Editorial

Science and technology of 21st century will rely heavily on the development of new materials and structures. New developments in solid-state physics, the technological application of quantum effect material research, optoelectronics information engineering and smart technology have opened nanoscopic formation methods to the world. Nanostructures, for example, the manipulation of structures on the atomic molecular levels though still in infancy stage, will gain momentum in the next five years.

The technology of semiconductor materials and devices is advancing at a very rapid pace. It is essential to keep abreast with the latest developments in the design of new fabrication techniques, characterisation tools and also in understanding the physics to produce reliable and large volume production of state-of-the-art devices. In the past five years, efforts have also been made to study gallium nitrides and now the blue light emitting diodes have been produced. Similarly, another example is of infrared night vision devices. In this direction, a lot of work has been done and the most advanced systems of mercury-cadmium-telluride materials are now available. But, all these systems are operational at liquid nitrogen temperature. Recently, silicon micromachining has shown a hope to provide focal plane array, working at room temperature. Some of the systems based on this are included in this Special Issue. The Issue also contains information on high speed devices; functional devices up to a density of 10^{12} devices/mm^2 are possible with a special scheme.

Recently introduced technology known as smart technology, smart structures or microelectromechanical systems is the technology for the 21st century. In this, the functioning of the devices are analogous to the biological pattern of functioning. This idea has again been taken from *Nature*. The most perfect system is human body containing sensors, intelligent control (brain) and actuators. Efforts have been made to integrate microsensors, microprocessors and microactuators at one place; this is a smart system. It has a large number of applications in defence, aerospace, medicine and automobile industries.

About the futuristic optoelectronics, it can be quoted as T Hiruma's vision 'detecting a single photon cannot be the end point. It is just a starting point. Human kind does not know enough even in photonics. We have to find our own direction. God of absolute truth. Infact, we are able to detect a single photon now using a low-noise detector. We have been measuring light from the human body. The body emits about 100 photons per second. His question at the moment is how to measure wavelength and polarity of this light. The purpose is to explore way to apply these photon technologies to study biology and brain' which can be possibly achieved.

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