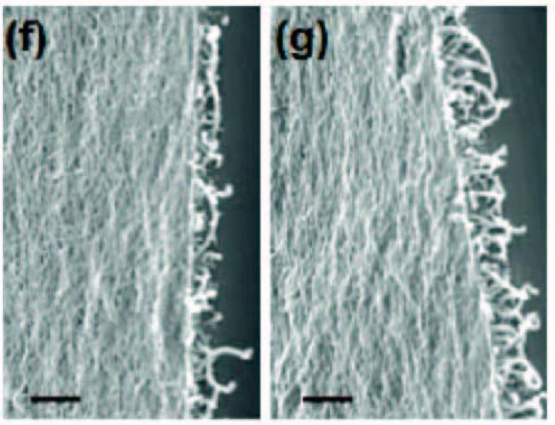
Nepal, D., Balasubramanian, S., Simonian, A.L., Davis, V.A. "Strong Antimicrobial Coatings: Single-Walled Carbon Nanotubes Armored with Biopolymers", *Nano Letters*, 2008, 8(7): 1896-1901. (link)

Overview

Auburn University is seeking a licensee or development partner for a technology that combines carbon nanotubes and biomolecules to produce robust films with biological activity. Such films exhibit strong mechanical properties to stand up to long-term use and wear, while retaining the incorporated biological activity such as antimicrobial properties or enzymatic activity. This technology has potential applications (at least) in consumer products, medical equipment, and the defense industry (including sensors).

Advantages

- Retain mechanical properties of nanotubes, providing strength and robustness to final product
- Retain activity of biological component, conferring desirable functional properties
- Can be used with a variety of biological components, including enzymes and nucleic acids, enabling a wide variety of potential applications
- Can be produced using a variety of methods, providing flexibility for applications and cost of production



SEM of carbon nanotube/lysozyme films. These films have been shown to kill *Staphylococcus aureus on contact*.

Description

There has been growing concern about the role of contaminated public surfaces in the spread of infections such as severe acute respiratory syndrome (SARS), staph and *C. difficile*. Researchers at Auburn University have produced coatings that combine the strength of single-walled carbon nanotubes (SWNTs) with the antimicrobial activity of lysozyme (LSZ). These coatings could be applied to a variety of surfaces, such as computer keyboards, hospital beds or exercise equipment, in such a way as to provide long lasting antimicrobial protection.

Lab-scale testing has demonstrated strong surfaces capable of killing *Staphylococcus aureus* on contact. An ability to manipulate morphology, thickness and nanotube orientation has also been shown. These novel coatings can also be used with a variety of other biomolecules, including other enzymes and proteins, and nucleic acids.

Status

- A non-provisional US patent application has been filed
- Has been demonstrated on a lab scale with carbon nanotubes and lysozyme (antimicrobial)
- Has been featured by several news organizations, including MSNBC.com.
- Work is ongoing to study additional biomolecules and additional methods of production

Licensing Opportunities

- This technology is available for exclusive or non-exclusive licensing
- Joint development opportunities include funded research or a joint venture