

Carbon Nanotubes: From Basic Research to Commercialization

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Carbon nanotube (CNT) is a promising nanomaterial for real applications due to its excellent mechanical, electrical, and thermal properties. The real products of CNT are expected after long time intensive research efforts on it. In this talk, I will present our research works on CNTs in the past two decades, including studies on the growth mechanism, controllable synthesis, physical properties, and real applications of CNTs. In particular, I will show that a unique macroscopic form of CNTs, the super-aligned CNTs, can bridge the gap between nano-world and macro-world and lead CNTs into real applications¹⁻⁷. Many real applications, such as field and thermionic emission electron sources,⁸⁻¹² high strength CNT yarns,^{2,6,7} electrodes for batteries and supercapacitors,¹³⁻¹⁷ loudspeakers,^{18,19} displays,²⁰⁻²² SERS substrate²³, IR detector²⁴ etc. have been demonstrated. Real products of CNT TEM grids^{25,26} and CNT touch panels⁴ have already been commercialized. More products based on super-aligned CNTs are expected to go to the market in the near future²⁷.

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