

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Characterization and Reduction of 1/f Noise in Carbon Nanotube Devices YU-MING LIN, PHAEDON AVOURIS, IBM T. J. Watson Research Center — 1/f noise is a ubiquitous fluctuation in semiconductors and metals. Unlike other types of fluctuations such as the thermal noise and the shot noise, 1/f noise increases with decreasing device dimension and is highly dependent on the material quality and interface properties. Therefore, the noise characteristics in nanoscaled devices are usually dominated by the 1/f-type fluctuations. Here we perform a systematic study on the 1/f noise of carbon nanotube devices consisting of individual single-wall carbon nanotubes. We have examined the impact of the contact and the substrate to the 1/f noise in carbon nanotube devices in order to reduce the 1/f noise level. By eliminating the charge traps associated with oxide substrates, we found that the 1/f noise in carbon nanotube devices can be lowered by up to two orders of magnitude. These results reveal important factors contributing to the 1/f noise source in carbon nanotube devices, and are of great importance for applications based on carbon nanotubes.

Yu-Ming Lin
IBM T. J. Watson Research Center

Date submitted: 20 Nov 2006

Electronic form version 1.4