Title: The Challenges and Recent Innovations in Nanotechnology

Maurya Savita[1],

[1]Department of Electronics & Communication Engineering, Integral University, Lucknow, India

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I. Abstract

Nanotechnologies utilize devices/materials those have engineered functionality at molecular/nanoscale level and it existed for long such as Kaajal. However, in recent times man found could be used in a variety of applications. To fabricate these devices/materials we need technologies. The broad area of the application itself may define a technology like electronic, biology, medical, healthcare, construction engineering etc. The challenges in nanotechnologies arise from three sources. They are: Building application system that uses nano-devices/materials, how to embed nano-devices/materials. Technology into the application system and the last one is the technique of producing nano devices/materials in the required form and quantity to the required degree of precision. The talk/paper presents some of the application areas, recent innovations and the challenges of nanotechnology. The applications & innovations are discussed under engineering, scientific, and medical applications.

Nano medicine/ nano medical technology deals with precisely engineered objects of the size 1–10 nm (drugs, sutures, equipment etc.) to develop new therapeutic and diagnostic techniques. These materials have physic-chemical properties, such as ultra small size, large surface area to mass ratio, high reactivity, quick absorption, local interaction etc. These properties differ from those of the bulk materials of the same composition. These properties can be used to offset some of the limitations found in traditional therapeutic and diagnostic practices. The paper touches upon the nano drug design and targeted drug delivery, the design of consumable sutures, advanced molecular imaging technologies, sensitive diagnostic sensors, and sensors that could be delivered to a remote location in the body.

Nanotechnology introduces high-performance and low-power electronics. We have been practicing both top down approach (with photolithography) and bottom up approach (ALD, circuit synthesis and circuit fabrication). Use of carbon nanotube (CNT) FET, Si nanowire FET and other nanoengineered technologies enables enhanced circuit functionality and Moore's Law. The challenges to overcome in this are limit set by materials itself and by fabrication technologies.

A number of applications were planned around CNTs as it was one of the earliest fabrication techniques planned. But CNTs proved to be difficult due to low yield and difficult to align and thus difficult to fabricate any useful materials. Alternative to CNT, nanofiber electro-spinning, in which continuous threads of polymers or ceramic precursors are emitted from a liquid surface as thin jets. These nanofibers being continuous may provide an alternative base for new nanotechnology applications.

Recently, a number of studies have been published on the use of nanomaterials and nanotechnology in various fields and applications such as dentistry, orthopaedics, neuroscience, space vehicles, food industry, poultry industry, agriculture etc.

Nanotechnology eases our life but also introduces some challenges with it. One of the serious concerns is harm to living creatures due to free nanoparticles produced in different applications and absorbed from creatures in any form.

II. Reference:

1 Tekade R. K., Maheshwari R., Soni N., Tekade M, Chougule M B, Chapter 1 - Nanotechnology for the Development of Nanomedicine, Editor(s): Mishra V, Kesharwani P, Amin M.C.I.M., Iyer A, 2017, Nanotechnology-Based Approaches for Targeting and Delivery of Drugs and Genes, Academic Press, 3-61.

2. Karcher S, et. al., 2018, Integration among databases and data sets to support productive nanotechnology: Challenges and recommendations, NanoImpact, 9: 85-101.

3. Paolo Di Sia, 2017, Nanotechnology Among Innovation, Health and Risks, Procedia - Social and Behavioral Sciences, 237, 1076-1080.

III. Biography:

Savita Maurya has completed her PhD in Sep 2015 from Indian Institute of Information Technology Allahabad- India. She is renowned in semiconductor/ material science and has published more than 25 papers in reputed journals and conferences. She has been serving as an editorial board member/ reviewer of reputed journal. She has variety of research as electronic materials, radiation hard electronic, solar PV systems, advanced memory devices etc.

IV. Presenting author details



Full Name: **Dr Savita Maurya**
Contact number: **+91 8299054137**
Twitter account: **Dr SAVITA (@(DrSAVITA9)**
Linked In account: **https://www.linkedin.com/in/savita-maurya-7711b516**
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