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NON-CONFIDENTIAL TECHNOLOGY DISCLOSURE

Nanopatterned Surfaces for Highly Selective Adhesion, Sensing and Separation

Lead Inventor: Maria M. Santore, Ph.D.

TECHNOLOGY DESCRIPTION

This technology provides novel, engineered surfaces containing nanoscale adhesive elements whose surface arrangements are optimized for highly selective adhesion, sensing and separation of biological or non-biological analyte particles in a broad range of sizes, from submicron to tens of microns. The nanopatterned surfaces are designed to exploit repulsive interactions between analyte particles and the main portion of the surface in addition to attractions between the adhesive elements and the target particles. The competitive attractive and repulsive interactions produce tunable selective dynamic adhesion for approaching particles, discriminating targets on the basis of size, local curvature (roughness), net charge density, and arrangement of surface functional groups.

ADVANTAGES

- **High Selectivity:** The novel surface design incorporates analyte interactions with both the nanoconstructs and the main body of the surface. This produces enhanced selectivity for analyte adhesion, sensing and separation, compared with any selectivity attributed to the individual nanoconstructs.
- **Broad Applicability:** The nanopatterned surfaces can be fabricated using polymers or proteins on planar or arbitrarily-shaped non-planar surfaces (including fibers and packings) for the characterization and/or separation of a variety of analytes.
- **Low-Cost Surface Patterning Process:** The nanopatterned surface fabrication does not require sophisticated and costly patterning technologies, and also may not require organic solvents.

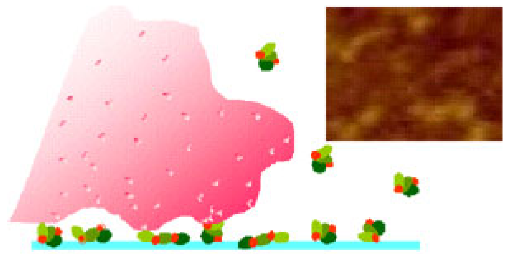


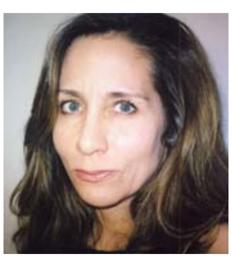
Figure 1. Schematic of cell-protein-surface interactions and AFM image of adsorbed fibrinogen (with its 45 nm-long trinodular shape).

- **Re-Usable, Self-Cleaning Surfaces:** A portion of the parameter space for these surfaces produces weak net attractions between targets and the collector, such that the collecting surface spontaneously clears after an exposure, facilitating repeat uses.

APPLICATIONS

- Sensing and/or separation of cells, bacteria or viruses in pharmaceutical and biomedical applications
- Separation of organic and inorganic particles such as latexes, oxides, etc.
- Manipulation of particles carrying biological functionality in assay applications
- Development of materials with controlled wetting and adhesive properties

ABOUT THE LEAD INVENTOR



Dr. Maria M. Santore is Professor of Polymer Science and Chemical Engineering at the University of Massachusetts Amherst. Dr. Santore's research focuses on polymer and colloid behavior at interfaces, with experimental projects targeting a range of applications and technologies, from the extremely fundamental to the highly applied, and from improvements to existing processes to the development of new materials and processes which are highly evolved. Under Dr. Santore's expert leadership, the Santore lab researchers create materials that exploit the underlying biophysical principles to develop new platforms for drug delivery, sensors, and biomaterials for implants, diagnostics and cell processing (tissue engineering).

BUSINESS OPPORTUNITIES: Available for Licensing or Sponsored Research
DOCKETS: UMA 05-10, UMA 07-35
PATENT STATUS: Patent Pending

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