Abstracts

("Smart Materials and Recent Trends in Nanotechnology")

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1. Basics of transistors and introduction to wide band gap devices

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In this talk, an introduction to the basics of transistors and their nano-fabrication in cleanroom will be provided. Next, gallium nitride semiconductor will be introduced along with its motivation, promises and challenges. The importance of semiconductor devices in power electronics, in particular wide band gap material, will be highlighted. Next, the material-device correlation for GaN transistors on silicon will be discussed, and recent results on the study of MOCVD growth of GaN epi-layers toward improved structural and electrical properties will be presented.

2. Nanotechnology and its multidisciplinary applications

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Nanotechnology, based on the manipulation, control, and integration of atoms and molecules to form materials, structures, components, devices, and systems at the nanoscale, is the application of nanoscience, especially to industrial and commercial objectives. Nanotechnology deals with systems involving materials with physical extents less than 100 nm in one or more dimensions. At this size range, materials behave completely differently with remarkable properties and great potential. Nanotechnology is a horizontal enabling convergent technology that cuts across all vertical industrial sectors. Nanotechnology is a disruptive technology with a high barrier of entry that will impact the development of enhanced materials and devices in almost all application areas. Nanotechnology will require that a new genre of partnerships be formed among and between business, academia and government. It will focus study and effort on potential societal implications of a new and certainly disruptive technology. Nanotechnology is predicted to significantly impact the wealth and security of nations. Nanotechnology is the next industrial revolution. It is considered to be, more so than ever, a technology that will have great impact on all aspects of culture and society.