

Carbon nanotube arrays: synthesis and properties

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Arrays of the oriented perpendicular to the surface of carbon nanotubes (CNTs) exhibit anisotropy of mechanical, electrical and optical properties that allows producing new types of functional materials and devices. In last years, new technological approaches based on CVD methods were developed for the synthesis of films from multiwall and single-wall CNTs. Significant changes in the structure of the nanotubes, the distribution density on the surface can be achieved by varying parameters of the synthesis. Changing of the chemical structure of the starting hydrocarbon compounds and varying the synthesis temperature provides a CNT arrays with different texture, electrical and magnetic properties. The developed CVD reactors allow growing the arrays with high about 5 mm and square of 500 cm² on silicon, quartz or copper substrates. CNT arrays can be coated of conducting polymers to create a specific capacitance of supercapacitors to 700 F/g. CNT arrays of coated semiconductor nanoparticles may be used to produce solar cells, nanoscale light sources or electrochemical sensors.