



Direct Deposition of Functionalized Nanoscale Hydrogels

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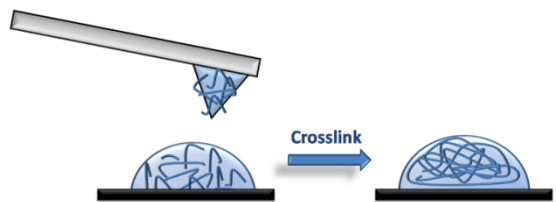
Burchard 118, Time 11am

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The tip-based nanofabrication technique, dip pen nanolithography (DPN), is simply the controlled delivery of materials from a nanoscale tip to a substrate. In a typical experiment, the DPN tip, a direct descendant of the atomic force microscope (AFM) probe, is coated with a solid or liquid phase material and then used as a “pen” to write nano and microscale patterns to a surface. This talk will present how we use DPN to pattern biocompatible polymers to create nanoscale hydrogel patterns for tissue engineering applications and protein arrays.

Hydrogels are three dimensional networks of hydrophilic polymers that can be manipulated for a variety of applications. In this talk, we will discuss the use of dip pen nanolithography to deposit arbitrary patterns of hydrogels with varying functionalities, all while maintaining fine control over the size and shape of the hydrogel pattern. The simple method uses a photocrosslinkable polymer precursor as the ink coating on the DPN tip. Once the desired pattern is written, the polymers are crosslinked under UV light. Through the control of the time the tip is in contact with the surface, it is possible to create features smaller than 200 nm or larger than 5 μm . Recent results include the delivery and encapsulation of proteins, orthogonal crosslinking of deposited patterns, and complex nanoscale features within a larger microscale pattern. Future directions will also be explored.



Paul Stiles is currently a Development Scientist with NanoInk, a nanotechnology company focused on advanced nanoscale patterning technologies. From 2005-2007 Stiles was a post-doctoral scientist at Northwestern University developing UVH scanned-probe systems for tip-enhanced Raman spectroscopy applications (TERS). He earned his Ph.D. in Physics from the University of North Carolina and his undergraduate degree from San Francisco State University.