Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Large-Scale 'Linker-Free Assembly' of swCNT-Based Biosensor Arrays DONGHEE SOHN, BYUNG YANG LEE, SEUNGHUN HONG, Department of Physics and NANO Systems Institute, Seoul National University, Seoul, Korea — Biosensors based on single-walled carbon nanotubes (swCNTs) have received a great deal of attention due to their potential applications such as genotyping, disease diagnosis, food analysis, etc. However, a lack of reliable mass-production method for such swCNT-based biosensor has been holding back their practical applications. One promising mass-production method for swCNT-based biosensor arrays can be *'linker-free assembly'* process (Nature Nanotechnology 1, 66 (2006)), where non-polar patterns guide the *'selective assembly'* and *'precision alignment'* of carbon nanotubes on bare substrates without using any external forces such as liquid flow, etc. We used this method to fabricate large-scale assembly of swCNT-based integrated devices on virtually general substrates including SiO_2, Si, Al, Au, etc. To utilize swCNT devices for biosensors, we functionalized swCNT devices on SiO_2 with receptor biomolecules such as enzyme L-glutamate oxidase or biotin. And then, we could detect the target biomolecules (L-glutamate or streptavidin, respectively) with high sensitivity and selectivity by monitoring the conductance change of swCNT junctions in aqueous environment. These studies provide biological implications on neurotransmitters and proteins onto swCNT patterned surface.

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Date submitted: 23 Nov 2007 Electronic form version 1.4