UMASS BOSTON

Invention Available for Licensing Nanomaterials

Title: ***Fabrication of Micro- and Nano-Particle Coated Materials***

UMB14-08

Inventors: ***Martin Thuo, et al.***

Applications:

- Imparting biphilicity (hydrophilic and hydrophobic properties) to paper, oxide-covered substrates like silicon, substrates containing surface hydroxyl or amide bonds, or those that can react with halosilanes
- Applicability to MEMS sensors, microfluidic devices, cell-based assays

Benefits:

- Novel method of creating microfluidic devices with biphilic properties
- Broadens the possible uses of paper, silicon, or other materials as substrates for microfluidic, other devices

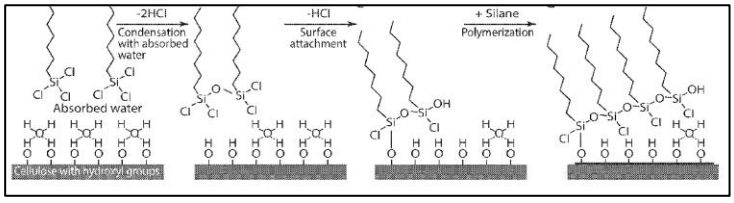
Technology Description:

Novel, innovative materials are needed for use with devices to handle the flow of liquids, particularly where the flow of liquids can be channeled or restricted through non-permeable materials. Paper is a useful substrate in applications that require low cost, flexibility, disposability, porosity, and it has been used as a material for the construction of devices in fields such as consumer electronics, chemical and physical microelectromechanical systems (MEMS) sensors, electronic displays, cell-based assays and microfluidic devices. But the tendency of paper to absorb water and other solvents limits its use for these purposes. For such applications, paper must resist wetting, hence adsorption, of liquids (especially water) from analytes or the surrounding (Glavan, et al. (2014), *Adv. Funct. Mater.,* 24: 60-70).

This invention offers a novel approach to the modification of substrates by introducing nanoparticles or microparticles to impart biphilic properties. Specifically, the method comprises bonding silane monomers onto the surface of the substrate. The substrate can be cellulose, to apply the technology to paper, or it can be used on silicon, for use on microchips or other electronic devices, or any other material with surface graftable groups.

Patent and Publication Status:

UMass Boston has filed a U.S. patent application on this invention. The research underlying the invention has been published at *J. Mater. Chem. A*, 2016,4, 14729-14738 and *RSC Adv.*, 2016,6, 82233-82237.



Process of surface modification in accordance with the invention.

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