UNIVERSITY OF WYOMING
Wyoming Technology Transfer and Research Products Center

Method and Apparatus for Carbon Nanotube Alignment

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Patent Status:
Patent Pending

Description of Technology

Single walled carbon nanotubes (SWCNT) are a new material that have many different applications in electronics, as well as applications in materials and batteries that are still being researched and discovered. SWCNTs are carbon tubes with diameters of close to one nanometer, and lengths that can be millions of times longer. The nanotubes are usually used by aligning many to create bundles that have remarkable properties along the axis of alignment, including low mass density, high electron mobility, large current-carrying capability, high thermal conductivity, and large aspect ratio. These properties rely heavily on having all of the nanotubes aligned on the same axis; if they are not, the effectiveness of the properties decreases substantially.

Researchers at the University of Wyoming have invented a technology that creates SWCNT films with true global alignment. The technology works by flowing a liquid solution of carbon nanotubes at a constant rate through a pressure-controlled system to align the nanotubes, and then flattens them to remove unwanted spherulite formation on the film. The process is also automated, which not only removes human control and error, but also enables production upscaling.

Applications

The true global alignment of the carbon nanotubes in the films allows for more consistent properties from film to film. Such consistency can make research more repeatable and allows for the film to have the best possible properties. The automation of this process also enables upscaling of production to make large manufacturing more feasible.

Features & Benefits

- Creates single-walled carbon nanotube films with true global alignment
- Automated to eliminate human control and error
- Possible to upscale production

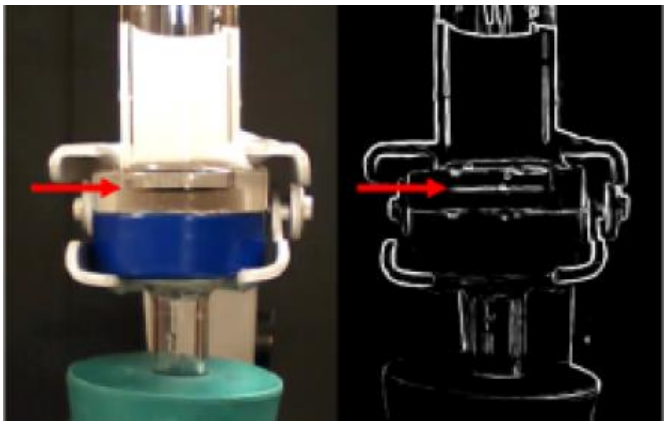

Figure: (Left) Image of the filtration assembly taken by camera during filtration.
(Right) Corresponding contrast-enhanced edge image produced using the Canny edge algorithm.
The arrows in both figures highlight the meniscus edge.

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