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CHALLENGES IN DESIGNING NANOROBOTS

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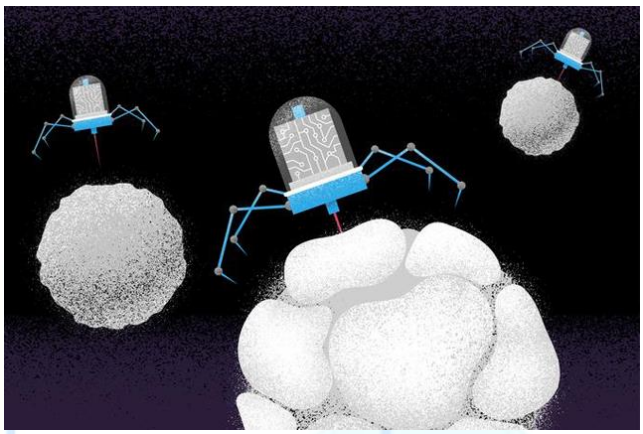
Abstract: Nanorobotics is the technology to create machines or robots at or near nanometer in size. More specifically, nanorobotics refers to the still hypothetical nanotechnology engineering discipline of designing and building nanorobots. Nanorobots (nanobots, nanoids, or nanites) are devices typically 0.1-10 micrometers in size and constructed of nanoscale or molecular components.

Key words: nanorobots, devices, **atomic force, percent elongation to break,** adhesion and static friction**.**

Introduction

Nanorobotics is the technology to create machines or robots at or near nanometer (10^{-9} meters) in size. More specifically, nanorobotics refers to the still hypothetical nanotechnology engineering discipline of designing and building nanorobots. Nanorobots (nanobots, nanoids, or nanites) are devices typically 0.1-10 micrometers in size and constructed of nanoscale or molecular components. As artificial non-biological nanorobots have not yet been created, they remain a hypothetical concept at this time.[1]



Another definition that is sometimes used is a robot that can precisely interact with or manipulate nanoscale objects with nanoscale resolution. Following this definition, even large apparatus such as an atomic force microscope can be considered a nanorobotic instrument if it is configured to perform nanomanipulation. In addition, macro-scale robots or micro-robots that can move with nano-scale precision can also be considered nano-robots.[2]

Methodology

Nanomachines are mostly in research and development, but some primitive molecular machines have been tested. An example is a sensor with a key of about 1.5 nanometers that can count certain molecules in a chemical sample. The first useful applications of nanomachines, if they are built, could be in medical technology, where they could be used to detect and destroy cancer cells. Another potential application is the detection of toxic chemicals and the measurement of their concentrations in the environment.

Results

Recently, Rice University demonstrated a single-molecule car developed through a chemical process that includes buckyballs for wheels. It is performed by controlling the ambient temperature and placing the tip of a scanning tunneling microscope. Basic nanomachines are used in other fields as well. Nanotechnology coatings are already

being used in clothing with stain-resistant fibers and in swimsuits that repel water, reduce friction with water, and allow swimmers to go faster. Nanotechnology powders are being used to create highly effective sunscreen lotions, and nanoparticles can help deliver drugs to target tissues in the body.[4]

Discussion

Nanotechnology broadly refers to the field of applied science and technology whose unifying theme is the control of matter at the atomic and molecular scale, typically between 1 and 100 nanometers, and the fabrication of devices of that size. These include applied physics, materials science, interface and colloid science, device physics, supramolecular chemistry (refers to the field of chemistry that focuses on non-covalent bonding interactions of molecules), self - is a very interdisciplinary field drawn from fields such as reproduction. machinery and robotics, chemical engineering, mechanical engineering and electrical engineering. There are many speculations about what might happen as a result of these lines of research. Nanotechnology can be seen as a nano-scale extension of existing sciences or a revision of existing sciences using a new, more modern term. Such an approach does not work due to the high surface energy of nanostructures, which means that all contact parts stick together according to the principle of energy minimization.

Conclusion

The adhesion and static friction between the parts can easily exceed the strength of the materials, so the parts break before they start moving relative to each other. This leads to the need to design moving structures with minimal contact area.[7]

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