The Synthesis Of Nanotechnology

Dr K.B. Shanthi Sudha*[1], Dr Baby Abrarunnisa Begum*[2]

1* Andhra Mahila Sabha Arts and Science College for women (AMSASCW), Osmania University campus,Telangana state, Hyderabad-500007
2*Associate Professor at Shadan college of engineering and technology

Abstract

The present characteristics of "Nanotechnology". The nanotechnology has made one of the most dynamic wisdom and technology disciplines at the convergence of physical lore's, molecular engineering, biology, biotechnology and drug. Nanotechnology grounded systems, styles of medication, operations, advantages and disadvantages. At present, the number of implicit forms of nanomaterials available for use in biotechnological operations includes a growing list of nanoparticles, nanowires, nano-filaments, nanostructures, and Nano machines. Despite the challenges, the commercialization of nanobio-technologic products appears to have a bright future, and within 10 times numerous new products of this nature are likely to be accepted and in use in worldwide commerce.

Keywords: nanotechnology, nanoparticles, synthesis technic, characteristics technic

Introduction

The prefix nano in the word nanotechnology means a billionth (1×10^{-9}). Nanotechnology deals with colorful structure of matter having confines of the order of a billionth of a cadence. A nanometer is 10^{-9} m. Nanoparticles are generally considered to be a number of snippet or motes clicked together a compass of <100 nm. The interest in Nano science (science of low dimensional systems) is a realization of a well-known statement by Feynman that" There is a lot of Room at the Bottom". According to Feynman's idea.[1] K. E. Drexler advanced the idea of "molecular nanotechnology" in 1986 in the book Engines of Creation, where he suggested the idea of using Nano scale molecular structures to act in a machine like manner to monitor and initiate the synthesis of larger molecules.

Fig 1: The scale of things of Nature.

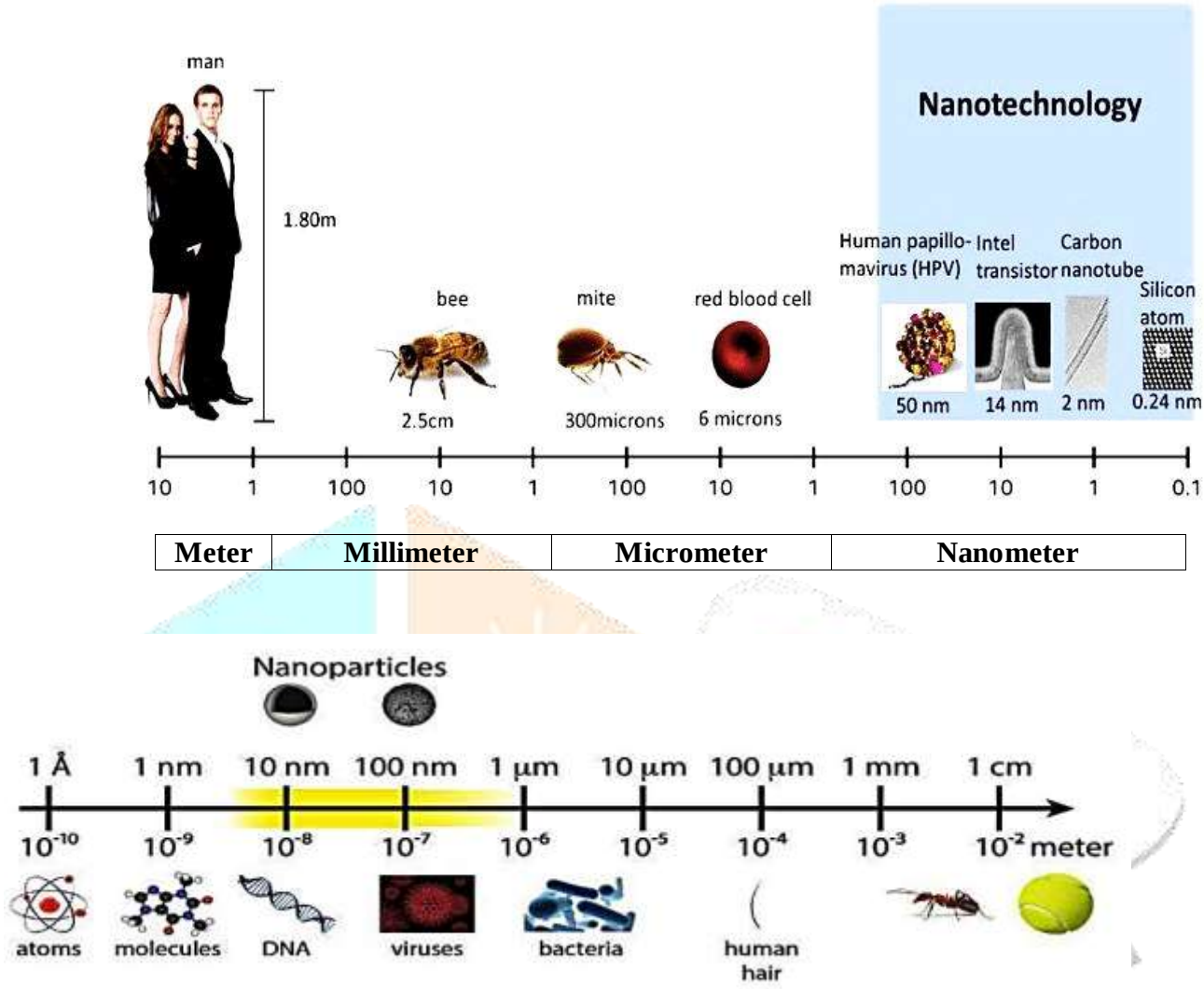

Fig 2: Representing the Nano particles with their approximate sizes.

In general physical properties of material can be categorized by several critical lengths, a thermal diffusion length. This distance is called the mean free path. The nanomaterial is those which have a characteristic length scale within 100nm. A particle diameter, grain size layer thickness or width of showing line on a device is some example of length scale.[3]

A set of 10^6 or less number of atoms or molecules bonded together in a cluster with the radius of around a 100nm

Special features of nanomaterial

Conventional materials have grains varying in size anywhere from hundreds of microns (µm) to millimeter (mm). A nano crystalline material has grains on the order of 1-100 nanometers. The properties of bulk material are typically retained fill the reduction of their dimensions to the micrometer range but materials in the nanometer scale display remarkably new properties.[4]

Synthesis technique of nanomaterial

The importance in synthesis of nanomaterials has grown because of their distinct optical, magnetic, electronic, mechanical, and chemical properties compared with those of the bulk materials. The exposure of exact size and shape controlled synthesis of nanostructure materials is becoming a great task for the nanotechnologists. Nanostructure materials have attracted a great deal of attention because their physical, chemical, electronic and magnetic properties show dramatic changes from higher dimensional counter parts and depend on their shape and size.[5, 6]

Classification of techniques for synthesis of nanomaterials

The two general methods for the synthesis of nanomaterial are as follows

I. **Top- down approach**
II. **Bottom–up approach**

In Top-down approach refers to slicing or successive cutting of a bulk material to get nano sized particles. In Top-down techniques the starting material is solid state. In Top-down approach this approach physical processing technique used one is mechanical method in this method cutting, etching, grinding, ball milling. And the other is Lithographic process. In this process we used photo lithographic and Electron beam lithographic.[7, 8]

In Bottom- up approach refers to the buildup of a material from the bottom. Atom by atom, molecule by molecule. Atom by atom deposition leads to formation of self-assembly of atom or molecule and clusters. These cluster come together to from self-assemble monolayer on the surface of substrate.

In Bottom- up approach the starting material is either gaseous state or liquid state of matter. Its two type method. Physical and chemical processing methods.[9] in physical method, physical vapor deposition (PVD), evaporation (thermal, e – beam) sputting, plasma arching, laser ablation. In chemical method, chemical vapor deposition (CVD), PECVD, electrolatic deposition, sol-gel method, pyrolysis, micro emusion route[10].

Conclusion:

The investigation has been focused on the generation of nanoparticles and nanostructures, a shift towards nanoparticles processing and imaginative utilization is noticeable. Future work is expected to expand basic understanding of nano scale phenomena and mechanisms, combine synthesis and assembling in to function.

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