

Abstract Submitted
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**All-Semiconducting nanotube networks Thin Film Transistors:
An insight towards High Performance Printed Nanoelectronics** DHEERAJ
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fornia, Irvine — In this work, we present our progress towards devices fabrication
using all semiconducting nanotubes as the starting material. A critical issue is the
ink formulation and dependence of electronic properties on the nanotube density
after deposition. These are some of the first spin-on, all semiconducting nanotube
devices ever made and initial results are quite promising for printed RF electron-
ics. Semiconducting single-walled nanotube (99%) ink was used to deposit nanotube
network on APTES modified Si/SiO₂ substrate. Following the nanotube deposition,
source and drain electrodes (Pd/Au) were deposited using standard photolithogra-
phy and E-beam evaporation. The Si wafer was used for back gating and SiO₂ as
the gate dielectric. The impact of density of nanotube was studied for 3 random
densities. We also studied the effect of gate length on mobility, and on/off ratio,
for devices with different gate lengths (10~100 μm). DC characterization of devices
shows a high mobility, up to 40 cm²/V-s, and good on/off ratio up to the order of
10⁴ in some cases. Since we are using 99% semiconducting ink, a high on/off ratio
is expected, which is true in our devices. The on/off ratio of more than 1000 and
mobilities up to ~ 40 cm²/V-s were observed in almost all devices.

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