

(Invited) Semiconducting Enriched Carbon Nanotube Thin Film Transistors Using Metallic Carbon Nanotube Contact*

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Abstract

Carbon nanotubes (CNTs) have attracted a significant attention in recent years due to their extraordinary electronics, optical and mechanical properties. In particular, CNT thin film transistors (TFTs) are considered as a promising active components in the next-generation flexible, transparent, and invisible electronic devices. In this talk, we will discuss the high-performance CNT TFTs where densely aligned array of metallic single walled carbon nanotubes (SWNTs) were used as source and drain electrodes while semiconducting enriched aligned SWNTs were used as channel material. The both metallic SWNTs in the electrodes and the semiconducting SWNTs in the channel were aligned via dielectrophoresis (DEP) using a high quality surfactant-free solution. We show that the performance of the s-SWNT devices with metallic SWNT electrodes is significantly improved than that of the control s-SWNT devices with Pd electrodes. In order to find the information about injection barrier between s-SWNT and metallic SWNT interface, we carry out low temperature electron transport measurement of our devices. We will discuss the detailed analysis of the low temperature data.

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