

CHEMICAL ENGINEERING

SEMINAR SERIES



PETER KOFINAS

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Professor and Chair

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Responsive and Intelligent Polymers for Recognitive Systems, Energy Storage and Biomedical Devices

ABSTRACT: We address the design, synthesis, and processing characteristics of novel functional polymers with application in a variety of technological fields ranging from medicine to energy storage.→† Air-stable solid polymer electrolytes (SPEs) with room temperature conductivity values comparable to liquid electrolyte performance, enable flexible and non-flammable solid membranes for use in Lithium-ion batteries (LIBs). Through the use of a 3D printed microfluidic and a polymer membrane filter, we have developed a method to accurately measure levels of ammonia in whole blood. We have also demonstrated that by incorporating silica nanoparticles at a high density within a degradable polymer hydrogel composite, soft intelligent materials can be fabricated with a unique response to proteolytic stimuli. Our research is also centered on the investigation of a polymer fiber mat deposition method called solution blow spinning (SBS), which is utilized to create a body temperature responsive, surgical sealant to supplement sutures. Adhesion to tissue is controlled by manipulating the morphology and thermal transition temperatures of constituents in the polymer blend. We also demonstrate how SBS can be used to spray body temperature-responsive biodegradable polymer blend dressings in situ, and deliver advanced functionality, either by releasing silver ions to prevent infection or by incorporating silica particles to reduce coagulation time.

RECEPTION 3:30 • LECTURE 4:00 - 5:00
PHYSICS ASTRONOMY BLDG. PAA A 110

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BIOGRAPHY: Peter Kofinas is Professor and Chair of Chemical and Biomolecular Engineering at the University of Maryland. He was previously appointed Associate Dean of Faculty Affairs and Graduate Programs in the Clark School of Engineering, where he also served as the Equity Officer and Diversity Officer for the Clark School.