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Opinion Article

Nanotechnology Techniques Involved in Biomedical Engineering

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DESCRIPTION

Nanotechnology is the utilisation of materials at the atomic, molecular, and supramolecular scales for industrial purposes is known as nanotechnology.

There are numerous significant contemporary innovations. Nanotechnology was introduced *via* the Atomic Force Microscope (AFM) and the Scanning Tunneling Microscope (STM), two early iterations of scanning probes. Other variations of scanning probe microscopy exist. Though conceptually related to the scanning confocal microscopes have much higher resolution because they are not constrained by the wavelength of sound or light.

A scanning probe's tip can also be utilised to work with nanostructures and a potentially successful approach to implementing these Nano manipulations in automatic mode is feature-oriented scanning methodology. Due to the microscope's poor scanning speed, this technique is still cumbersome.

There have also been developments in a number of nanolithography techniques, including optical lithography, X-ray lithography, dip pen nanolithography, electron beam lithography, and Nano imprint lithography. A top-down fabrication method called lithography shrinks a bulk material to a Nano scale design.

Nano imprint lithography, deep ultraviolet lithography, electron beam lithography, focused ion beam machining, molecular vapour deposition, and molecular self-assembly methods are among another group of Nano technological techniques. These methods are also used to create nanotubes and nanowires, as well as semiconductors. The predecessors of these methods predate the nanotech era and are extensions of the growth of scientific achievements rather than methods that were developed solely for the creation of nanotechnology and which were the outcomes of nanotechnology research.

The top-down strategy assumes that Nano devices must be assembled piece by piece over time, much like produced goods. A crucial tool for the characterization and production of nanomaterial is scanning probe microscopy. Surfaces and moving atoms can be examined using atomic force microscopes and scanning tunneling microscopes. These microscopes can be used to carve out structures on surfaces and direct self-assembling structures by designing various tips. Atoms or molecules can be moved about on a surface utilizing scanning probe microscopy techniques, such as the feature-oriented scanning approach. Currently, it is expensive and time-consuming for bulk production, but it works great for lab testing.

Methods include positional assembly, self-assembly, and chemical synthesis. One tool useful for characterising self-assembled thin films is dual polarisation interferometry. Molecular Beam Epitaxy, also known as MBE, is another version of the bottom-up strategy. MBE enables the construction of intricate structures by enabling the atomically accurate layering of atoms. MBE is frequently utilised to create samples and devices for the recently growing science of spintronics, which is crucial for semiconductor development.

However, there are now being developed and some nations have already granted human use approval for new therapeutic items based on responsive nanomaterials, such as the ultradeformable, stress-sensitive transfersome vesicles.

CONCLUSION

There are numerous significant contemporary innovations. Though conceptually related to the scanning confocal microscope. A potentially successful approach to implementing these nano manipulations in automatic mode is feature-oriented scanning methodology. There have also been developments in a number of nanolithography techniques, including optical lithography, X-ray lithography, dip pen nanolithography, electron beam lithography, and nano imprint lithography. A top-down fabrication method called lithography shrinks a bulk material to a nanoscale design. These methods are also used to create nanotubes and nanowires, as well as semiconductors. A crucial tool for the characterization and production of nanomaterials is scanning probe microscopy. These microscopes can be used tocarve out structures on surfaces and direct self-assembling structures by designing various tips.

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