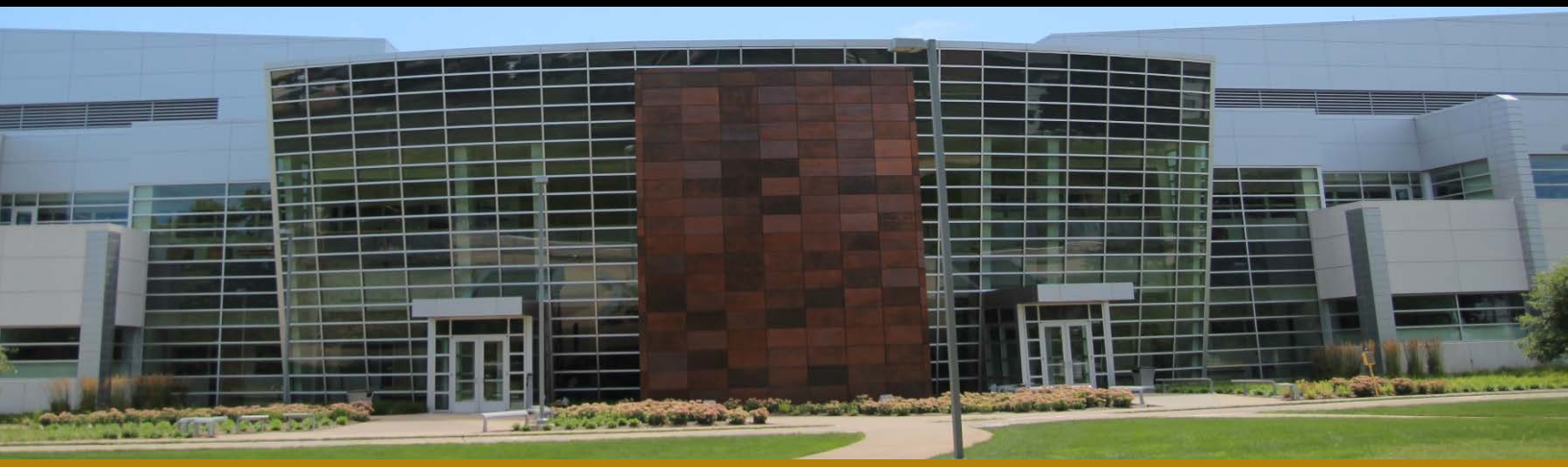
PURDUE UNIVERSITY



Birck Nanotechnology Center

Organic Conductive Polymers for Wearable Electronics

Professor Gegory Sotzing

Department of Chemistry, University of Connecticut

Wednesday, May 2nd, 2018
11:00am – 12:00pm, BRK 1001

Figure: Demonstration of PEDOT-PSS treated synthetic leather (rectangular fabric connected to alligator clips) carrying 2 Amps at AC 120V to light a 240 Watt heatlamp.

Abstract: PEDOT-PSS has had significant advancements over the past 2 decades, with many of these advancements being the enhancement of electrical conductivity of thin films. Recent advances have been with the incorporation of PEDOT-PSS into flexible and stretchable components. Our research laboratory has been involved with the incorporation of PEDOT-PSS into fabrics such as nonwovens like synthetic leathers, and wovens/knits such as spandex. We have discovered that a phase segregation of PEDOT and PSS occurs when PEDOT-PSS is applied to fabric via an esterification reaction between PSS with the periphery alcohol functionalities located at the surface of common delustering agents used in industry like silica and titania. This phase segregation generates a PEDOT rich surface allowing for sheet resistance of coated fabrics to be as low as 1 ohm/sq. The PEDOT-PSS temperature characteristics are those of a room temperature metal. Several applications of this organic conductor will be presented including electrochromic color changing fabric, screen printed ECG sensors, wire replacement to carry current, as well as other applications. Preliminary data on protection of the PEDOT-PSS will be presented in which ScotchguardTM was used to protect the conductive polymers through 3 accelerated aging wash/dry cycles.

PURDUE UNIVERSITY Discovery Park