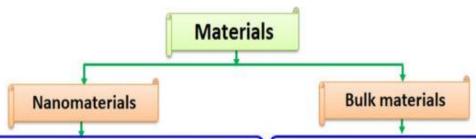


## SNS COLLEGE OF ENGINEERING

Kurumbapalayam(Po), Coimbatore - 641 107 AN AUTONOMOUS INSTITUTION Accredited by NBA - AICTE and Accredited by NAAC-UGC with 'A' Grade Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai



## 19CH103- ENGINEERING CHEMISTRY Unit-3 NANOCHEMISTRY



- Nanomaterials (NMs) are chemical substances or materials that are of size, at least in one dimension, in nanoscale 1-100 nm
- Cannot be seen by simple microscope, or naked eye. Advanced microscopic techniques are used.
- Large surface to volume ratio leads to better performance such as in catalysis, solar veils, gas sensors
- High percentage of atoms or molecules on the surface which leads to unique properties
- Surface forces are very important
- Metal nanoparticles have unique scattering properties
- Semiconductor nanoparticles may exhibit confined energy states in the electronic band structure
- Their chemical and physical properties are unique and change by size and shape
- NMs properties can be 'tuned' by varying the size of the particle (e.g. changing the fluorescence colour so a particle can be identified)
- NMs complexity offers a variety of functions to products
- Adsorption and absorption of molecules (gas or liquid phases) are high and fast
- Examples are nanosilica, nanotitania, nanoalumina, etc.

- Bulk materials are particles that have their size above 100 nm in all dimensions
- Can be seen by simple microscope, or naked eye.
- Low surface to volume ratio leads to better performance such as in catalysis, solar veils, gas sensors
- Low percentage of atoms or molecules on the surface which leads to their properties
- Bulk forces are not as important as surface forces
- Metal bulk have normal scattering properties
- Semiconductor bulk may not exhibit confined energy states in the electronic band structure
- Their chemical and physical properties cannot be tuned
- Adsorption and absorption of molecules (gas or liquid phases) are low and slow
- Examples includes sand, cement, alumina, ore, salts, etc.