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High Throughput Carbon Nanotube Growth System

Carbon nanotubes are the strongest and stiffest materials on earth, and their varying electronic properties, high aspect ratio, and large surface area make carbon nanotubes an ideal material for many diverse uses. Many methods have been developed to synthesis carbon nanotubes, however, the growth of carbon nanotubes is still one of the bottlenecks for carbon nanotechnology. There is a need to provide a synthesis system that does not involve methods that use complex extra energy and that can be optimized to grow carbon nanotubes at lower temperatures than being used currently. Lower temperature growth methods are required in order to meet certain applications and devices, such as biological sensor and field emission displays, that cannot be subjected to high temperatures. In general, there is a need for improved carbon nanotube growth methods and processes in order to meet the increasing requirements for high quality and quantity of carbon nanotubes. Therefore, a method for growing carbon nanotubes on a substrate using a hot filament CVD system has been developed. The system has the capability to grow nanotubes on catalyst particles at low temperature where large scale and large area device coating and applications are expected. Since the system does not require vacuum conditions, producing unique advantages such as scalability, large area production as well as role-to-role coating capability.

The University of Toledo is seeking a company interested in utilizing this method and technique for growing carbon nanotubes using a hot filament CVD system.

Applications:

1. Field emission display
2. Adsorption of hydrogen
3. Charge-based sensors
4. Catalyst support
5. Lithium batteries
6. Biological catalyst
7. Nanoelectronic devices
8. Nanocomposites
9. Sensor technology

Advantages:

1. High throughput manufacturing
2. Low cost approach
3. Selective growth capability
4. Low temperature operation
5. No vacuum requirement. Thus, role to role process capability
6. Mass scale production
7. State-of the art manufacturability
8. Adoptability in electronics and other industries
9. Low instrument cost
10. Excellent controllability of process
11. Excellent controllability of product and reproducibility

This invention is patent pending

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