Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Graphene Nanonet for Biological Sensor NARAE SHIN, TAEKYEONG KIM, Seoul Natl Univ, JAESUNG PARK, Pohang University of Science and Technology, HYE JUN JIN, HYUNGWOO LEE, KYUNG-EUN BYUN, Seoul Natl Univ, CHANG-SEUK LEE, Soonchunhyang Univ, KWANG S. KIM, Pohang University of Science and Technology, BYUNG HEE HONG, Seoul Natl Univ, TAE HYUN KIM, Soonchunhyang Univ, SEUNGHUN HONG, Seoul Natl Univ — Graphene nanoribbons (GNRs) have been drawing attentions because they exhibited improved transconductances compared with graphene, and their edges could be functionalized with various chemicals or biological molecules. Herein, we developed a facile method to fabricate graphene nanonet (GNN) patterns over a large surface area for biological applications. In this method, the networks of V_2O_5 nanowires were adsorbed selectively in the desired regions on a graphene layer, and they were utilized as a shadow mask during the reactive ion etching on the graphene layer. This fabrication process allowed us to prepare large scale patterns of GNN structures which were comprised the continuous networks of GNRs with chemical functional groups on their edges. The chemical functional groups in the GNN could be functionalized with biological molecules such as DNAs for biological applications. Using the GNN-based biochip devices, we have successfully achieved the fluorescence imaging of DNAs on the GNN channels and the electrical detection of the DNAs at 1nM concentrations. Our method could be a powerful strategy to mass-produce GNR-based devices and should enable various practical bio-applications.

Narae Shin
Seoul Natl Univ

Date submitted: 09 Nov 2014 Electronic form version 1.4