

reinforced with polymer matrix will result in composites which are super strong, light weight, small and intelligent structures in the field of material science. This has tremendous aerospace applications.

Molecular switches and circuits along with nano cell will pave the way for the next generation computers. Ultra dense computer memory coupled with excellent electrical performance will result in low power, low cost, nano size and yet faster assemblies.

The solar rays, when passed though presently available solar photovoltaic cells have an efficiency of less than 20%. I would like to discuss the latest research in the area of photovoltaic cells using Carbon nano tubes which can give an efficiency of over 45%, nearly three times the efficiency which the present technology can offer. The CNTs provide better electron ballistic transport property along its axis with high current density capacity on the surface of the solar cell without much loss. Higher electrical conductivity and mechanical strength of CNT could improve the quantum efficiency to the order of 35%. But, this is not sufficient. Recent research abroad has shown that the alignment of the CNT with the polymer composites substrate is the key issue and this aligned CNT based PV cells would give very high efficiency in photovoltaic conversion. In this process, the researchers could achieve the efficiency of about 50% at the laboratory scale. I am sure the researchers of BHU will definitely like to participate in the development of high efficiency Photovoltaic cell since your team has already developed carbon nanotube filters that efficiently

remove micro-to-nano-scale contaminants from water and

Energy Independence

Our energy requirement in the future will go up to four hundred thousand megawatt from the existing one lakh thirty thousand megawatt. Presently our energy requirement is mainly from coal (56%), hydroelectricity (25%), nuclear power (3%) and Renewable (5%). Solar energy segment contributes just 0.2% of our energy production. In the future we will be concentrating on coal 50%, hydro-electricity 20%, solar energy 14%, Nuclear energy 6%, Renewable energy 10%. We have to work on the research area to increase the photovoltaic cell efficiency to 50% which I have talked to you earlier, enhance our research effort in generating nuclear power through

thorium route and work towards bringing clean coal. In the transportation sector where we are now importing 75% of our oil requirement at a cost One lakh twenty thousand crore per year, we should enhance our bio-fuel generation capacity to 60 million tons and hydrogen packaged fuel. Also we should develop solar cars and solar thermal for chemical plant utilization. This combined strategy will lead us to total energy independence by the year 2030. BHU has got a great role to play in promoting energy independence through research and development work.



The Gold Medalists (list at page # 08)