PURDUE INNOVATES | Office of Technology Commercialization

Precision Structured Surface Functionalization of Hydrogels Below the Length Scale of Hydrogel Structural Heterogeity

A new method creates highly-structured hydrogel surfaces that ensure predictable interaction with biomolecules, improving performance for DNA chromatography, cell culture supports, and regenerative medicine implants.

Researchers at Purdue University have developed a method to produce a highly-structured functionalized hydrogel surface. Traditionally, polyacrylamide (PAAM) hydrogels cross-linked with bis-acrylamide have been used as functionalized surfaces for DNA chromatography, cell culture supports, and implants for regenerative medicine. However, surface heterogeneity of these surfaces creates unpredictable interactions with biomolecules. The Purdue researchers' method involves assembling nanometer-resolution chemical functional patterns on highly oriented pyrolytic graphite (HOPG), polymerizing them to 'set' the functional pattern, and then transferring the functional pattern to PAAM. This method creates a highly-structured pattern that provides predictable assembly of nano- and microscopic objects at the interface.

Technology Validation: The researchers found that the functionalized surface patterns interactions with DNA at the interface, a capability of importance for chromatography, supports, and implants.

Advantages

- highly-structured surface

- predictable interactions with biomolecules

Applications

- DNA chromatography

- Cell culture supports

Technology ID
2022-CLAR-69746

Category
Materials Science & Nanotechnology/Nanomaterials & Nanostructures
Materials Science & Nanotechnology/Advanced Functional Materials
Biotechnology & Life Sciences/Analytical & Diagnostic Instrumentation

Authors
Juan Arango
Shelley A Claridge

Further information
Dipak Narula
dnarula@prf.org

View online

- Implants for regenerative medicine

TRL: 2

Intellectual Property:

Provisional-Gov. Funding, 2022-05-05, United States | Provisional-Gov. Funding, 2022-08-08, United States | PCT-Gov. Funding, 2023-05-05, WO | NATL-Patent, 2024-11-05, United States

Keywords: Functionalized hydrogel surface, polyacrylamide hydrogels, PAAM, bis-acrylamide, DNA chromatography, cell culture supports, implants for regenerative medicine, surface heterogeneity, highly structured pattern, predictable interactions with biomolecules, Biomolecules, Cell Culture, Chemistry and Chemical Analysis, Chromatography, DNA, Hydrogels, Implants, Nanotechnology