

Controlled solution process for fabricating carbon nanotube thin films and finely patterned carbon nanotube structures

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We report a novel solution process to fabricate a transparent conducting thin film made of single wall carbon nanotube (SWCNT). The films are formed within 1 minute by using only tens of microliters of SWCNT dispersion. The precise tuning of the optoelectronic properties of the SWCNT films is achieved by simply varying coating parameters and film thickness is controlled up to sub-nanometer scale. This coating technique is easily able to fabricate uniform, large area thin films on various substrates directly. Also, we show a simple and reproducible patterning process of SWCNT microstructures on various substrates. Such well-defined SWCNT micro-patterns are made by nitric acid doped SWCNT thin films and pre-patterned elastomeric molds. Using this technique, various shaped and sharp-edged SWCNT micro-patterns are demonstrated. This patterning technique is extremely simple, effective, and easy to fabricate SWCNT micro-patterns without any pressurization and/or heating.