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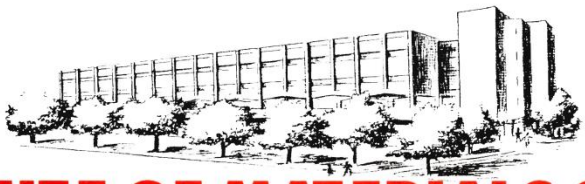

INSTITUTE OF MATERIALS SCIENCE

POLYMER PROGRAM SEMINAR

"Changing Landscape in Polymer Research: Challenges and Opportunities"

Prof. Sadhan C. Jana
University of Akron

Friday, September 30, 2016
11:00 AM, IMS Room 20

ABSTRACT

Polymer research landscape has changed significantly in last 15 years. The polymer conversion industries have reached a level of maturity with an almost irreversible impact on fundamental research on polymer processing. No longer do we see full scale reports in current literature on the dynamics of screw extrusion, flow behavior in injection molding, rheological issues of stretch blow molding, or structure formation in film blowing, although no one believes that all fundamental problems in polymer processing have been unequivocally solved. The availability of funding largely dictates the scope of contemporary polymer research. Consequently, a large majority of active researchers are currently pursuing the unknowns in biomaterials processing or materials development in the areas of thin films, nanocomposites, multifunctional materials that change color, emit light, harvest solar energy, change shape on application of stimuli, etc. The fundamental principles of mass, momentum, and energy balances still apply to these new problems, but the length scales of interest are a now a few orders of magnitude smaller than what we are used to. In this talk, several examples will be presented to relate the length and time scales to polymeric materials performance in applications involving hysteresis in rubber compounds, drug delivery, air clarification, and coalescing filtration. In the first example, polymer building block synthesis from monomers and their organization in the mesoporous macroscale structures will be discussed in relation to airborne nanoparticle filtration as well as drug release. In the second example, nanoscale surface engineering of carbon black particles will be discussed with the objective of obtaining low rolling resistance rubber compounds. The third example discusses the use of polymer nanofibers with interpenetrating network morphology in removing water droplets from ultralow sulfur diesel fuel where a balance of surface energy and surface area is a key parameter.

**For further information, please contact YH Chudy at younghee.chudy@uconn.edu.*

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