

DNA Double-Write/Double Binding Identity For Micro/Nano Lithography and Self-Assembly Nanofabrication

Tech ID: 23587 / UC Case 2013-283-0

BACKGROUND

There have been several attempts to use DNA for photolithographic micro/nanofabrication. For example, exposing immobilized DNA in an un-masked area to ultraviolet light (UV) will cause the DNA to lose the ability to hybridize to complementary DNA sequences, whereas the immobilized DNA in the masked areas will retain the ability to hybridize a complementary sequence. Pattern formation can be achieved by using the difference in DNA assembly in the masked and exposed areas. However, there is an unmet need to improve the usefulness of DNA lithography to fashion more finely defined and complex.

TECHNOLOGY DESCRIPTION

Researchers at the University of California have developed novel DNA, RNA, and other modified nucleic acids such that it allows the DNA to be used as a double write/double identity photolithographic material for macro, micro and nanolithographic patterning and for three dimensional nanofabrication. The unique design of the immobilized DNA sequence has many major advantages including: (1) new structures can be assembled in both the masked and un-masked areas; (2) new specific DNA binding identities can be created in both the masked and un-masked areas; (3) an increasingly larger number of smaller features and/or DNA identities can be created as each new DNA layer is deposited; (4) highly complex integrated heterogeneous 2D and 3D materials, structures and devices can be created; and (5) the process combines the best aspects of top-down micro/nanolithography with bottom-up directed DNA assembly and DNA based self-assembly.

APPLICATIONS

This invention has a wide range of applications for carrying out highly integrated micro/nanofabrication for a variety of new 3D structures, materials, and devices. These processes can include but are not limited to: smart nanomorphing materials, batteries; photovoltaics; fuel cells; catalysts and synthetic enzyme structures; nano/micro integrated electronic and photonic devices; porous electrode/electrolyte/integrated sensor hydrogel materials, structures and devices; cell and tissue engineering scaffolds, matrixes, and structures with integrated sensors; micro/nanoarray genotyping, sequencing, proteomic and drug discovery devices; lab-on-a-chip; point of care, hand held, patch, and in-vivo diagnostic devices.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20160179008	06/23/2016	2013-283

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ [Microarray for High Throughput Detection of Enzymatic Activity](#)
- ▶ [Self-Assembling 2D and 3D Nanostructures for Nano-Photonic and Nano-Electronic IC's and Devices](#)

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OTHER INFORMATION

CATEGORIZED AS

- ▶ [Nanotechnology](#)
 - ▶ Other
- ▶ [Sensors & Instrumentation](#)
 - ▶ Other

RELATED CASES

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