

Nanoparticles

Puja Kundu

M.sc in chemistry (3rd semester)
Belda college (Vidyasagar University)

Submitted: 15-09-2021

Revised: 25-09-2021

Accepted: 28-09-2021

I. INTRODUCTION:-

A nanoparticle is simply called those particle which have the diameter between 1 to 100nm. At the lowest range, metal particles smaller (<1nm) are usually called atom clusters.

Nanoparticles are usually distinguished from microparticles, particles & coarse particles, cause of their small size being very different chemical or physical property like colloidal property. The separation of liquids and nanoparticles by special nanofiltration techniques.

Nanoparticles occur in nature and are objects of study in many science like chemistry, physics, geology & biology. The production of nanoparticles with its specific properties by the branch of nanotechnology.

Definition:-

In its 2012 terminology proposed for biologically related polymers, the IUPAC defined a nanoparticle as "a particle of any shape with dimension 10^{-9} nm to 10^{-7} nm".

In another publication, the IUPAC extends the term to include tubes and fibers with only two dimensions below 100nm.

•ISO:- According to the International Standards Organization, a nanoparticle is an object with all three external dimensions in the nanoscale.

•Common usage:- "Nanoscale" is understood to be the range from 1nm to 100nm because the novel properties that differentiate particles from the bulk material typically develop at that range of size.

History:-

•Natural occurrence:- Nanoparticles are usually produced by many process these are-

- ~cosmological
- ~biological
- ~meteorological
- ~geological

The interplanetary dust still falling on the Earth at the rate of thousands tons per year same as nanoparticle range. Many virus have diameters in the nanoparticle range.

•Pre-industrial technology:- Nanoparticles were specially used by artisans in their art work. were by glassmakers and potters in classical Antiquity. The latter is characterized by silver and copper nanoparticles.

•19th century:- Michael Faraday first provided in scientific term the manometer-scale metals in his 1857 paper. In a subsequent paper, the result is white light is now freely transmitted, reflection is correspondingly, other the electrical resistivity is enormously increased.

•20th century:- During the 1970 & 1980 first start. In 1990 National Nanotechnology Initiative United States & the nanoparticle term become more common.

Structure:-

Nanoparticles occur in various type of shapes like nanochains, nanorods, nanoflower etc. Its shapes can be determined by intrinsic crystal habit. The study of fine particles is called micromeritics.

Properties:-

The properties of nanoparticle are usually different for their micrometer size. properties are-

- ~Large area
- ~Interfacial layer
- ~Solvent affinity
- ~Diffusion across the surface
- ~Ferromagnetic and ferroelectric effects
- ~Mechanical properties
- ~Melting point depression

Production:-

Artificial nanoparticles can be created from any solid or liquid. There are several methods for creating nanoparticle these are-

- ~Mechanical
- ~Breakdown of biopolymers
- ~Radiolysis
- ~Functionalization
- ~Pyrolysis

Application:-

Nanoparticles have an enormous range of potential and actual applications. The applications are given below-

- ~Polymer reinforcement
- ~Liquid properties tuner
- ~ Photocatalysis
- ~Biomedical
- ~Industrial(agriculture, construction, cosmetics, medicine,food etc.)

Safety:- Nanoparticles have possible if dangers both medically and environmentally. Most of these are due to Large area which can make the particle more reactive. The particles are pass the cell membrane and enter the cell nucleus, Golgi, other

internal organ. The pharmaceutical companies concern on safety data produced in cilinical studies in medicine chemistry. As of 2013 the U.S.Environmental Protection Agency was investigating the safety of nanoparticles.

II. CONCLUSION:-

Nanoparticles are one of best drug in delivery process. Its potential use in controlling and targeting drug delivery also in cosmetics and paints. With potential enhancement increasing the affinity of the nanoparticle for cancerous cell with greater efficiency.

