



Nanoscopic Lens for Bio-Nanoelectronic Devices

Michael R Hamblin, Shanmugamurthy Lakshmanan

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The ability to arrange precisely designed patterns of nanoparticles into a desired spatial configuration is the key to creating novel nanoscale devices that take advantages of the unique properties of nanomaterials. While two-dimensional arrays of nanoparticles have been demonstrated successfully by various techniques, a controlled way of building ordered arrays of three-dimensional (3D) nanoparticle structures remains challenging. The authors shows that a new technique called the "nanoscopic lens" is able to produce a variety of 3D nano-structures in a controlled manner based on ion-induced focusing, electrical scaffold and antenna effects from charged aerosols. Particle trajectory calculations can efficiently predict the whole process of 3D assembly. This book moves from the current ability to position nanoparticles on surfaces, to a new dimension of spatial control. The nanoscopic lens technique can serve as the foundation of a multifaceted technology for device development that is not limited to a variety of optical, magnetic and electronic devices, but can also create a wide range of bio-nanoelectronic devices. These can include, biofuel cells, protein nanoarrays for diagnostics, implantable glucose nanosensors, and gas nanodetectors. The advantages of this include being relatively easy set-up and operate, CMOS-compatible, cost-effective, uses commercially available machinery, components and substances.

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