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## Nanowire arrays for multiplexed nano-biosensors

Ajay Agarwal

Central Electronics Engineering Research Institute, India

Nanotechnologies are enabling novel nano-dimensional materials and devices that find diverse applications in the fields like medicine, electronics, and energy production. With the increasing awareness, healthcare is in focus that includes early diagnosis, drugs discovery, etc. For biological and chemical diagnostic sensors, specificity and sensitivity are crucial aspects. Among the various nano-materials, nanowire (NW) and carbon nano-tube (CNT) based bio-chemical sensors are most exploited for the purpose. NW and CNT sensors work on the principle of Field Effect Transistor (FET) where charge associated with the chemical and biological species attached on the nanowire/ CNT surface acts as chemical or bio-gate, and the devices are also termed as CHEM-FET or BIOFET.

The paper will present the process techniques to realize highly reproducible silicon nano-wire sensors in array format for various bio-chemical applications. Some typical analysis including DNA sensing for Single Nucleotide Polymorphisms (SNP) and Heterozygous SNPs detection; analysis of various ions like H<sup>+</sup> (pH), alkali metal ions (Ca<sup>2+</sup>, Mg<sup>2+</sup>, Na<sup>+</sup>, K<sup>+</sup>)<sup>7</sup>; Cu<sup>2+</sup>, Zn<sup>2+</sup>; bio-electricity detection from cells and organs, etc. will be presented.

## Biography

Ajay Agarwal is Principal Scientist and Nodal officer at CSIR- Central Electronics Engineering Research Institute, Pilani; involved in development of Nanotechnologies MEMS, and Microsensors. He is also Associate Professor at Academy of Scientific and Innovative Research (AcSIR), New Delhi. Earlier as a Member of Technical Staff he served Institute of Microelectronics, Singapore for over 9 years. He received BE. from NIT, Rourkela followed by MS and PhD from BITS, Pilani. His engagement with semiconductor industries and research institutes is for 24 years. He has ~210 research publications, 25 invited/ plenary/ keynote talks and 25 patents. He is Senior-member of IEEE, USA; Life Fellow of MSI, India, etc. He is bestowed with various awards including 2008 National Technology Award, Singapore; 2009 Excellence Award, IME Singapore; "Collaboration Development Award" British High Commission, Singapore for year 2005 and 2006, Super Kaizen (4 times) and Best Kaizen (7 times) at USHA (India) Ltd., etc. Development of Micro-, Nano-technologies, MEMS and semiconductor processes for various applications are his main research interests.

dr.ajay123@gmail.com