Macromolecules Innovation Institute (MII) Seminar Series

VirginiaTech
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Dr. Travis W. Baughman

"Materials Based on Designer Polyolefins: From Olefin Metathesis Copolymers to UHMWPE Materials"

DSM Engineering Plastics

Host: Johan Foster

Abstract: This lecture will focus on the development of two families of designer polyolefin materials: precise ethylene-acrylic acid copolymers and related ionomers as well as UHMWPE materials for use in commercial products. For both sets of materials, we will review the synthetic methods used to create the desired functionalized polymer structures via ADMET and ROMP polymerizations and produce designer polyethylene morphologies via Ziegler-Natta and post-metallocene ethylene polymerizations. The impact of the precise polymer meso and microstructures is shown to be significant in both sets of materials as it leads to increased morphological control, and the enhanced properties of the described designer materials demonstrate the power of the reviewed synthetic strategies. The lecture with close with a renewed perspective on structure-property-morphology relationships in designer polyolefin materials and their use in current and future applications.

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Bio: Dr. Baughman graduated from Clemson University in 2001 with a B.Sc. in Polymer, Fiber & Textile Chemistry. He then moved to the University of Florida to join Prof. Ken Wagener's lab culminating in a Ph.D. in Organic Chemistry in 2006. His thesis focused on olefin metathesis polymerizations applied as tools to create various precise and pseudo-random (co)polymer structures to further the understanding of structure-property relationships within this unique class of designer polyolefins. The research also provided opportunities to study ionic aggregate structure in neutralized ethylene-acrylic acid copolymers and, further, the effects on bulk ionomer morphology and the potential to control bulk morphology. Dr. Baughman then moved to the Netherlands to join Prof. E. W. "Bert" Meijer's lab where he developed a novel class of supramolecular hydrogels designed as modular scaffolds for in vivo applications. As of 2008, he started at DSM in the central research unit and has since moved from the lab to product development and on into research & technology management for the Engineering Plastics Division. In March of this year, Dr. Baughman was inducted as a Fellow of the ACS Division of Polymer Chemistry.

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