

Editorial Note on Molecular Nanotechnology

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EDITORIAL

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 definition has shifted from a specific technological goal to a research category that encompasses all types of research and technologies concerned with the special properties of matter that occur below the given 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. Nanotechnology, as defined by size, encompasses a wide range of scientific disciplines, including surface science, organic chemistry, molecular biology, semiconductor physics, and energy storage, engineering, microfabrication, and molecular engineering to name a few. 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 on the atomic scale.

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, nanoelectronics, biomaterials, energy production, and consumer goods. Nanotechnology, on the other hand, poses many of the same concerns as any new technology, including concerns about toxicity its possible economic consequences, as well as conjecture about numerous apocalypse scenarios these concerns have sparked a debate among advocacy groups and governments about whether nanotechnology requires specific regulation.

Nanotechnology is the creation of molecular-scale functional systems. This includes both current work and more advanced thoughts. Nanotechnology, in its original sense, refers to the ability to build anything from the ground up, employing processes and tools that are now being developed to create full, high-performance goods. A nanometer (nm) is one billionth of a metre (10⁹). Carbon-carbon bond lengths, or the distance between these atoms in a molecule, are typically in the range of 0.12–0.15 nm, whereas the diameter of a DNA double-helix is roughly 2 nm. The bacteria of the genus *Mycoplasma*, on the other hand, are the smallest cellular life-forms, measuring roughly 200 nm in length.

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