



## TECHNOLOGY

# Water Soluble, Surfactant Free, Functional Carbon Nanostructures

## OVERVIEW

### Background:

Carbon nanotubes, though tiny, have a huge number of potential applications. At approximately 1/50,000th of the width of a human hair, nanotubes find widespread uses in electronics, composites, and biomedical science because they exhibit extraordinary strength and unique electrical properties, and are efficient thermal conductors. Unfortunately, they have nearly zero solubility in any conventional solvent, making solution processing a challenging task. Currently, nanotubes can be modified by covalent chemistry or surfactants, but that comes at the expense of their extraordinary properties and the surfactants introduced often degrade or contaminate the final products.

### Innovation:

Researchers at the University of Maryland have discovered a novel approach that allows carbon nanotubes to be soluble without the need of surfactants, while retaining their electronic properties. The researchers have demonstrated the creation of beaded necklace-like structures that contain alternate functionalized and intact segments on the same nanotube. Because these structures are water-soluble and surfactant free, while simultaneously preserving the optical properties of the starting nanotubes, they may find application in areas such as conductive inks and biological sensing.

### Advantages

- Water soluble and "surfactant free"
- Preserves the optical properties of the starting nanotubes
- Surface recognition of target by sensors and biological molecules
- Improves imaging contrast
- Can be coated for protection from the environment, improving functionality in electronic devices

### Applications

- Conductive composites
- Conductive inks and paint additives
- Imaging contrast agents
- Optical biosensors

## CONTACT INFO

UM Ventures  
0134 Lee Building  
7809 Regents Drive  
College Park, MD 20742  
Email: [umdtechtransfer@umd.edu](mailto:umdtechtransfer@umd.edu)  
Phone: (301) 405-3947 | Fax: (301) 314-9502

## **Additional Information**

### **INSTITUTION**

University of Maryland, College Park

### **PATENT STATUS**

Patent(s) pending

### **LICENSE STATUS**

Available for exclusive or non-exclusive license

### **CATEGORIES**

- Nanotechnology + Nanoparticles + Nanomaterials

### **EXTERNAL RESOURCES**

- [US Patent 8,980,216](#)

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