

Study of Nanotechnology and its Probable Outcomes

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ABSTRACT

In Nanotechnology we study and produce materials that have at least one dimension between 1nm and 100nm. The material when taken at microscopic level will behave differently than when taken at macroscopic level. One can introduce desired properties in the material by changing its dimensions. Probably properties of costly metals can be introduced in metals of low cost. It seems nanotechnology can bring drastic changes in medical field. Beautification of skin seems to be possible using nanotechnology. Though lot has been done in nanotechnology for example in fibre industry, cosmetics, and medical field but lot seems to be still unexplored in such fields. Reactions having high activation energy seem to be feasible under natural conditions by using nanotechnology.

I. INTRODUCTION AND PROBABLE OUTCOMES

Superfast computers, sensors, drugs that target and kill cancerous cells without making much damage on healthy cells are some of the developments of nanotechnology. Nanotechnology is used to study and produce materials that have at least one dimension between 1nm and 100nm. Depending whether the material contains only one dimension in 1-100nm rang or two or all three, as such material is accordingly classified into nanolayers, nanotubes (or nanowire) and nanoparticles respectively. Due to very small size of nanoparticles, they have different colour, low melting point and high reactivity.

Nanocomposites help to reduce packing waste associated with processed food products and serve to accomplish preservation requirements of fresh foods by extension their shelf life [1]. The term nanofood is used for the food product which has been produced, cultivated, processed and packaged using nanotechnology tools, or to which nanomaterials have been added [2]. Recently the scientists throughout the world have managed to develop nanoscale edible film coatings as thin as 5nm, invisible to the human eye. These edible coatings and films are used on a wide variety of foods, like fruits, meats, vegetables etc. to act as a barrier to moisture and gas[3]. Considering the basic structure of these nanoparticles, some important predictions can be drawn about their properties.

According to molecular orbital theory when atoms combine, their atomic orbitals combine and form new orbitals called molecular orbitals. These molecular orbitals are called bonding and antibonding molecular orbitals and have appreciable differences in their energies. But if the combining atomic orbitals are more in number then energy difference of highest occupied molecular orbital and lowest unoccupied molecular orbital decreases. If number of combining atoms are still increased as happens in metals, then various energy levels seem to have no energy difference, hence form energy band. So keeping the number of combining atomic orbitals in appropriate values levels with desired energy differences seem to be possible.

Material when considered at atomic level has quantized energy levels and in case of atoms only particular wavelength may get absorb or emitted. But as in metals large number of atoms are bound with one another through metallic bonds, which helps in delocalisation of free electrons or in otherwords energy difference between various energy levels decreases. This merging of atoms can set up new energy levels which may emit or absorb different energies. Thus it might be possible to set the energy levels in the nano size particles in a mode that a desired wavelength may be emitted or absorbed. If it would be possible than goggles containing nanoparticles may help in beautifying our skin, making us smart or cute. Radioactive cobalt is being used to treat cancerous cells, if above hypothesis works than any low cost metal can be used to produce suitable rays which can be used to treat deadly diseases like cancer.

Further, it is well known fact surface exposure increase the reactivity of material, which can be achieved by using the material at nanoscale. Thus it might be possible that those reactions which have very high activation energy may occur if used at nano scale levels. Thus like spontaneity of process changes with conditions like temperature, similarly spontaneity of a chemical reaction may also change by changing size of materials involved in reaction.

CONCLUSIONS

- Skin beautification may be possible by using material of suitable dimensions.
- Any low cost metal may work to treat deadly diseases.
- Like spontaneity of a reaction depends on conditions like temperature, there might be spontaneity dependence on size of material.

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