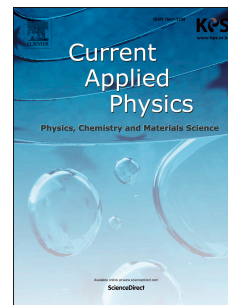


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**Ferroelectric Polarization Effect on Hysteresis Behaviors of Single-walled Carbon Nanotube Network Field-Effect Transistors with Lead Zirconate-Titanate Gating**

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**Abstract**

We report the fabrication of single-walled carbon nanotube (SWCNT) network transistors by ferroelectric  $\text{Pb}(\text{Zr}_{0.4}\text{Ti}_{0.6})\text{O}_3$  (PZT) bottom-gating and investigate the polarization effects of PZT on the transport properties of the transistor device. Our devices exhibit typical p-channel transistor characteristics and a large hysteresis loop with high ON/OFF current ratio and large ON current as well as memory window (MW) measured up to 5.2V. The origin of clockwise hysteresis is attributed to ferroelectric polarization modulated charge trapping/de-trapping process in the interface states between SWCNT networks and PZT. The retention time about  $10^4$ s with two high stable current states preliminarily demonstrates great potential for future non-volatile memory applications based on such SWCNT/PZT hybrid systems.

**Keywords:** Ferroelectric polarization, hysteresis, carbon nanotubes, transistors, charge trapping/de-trapping process

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