University of Minnesota
Driven to Discover℠

Department of Chemistry

Seminar

9:45 a.m. Thursday, April 12, 2012 • 331 Smith Hall

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Self-Cleaning Membranes for Implanted Glucose Biosensors

Her research is broadly focused on developing new materials to improve the performance of medical devices. Several specific research areas have emerged: self-cleaning membranes for implanted biosensors, clot-resistant coatings for blood-contacting devices and scaffolds for bone repair and for the regeneration of osteochondral interfaces.

Website: http://biomed.tamu.edu/biomaterials

Abstract

A membrane which limits biofouling is critical to extending the lifetime and efficacy of implanted glucose biosensors. When cycled above and below its volume phase transition temperature (VPTT, ~33 °C), poly(N-isopropylacryl-amide) (PNIPAAm) hydrogels undergo deswelling and reswelling, respectively. This process effectively removes adhered proteins and cultured cells *in vitro*. We propose that a PNIPAAm-based hydrogel membrane could control biofouling *in vivo* via a “self-cleaning” mechanism induced by thermal cycling with an external source. This approach is feasible if the membrane can be designed with rapid deswelling/swelling kinetics for efficient cell release, adequate mechanical properties and also sufficient glucose diffusion. In this work, several parameters were explored to achieve these properties including, incorporation of polysiloxane nanoparticles, a double network hydrogel matrix design and incorporation of an electrostatic comonomer.

Host: Professor Marc Hillmyer
Refreshments will be served prior to the seminar.