

## Some applications of nanoscience in chemistry

Dr. Layla Al Juhaiman

physical chemistry

King saud University

[ljuhoiman@yahoo.com](mailto:ljuhoiman@yahoo.com)

### I-Definition of nanoparticles

'Nano' is used in the world of science to mean  $10^{-9}$ . A nanometer is only ten atoms across! So generally nanotechnology is used to mean technology at the nanometer level.

-**Nanotechnologies** are the design, characterization, production and application of structures, devices and systems by controlling shape and size at nanometer scale

### II-Why nanoparticles (NP) are important?

At such scale ordinary rules of physics and chemistry no longer apply. Materials' characteristics, such as their colour, strength, conductivity and reactivity, can differ substantially between the nanoscale and the macro.

### III-Some applications of nanoparticles.

#### \*\*\* Chemistry

**Catalysis** : Using NP as promoters in many reactions

**Polymer** : Addition of NP change properties of polymers

**Electrochemistry** : Solar energy cells (photovoltaics)

\*\*\***Electronics** :New forms of computer memory, electronic circuits,etc

### IV -Higher Education Nanotechnology Centers

- [Center for Nanotechnology in Society at UCSB](#)
- [Manufacturing Engineering Centre \(MEC\), Cardiff University, UK](#)
- [Institute for NanoBioTechnology at Johns Hopkins University](#)

### V-Environmental aspect of nanotechnology

Developing instruments to evaluate exposure of nanomaterials to air and water. Finding methods to study the toxicity of nanomaterials,

### VI- References

1. [www.nanotec.org.uk/evidence/78aRSC.htm](http://www.nanotec.org.uk/evidence/78aRSC.htm)
2. *Science* **2007**, 315, 358
3. *Nat. Nanotechnol.* **2007**, 2, 21
4. *Science* **2006**, 314, 274
5. *Nature* **2006**, 439, 55.

