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Characterization of Inkjet-Printed Carbon Nanotube Electrode Patterns on Cotton Fabric

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Abstract : An aqueous conductive ink of single-walled carbon nanotubes for inkjet printing was formulated. To prepare the homogeneous SWCNT ink in a size small enough not to block a commercial inkjet printer nozzle, we used a kinetic ball-milling process to disperse the SWCNTs in an aqueous suspension. When a patterned electrode was overlaid by repeated inkjet printings of the ink on various types of fabric, the fabric resistance decreased rapidly following a power law, reaching approximately 760 X/sq, which is the lowest value ever for a dozen printings. The Raman and Fourier transform infrared spectra revealed that the oxidation of the SWCNTs was the source of the doped impurities. This study proved also that the droplet ejection velocity can have an impact on the CNT distribution and consequently on the electrical performances of the ink.

Keywords : ink-jet printing, carbon nanotube, fabric ink, cotton fabric, raman spectroscopy, fourier transform infrared spectroscopy, dozen printings
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