

## Fabrication of Room-Temperature-Operating Carbon Nanotube Single-Charge Transistors

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Single-electron and single-hole transistors (SETs/SHTs) using carbon nanotube field-effect transistors (CNT-FETs) have promising practical applications owing to their unique electrical characteristics and potential for room-temperature operation. To realize a charging energy larger than the thermal energy, very small islands are necessary on a carbon nanotube channel. In this article, we review two recent challenges in fabricating room-temperature-operating CNT-SETs/SHTs. One is the introduction of defects into the carbon nanotube channel surface, and the other is the realization of a CNT-FET with an extremely small channel length. All the devices described here clearly show Coulomb oscillations even at room temperature. Room-temperature-operating CNT-SETs/SHTs are expected for applications in logic circuits and high-sensitivity chemical sensors.

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