

Nanovation: Innovation in Nanotechnology Where is it Taking us?

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Nanotechnology, coined the technology of this century and the meeting ground of all fields, attracted billions of funding dollars, and thousands of scientists and engineers. It is exciting, novel, and ventures into areas of S&T beyond nature where we never been. It is simply synonymous with innovation and captures the imagination of all, and affords us to dream to solve the problems facing the human race, such as acute disease, energy, lighting and food crunch. Its importance is highlighted by the billions spent and by market size projection of \$1 Trillion in 10 years. Western countries established national initiatives, and Asian countries followed suit and Saudi Arabia entered the race.

It works at the limit of size, on a scale no bigger than 100 nanometers (billionths of a meter). The basic principle is that due to miniaturization, surface phenomena become the dominant factor. Often materials acquire much improved or even novel properties not found in bulk. Nanostructured materials have improved mechanical, electrical, optical, and chemical properties, and are lighter, stronger and cheaper. Prospective applications include energy storage, production & conversion; lighting; agricultural productivity & food management; water treatment & remediation; health monitoring & disease diagnosis & drug-delivery; air-pollution; skin care and advanced paints; defense, and communication.

In this talk, I will present the basic premises and innovative nature of the technology, drawing examples from my own research and commercialization activities at the University of Illinois. I will end with raising the issue of potential effects on the environment and health as well as the need for a code of ethics.