



## Yoon-Bong Hahn

Chonbuk National University, South Korea

### Selective detection of glucose, cholesterol and urea with metal-oxide nanostructures based field-effect transistors array biosensors

Nanotechnology revolution has led to the nanofabrication of sensor devices for rapid and specific identification of chemical/biological species. However, the development of multiplexed nanoscale biosensor for simultaneous detection of different analytes still remains a major challenge at the nanotechnology frontier. It is well recognized that diabetes mellitus is a metabolic disorder resulting in an abnormal blood glucose level and activation of several metabolic pathways related to inflammation and apoptosis events. Heart disease and stroke due to excess cholesterol in blood is the leading cause of death and disability, and kidney failure due to excess urea is caused by urea cycle disorders. We have developed metal-oxide nanostructures based, integrated field-effect transistors (FETs) array biosensor with simultaneously immobilizing GOx, ChOx and Ur enzymes on three separated FET arrays. In this lecture, we report a novel straight forward approach for simultaneous and highly selective detection of multi-analytes (i.e., glucose, cholesterol

and urea) with the FETs array biosensor without interference in each sensor response. Compared to analytically measured data, performance of the FETs array biosensor is found to be highly reliable for rapid detection of multi-analytes in mice blood, serum and blood samples of diabetic dogs. The development of an integrated, low-cost FETs array biosensor will produce quick detection under critical patient conditions, early identification of disease/disorder, and also have an enormous impact on the future generations.

### Biography

Yoon-Bong Hahn is Fellow of Korea Academy of Science and Technology, Director of BK21 Center for future energy materials and devices, Director of National Leading Research Lab for hybrid green energy, and Head of School of Semiconductor and Chemical Engineering, Chonbuk National University (CBNU). He joined CBNU in 1991, prior to which he worked for LG Metals Research Center from 1988 to 1991 after he received his PhD in Metallurgical Engineering from University of Utah in 1988. His main research interest is the synthesis of metal and metal oxide nanostructures and their applications for optoelectronic devices and chemical and biological sensors, resulting in over 270 peer-reviewed SCI papers and 14 patents. He co-authored six books including *Metal Oxide Nanostructures and Their Applications* (five volume sets) published in March 2010 by American Scientific Publishers. He also has 11 registered and nine applied patents.

[ybhahn@chonbuk.ac.kr](mailto:ybhahn@chonbuk.ac.kr)

### Notes: