Fabrication of Carbon nanotube TFTs for pressure-sensing device by printing method

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— Printing technology is very promising from many advantages, for example, low cost, flexible etc. We previously have developed a high-performance printed thin-film transistor(TFT) using single-walled carbon nanotube(CNT). A simple ink-jet printing system was used for drawing the device patterns. The maximum temperature was 200 degrees during nano-silver electrode fabrication. The temperature of CNT-channel patterning is under 50 degrees. The widths of the source and drain electrodes were about 1 mm and the channel length were about 150 µm. The thickness of the gate insulator was about 650 nm. The estimated mobilities using over 95% purified semiconductive-CNT were ∼5.1 cm2/Vs for the TFTs whose on/off ratio were more than 5,000.

This time we fabricated CNT-TFT arrays for pressure-sensing sheet devices, using the printed-process on a plastic film. CNT-TFT sheet has a dimension of 16 x 16 TFTs. The average mobility of the TFTs is 4.6 cm2/Vs. The pressure-sensing cell was prepared to combine Printed-TFT, a conductive rubber sheet and a film with a copper foil. Drain current changes in response to pressure applied to the current changes were observed up to 100nA from 10pA. These results were very promising for CNT-TFT applications to printable electronics.

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