Next Generation Nanotubes

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Over just one decade since the chance discovery (or re-discovery) by Iijima, carbon nanotubes have accumulated a vast array of real and potential applications. In the area of electronics, there is no shortage of remarkable and clever demonstrations of functional devices and logic gates. However, for real applications in electronic circuitry, carbon nanotubes in the present form have a number of short comings. Some of these short comings are intrinsic, such as the two-terminal nature of the tube structure and the extraordinary sensitivities to defects, to diameter, to length, and to the helicity.

Although I don't see much of a point to compete with the ever-more able silicon technology in what it does well, I do see the need to address these intrinsic shorting comings of nanotubes to enable new applications. And, I'd like to suggest that potential solutions exist in evolving the fabrication methods and the nanotube itself to the next generation - Structured Nanotubes. A few examples from my own lab will be presented in this context to demonstrate some of the possibilities of such next generation nanotubes. These include structurally engineered nanotubes (e.g Y-junction nanotubes, heterojunction nanotubes and hexagonal nanotube arrays) and compositionally engineered nanotubes (e.g magnetized-nanotube).