18p-D9-4

CNT 透明導電フィルムのプラスチック基板への直接作製

Transparent Conductive Carbon Nanotube Film on Plastic

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We have developed a simple and efficient fabrication method of transparent, flexible and conductive single-walled nanotube (SWNT) thin films with precisely controlled thicknesses and transmittances [1]. Uniform SWNT thin films were produced through the doctor-blade method using highly viscous, uniformly dispersed SWNT ink with hydroxypropylcellulose (HPC) as a matrix polymer. After the film formation, HPC was successfully removed by either solution curing or photonic curing (pulsed light irradiation) at room temperature, which are advantageous post-processes enabling direct film formation on plastic substrates. The sheet resistances as low as 68-240 Ω/sq at T = 89-98 % (taking the transmittance of the substrate as 100 %) were obtained. Further, the SWNT film on poly(ethylene naphthalate) (PEN) exhibited superior flexibility and stability in flexure endurance test of 200,000 cycles with a curvature radius of 10 mm.

[1] Y. Kim et al., *Appl. Phys. Express*, **6**, 025101 (2013).

* This work was partially supported by Grant-in-Aid for Japan Society for the Promotion of Science (JSPS) Fellows. We thank Dr. T. Saito of AIST for supplying SWNT (eDIPS), and Drs. K. Shinozaki and H. Uchida of Showa Denko Co. Ltd., for their suggestions concerning photonic curing.

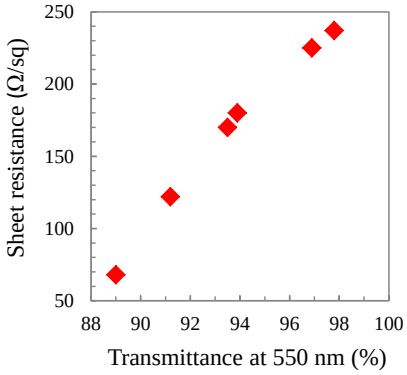

Fig.1 Sheet resistance of the SWNT films after HNO_3 doping as a function of transmittance at 550 nm (the values taking the transmittance of the substrate as 100 %).

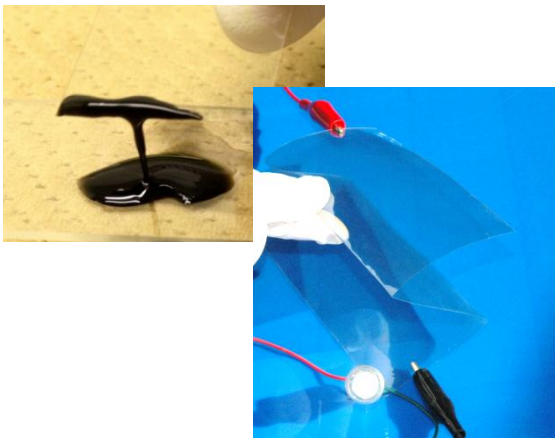

Fig.2 SWNT ink and resulting transparent conductive film prepared on PEN.