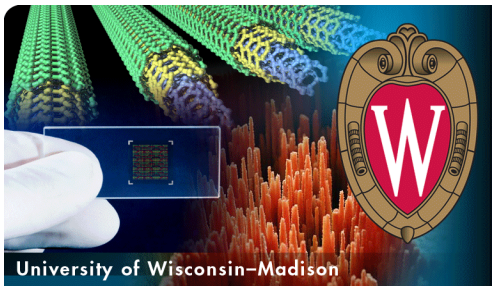
Robust and Improved Surfaces for Biological Microarrays That Reduce Nonspecific Binding



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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing improved surfaces for microarrays.

OVERVIEW

Biological microarrays are valuable tools that enable the parallel analysis of thousands of different analytes. However, one of the chief problems with existing protein microarrays is the nonspecific binding of target molecules on the array. This creates background noise and makes it difficult to detect the specific binding of the target at probe locations.

Polymer films provide an alternative substrate for microarrays. However, these films lack stability in most mediums. Coating the substrate with epoxide-containing polymers is another option, but most of these polymers form uncrosslinked films with poor stability and a tendency to delaminate.

THE INVENTION

A UW-Madison researcher has developed a robust coating for use in microarrays. This reactive polymer coating has a high mechanical stability, binding-site density and signal-to-noise ratio. It can be formed readily on many substrates and may also be patterned to control the localization and density of the target molecules.

The coating consists of a cross-linked epoxy-functional copolymer film. The copolymers incorporate at least two sets of polymerized monomers. The first set, which contains epoxide groups, reacts with the target molecules to immobilize them on the film. The second set contains photo-cross-linkable groups, which are used to cross-link the copolymers into a stable film. Using different monomers to provide the cross-linking and target binding functions allows each function to be controlled and optimized independently.

APPLICATIONS

- Improved surfaces for biological microarrays

THE WARF ADVANTAGE

Since its founding in 1925 as the patenting and licensing organization for the University of Wisconsin-Madison, WARF has been working with business and industry to transform university research into products that benefit society. WARF intellectual property managers and licensing staff members are leaders in the field of university-based technology transfer. They are familiar with the intricacies of patenting, have worked with researchers in relevant disciplines, understand industries and markets, and have negotiated innovative licensing strategies to meet the individual needs of business clients.

KEY BENEFITS

- Significantly reduces nonspecific binding
- Signal-to-noise ratio is three to six times higher than commercially available 2-D arrays of epoxy groups.
- The photo-cross-linking mechanism creates a robust reactive coating that does not peel or delaminate for months in aqueous or organic media.
- Substrate-independent chemistry allows surface to be created on glass, silicon wafers, stainless steel, gold or polycarbonate.
- Easy chemical tunability enables incorporation of other desirable features, such as a non-fouling surface or multiple target binding.
- Can be photo-patterned by exposure to UV light
- Does not require plasma deposition or processing
- Can be combined easily with ultrasonic plotting or an ultrasonic sprayer for scalability

STAGE OF DEVELOPMENT

The development of this technology was supported by WARF Accelerator. WARF Accelerator selects WARF's most commercially promising technologies and provides expert assistance and funding to enable achievement of commercially significant milestones. WARF believes that these technologies are especially attractive opportunities for licensing.

ADDITIONAL INFORMATION

Related Portfolios
WARF Accelerator Program Technologies

Publications
Cullen S.P., Ha S., Lagally M.G. and Gopalan P. 2008. Photopatternable Substrate-independent Poly (glycidyl methacrylate-ran-2-(acryloyloxy) ethyl 2-methylacrylate) Polymer Films for Immobilization of Biomolecules. J. Polymer Sci. Part A 46, 5826-5838.

Tech Fields
Micro & Nanotech - Microarrays

CONTACT INFORMATION

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