Supporting Information for

All-solution-processed, transparent thin-film transistors based on metal oxides and single-walled carbon nanotubes

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To quantitatively elucidate the contact resistance between the channel and the electrode, transmission line method (TLM) was used. The TLM patterns were defined with the channel width of 400 μm and different channel lengths from 50 to 250 μm. The channel width-normalized contact resistance (R_cW) of the SWCNT/IZO and the Al/IZO are extracted by TLM analyses, and the results are shown in Fig. S1a. As the gate voltage increased from 0 to 20 V, the contact resistance of the Al/IZO was in the range of 5.4 to 14.8 kΩ, which are comparable to those reported previously.[10] On the other hand, in case of the SWCNT/IZO, the contact resistance changed from 76.2 kΩ to 2.3 MΩ. Such difference of the contact resistance could be explained by the difference of work function of SWCNT and Al. The work functions of IZO and SWCNT were 4.77 and 5.12 eV, respectively, measured by surface analyzer. The difference of work function, 0.35 eV acts as carrier injection barrier which degrade the TFT performance as schematically shown in Fig. S1b.

Figure S1.

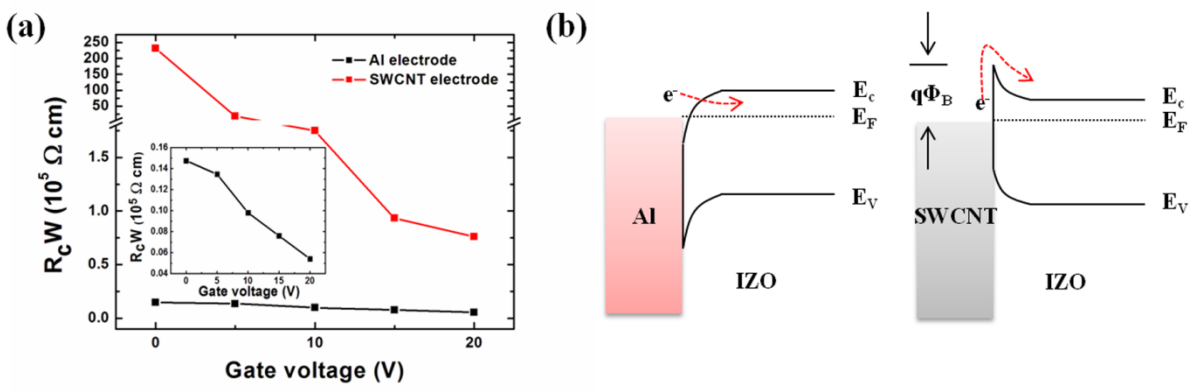

Figure S1. (Color online) (a) Applied gate voltage dependence of contact resistance of Al and SWCNT electrodes on IZO channel layer. The inset shows an enlarged view of contact resistance between Al and IZO. (b) Schematic illumination of barrier heights between electrodes and channel layers in Al/IZO and SWCNT/IZO contacts.

Reference

10) K. Song, D. Kim, X. S. Li, T. Jun, Y. Jeong, and J. Moon, *J. Mater. Chem.*, 2009, **19**, 8881.