

## Molecular jet growth of carbon nanotubes and dense vertically aligned nanotube arrays (CNMS IDR please send it to Larry Dickens)

### Disclosure Number

200401477

### Technology Summary

This invention describes a new technique for synthesis of single wall carbon nanotubes and dense vertically aligned single wall carbon nanotube arrays. Single-wall carbon nanotubes are the most highly sought after product in the marketplace and the growth method is optimized to achieve such. However, it can be easily used to grow multi wall carbon nanotubes and dense vertically aligned multi-wall arrays. The most important feature of the invention is that it enables identification of carbon containing molecules that directly transform into carbon nanotubes without the need to form intermediate reaction products. The secondary reactions responsible for the formation of intermediates also lead to formation of undesirable side products such as amorphous carbon and carbon coated nanoparticles which must be removed from the final material. For example chemical vapor deposition, the only technique regarded as a viable method for carbon nanotube synthesis occurs through numerous intermediate reaction steps which cannot be eliminated and are at best very difficult to control. This invention decouples the important growth parameters and provides external control mechanisms for determining such critical properties of carbon nanotubes as the nucleation threshold, nucleation density, type (single wall or multi wall), orientation, density, and length.

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