



University of Dayton  
Office of Technology Partnerships  
937.229.3469

## **Functionalization of Carbon Nanofibers, Nanotubes and Exfoliated Graphite Using Tailored Plasma Processing**

Case #: UD-439

UD Trade Secret

Inventor: Khalid Lafdi, et al.

### DESCRIPTION OF THE INVENTION:

Functionalization Of Carbon Nanofibers, Nanotubes And Exfoliated Graphite Using Tailored Plasma Processing And Gas Phase Methods

### INTENT OF INVENTOR:

The current invention explores and establishes wide range of methods and recipes of surface functionalization of nano-artifacts such as nanotubes, nanofibers and exfoliated graphite. These methods tailor both the amount of functional groups and oxygen content of materials. Results show improved interfacial bonding to variety of polymers and surface finishing for metal coating such as silver, platinum, copper, and nickel, etc. Tailored surface functions have solved all issues encountered in today's nanocomposites technology such as wettability and dispersion of nanoartifacts. This process allows uniform and controlled carbon nanoartifacts to be made in controlled fashion with selected surface conditions.

### PROBLEM TO OVERCOME:

The lengthy duration of the reactor, limited amount of production, and the excess amounts of chemical wastes, as well as the costs associated with each, of doing the functionalization of materials with chemical modification. For example, the functionalization of carbon nanoparticulates by application of chemical modifications via diazonium formation reaction mechanism. The diazonium formation reaction is a well known covalent modification method for preparing a chemically modified carbon product including an organic group attached to the carbon surface.

### APPLICATION:

Invention would be used in large scale production of functionalized materials, nanocomposites, composites, biomedical bone generation, and surface application for plating or coating.

### CURRENT STATUS:

Trade Secret. Contact UDRI for more details.