Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Making End-Bonded Contacts to Carbon Nanotubes JIANSHI TANG, QING CAO, GEORGE TULEVSKI, SHU-JEN HAN, IBM Thomas J. Watson Research Center, Yorktown Heights, NY 10598, USA — As a promising candidate for post-Si era, the implementation of carbon nanotube (CNT)-based CMOS technology requires both high-quality channel and electrical contacts that can be scaled down to sub-10 nm. In the efforts of making scalable contacts to CNT, we have recently demonstrated low-resistance end-bonded carbide contacts, formed by the reaction of Mo with CNT through high-temperature annealing (>800 ^{o}C) [1]. Such end-bonded contact scheme leads to a size-independent contact resistance of about 30 kilo-ohms, which overcomes the scaling limit of conventional side contacts. In this talk, we will present another strategy to make end-bonded contacts to CNTs through thermal annealing at much lower temperatures (400-600 ^{o}C). The contact metals are carefully chosen to have a high carbon solubility, so that the carbon atoms could dissolve into the contacts to inherently form end-bonded contacts. Experimental results, including Raman, SEM, and electrical measurements, with different annealing temperatures will be presented. The length-dependent contact resistance for this new end-bonded contact will be evaluated and compared with that of conventional side contact and also end-bonded carbide contact. [1] Q. Cao, et al., Science, 350, 68-72 (2015).

Jianshi Tang
IBM Thomas J. Watson Research Center, Yorktown Heights, NY 10598, USA

Date submitted: 05 Nov 2015 Electronic form version 1.4