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Editorial

Current Research and View on Nanotechnology

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INTRODUCTION

The utilization of materials on an atomic, molecular, and supramolecular scale for industrial purposes is known as nanotechnology. The first and most widely accepted definition of nanotechnology pertained to the specific technological objective of accurately manipulating atoms and molecules for the creation of macroscale goods, which is now known as molecular nanotechnology. The National Nanotechnology Initiative later adopted a more broader definition of nanotechnology, defining it as the manipulation of matter with at least one dimension sized between 1 and 100 nanometers. Because quantum mechanical effects are important at this quantum-realm scale, the term has evolved from a specific technological goal to a research category that encompasses all forms of research and technologies dealing with the peculiar case qualities of matter that occur at or below a certain size threshold As a result, the plural form "nanotechnologies" as well as "nanoscale technologies" are frequently used to refer to a broad variety of research and applications with a common characteristic of size. Surface science, organic chemistry, molecular biology, semiconductor physics, energy storage, engineering, micro fabrication, and molecular engineering are just a few examples of nanotechnology as defined by scale [1]. The research and applications that go along with it are equally broad, ranging from extensions of traditional device physics to wholly new approaches based on molecular self-assembly, from inventing new nanoscale materials to direct control of matter at the atomic scale [2].

Nanotechnology's future ramifications are now being debated among scientists. Nanotechnology has the potential to generate a wide range of new materials and devices with applications in nanomedicine, Nano electronics, biomaterials, energy production, and consumer goods [3]. Nanotechnology, on the other hand, raises many of the same concerns as any new technology, including safety concerns. Nanoparticles' toxicity and environmental impact, as well as their possible consequences on global economics and conjecture about numerous apocalyptic scenarios these concerns have sparked a debate among advocacy groups and governments about whether nanotechnology requires specific regulation [4]. Subfields of the nanomaterials area research or study materials with special properties due to their nanoscale dimensions.

Many materials that could be beneficial in nanotechnology have come from interface and colloid science, including carbon nanotubes and other fullerenes, as well as different nanoparticles and Nano rods. Nanomaterials that have a high rate of ion transport are also linked to nanoionics and Nano electronics. Nanoscale materials can also be employed in bulk applications; in fact, most current commercial nanotechnology uses are of this type [5].

The use of these materials for medical applications has progressed; see Nanomedicine. In solar cells, nanoscale materials such as nanopillars are occasionally employed to reduce the cost of regular silicon solar cells. Development of semiconductor nanoparticle-based applications for usage in the future generation of products Quantum dots are used in a variety of applications, including display technology, lighting, solar cells, and biological imaging [6].

Nanomaterials have recently been used in a variety of biomedical applications, including tissue engineering, medication transport, antibacterial, and biosensors. The specificity of Watson–Crick base pairing is used in DNA nanotechnology to create well-defined structures out of DNA and other nucleic acids [7].

Chemical synthesis approaches from the "traditional" sector likewise try to design molecules with well-defined shapes. Molecular self-assembly, in general, aims to leverage supramolecular chemistry ideas, specifically molecular recognition, to allow single-molecule components to spontaneously organize themselves into a useful shape. Dip pen nanolithography is a method that uses atomic force microscope tips as a tiny "writing head" to deposit a chemical on a surface in a specified pattern [8]. This method belongs to the broader subject of nanolithography. Molecular Beam Epitaxial allows for bottom-up assembly of materials, most notably semiconductor materials utilized in chip and electronic applications. There have been a number of significant modern innovations [9]. The scanning probes that launched nanotechnology were the atomic force microscope (AFM) and the scanning tunneling microscope. Other types of scanning probe microscopy exist. Although theoretically comparable to Marvin Minsk's scanning confocal microscope of 1961 and Calvin Quate and coworkers' scanning acoustic microscope of the 1970s, modern scanning probe microscopes offer far higher resolution since they are not limited by the wavelength

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of sound or light Manipulation of nanostructures can also be done with the tip of a scanning probe. The use of feature-oriented scanning methodology could be a viable strategy to automate these Nano manipulations [10].

Conflict of Interest

None

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