Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Aptamer sandwich-based carbon nanotube sensors for single-carbon-atomicresolution detection of non-polar small molecular species JOOHYUNG LEE, Department of Physics and Astronomy, Seoul National University, Seoul, Korea, MINJOUNG JO, JI-YOUNG AHN, SOYOUN KIM, Department of Biomedical Technology, Dongguk University, Seoul, Korea, TAE HYUN KIM, Department of Chemistry, Soonchunhyang University, Asan, Chungnam, Korea, DONG-KI LEE, Department of Chemistry, Sungkyunkwan University, Suwon, Korea, SEUNGHUN HONG, Department of Biophysics and Chemical Biology, Seoul National University, Seoul, Korea — Portable sensor platforms are crucial for the on-site monitoring of disease-related metabolites, environmental pollutants and food toxicants. However, it is still difficult to build highly-sensitive and selective sensor platforms for small molecular detection. We developed an aptamer sandwich-based carbon nanotube sensor, where aptamers were utilized to capture target molecules as well as to enhance the sensor signals. Using this strategy, we successfully demonstrated the detection of non-polar bisphenol A molecules with a picomolar sensitivity and single-carbon-atomic resolution. Furthermore, by modifying the labeling aptamer with additional biotin, we enhanced the detection limit of our sensors for one hundred times. These results overcome the fundamental limitation of general FET-based sensors and should make a major breakthrough in various applications such as environmental protection and food safety.

Joohyung Lee
Department of Physics and Astronomy,
Seoul National University, Seoul, Korea

Date submitted: 17 Nov 2010 Electronic form version 1.4