MATERIALS ENGINEERING

SEMINAR

"Cold Atmospheric Plasma (CAP)-Assisted Surface Modification and Functional Materials Deposition for Flexible Electronic Devices"

By

Venkat Kasi

Purdue MSE Preliminary Exam

Advisor: Professor Rahim Rahimi

ABSTRACT

Functional thin films consisting of inorganic, organic, or hybrid materials are considered the backbone of electronic devices for many different applications ranging from flexible displays to sensors. The use of additive manufacturing for the fabrication of flexible electronics has significantly increased over the last few decades. Compared to the traditional subtractive etching and photolithography processes, the manufacturing process of flexible electronics through additive manufacturing offers many benefits including faster time to market through rapid prototyping, aptness to on-demand and small batch fabrication, roll-to-roll manufacturing, significant reduction in waste generation, and elimination of complex vacuum systems. However, the use of traditional additive manufacturing techniques such as screen printing, inkjet printing, and gravure printing is also limited by the requirement of solvent processable inks for the deposition of functional coatings. Cold atmospheric plasma chemical vapor deposition (CAP-CVD) has become an attractive additive manufacturing technology to synthesize and deposit different organic and inorganic materials directly onto the desired substrate under atmospheric conditions. In this work, we investigate for the first time the possibility of using CAP-CVD as an alternative approach to deposit functional materials for flexible electronic applications under atmospheric conditions. Also, as part of this investigation, we have addressed one of the key challenges in the field of electrochemical sensors, which is the water layer formation at the interface due to weak bonding between ion-selective membrane and the electrode causing potential drift and inconsistency in potential responses.

Date: Friday, January 7, 2022
Time: 12:00pm(noon)
Place: https://purdue.webex.com/meet/rrahimi

PURDUE UNIVERSITY

School of Materials Engineering