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ENGINEERING AT THE NANOSCALE WITH CARBON NANOSTRUCTURES – A BRIEF COMMENTARY

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In scientific and technological innovations, the last two decades have clearly belonged to the nanoscale. In addition to the overriding push to miniaturize electronic devices, which has brought us to nanoscale devices in commercial computing platforms, the importance of nanotechnology has been accepted overwhelmingly by the scientific and technology communities. Enormous effort has been expended in designing and synthesizing nanoscale building blocks such as metal nanoparticles, quantum dots, carbon nanotubes, silicon nanowires etc., to name a few. The next stage in the evolution of nanotechnology as a viable future technology will be in nanoscale "engineering", where the nanoscale elements have to be built into functional architectures for practical applications. This effort is essential to bring the much promised revolutionary impact of nanotechnology, in areas as diverse as electronics, optics, alternative energy, multifunctional composite materials, thermal management, drug delivery and medical prosthetics.

In this short communication, a few examples will be presented to highlight the opportunities and challenges faced by nanotechnology.