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Ambient Processed, Water-Stable, Aqueous-Gated sub 1 V n-type Carbon Nanotube Field Effect Transistor

Abstract:
In this paper we report for the first time an n-type carbon nanotube field effect transistor which is air- and water-stable, a necessary requirement for electrolyte gated CMOS circuit operation. The device is obtained through a simple process, where the native p-type transistor is converted to an n-type. This conversion is achieved by applying a tailor composed lipophilic membrane containing ion exchanger on the active channel area of the transistor. To demonstrate the use of this transistor in sensing applications, a pH sensor is fabricated. An electrolyte gated CMOS inverter using the herein proposed novel n-type transistor and a classical p-type transistor is demonstrated.

Stichworte:
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