Solvay Seminars in Macromolecular Science & Engineering

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Prof. Brian Long

"Utilizing Coordination-Insertion Based Polymerizations for the Synthesis of Tailored Polyolefins and Gas Separation Membranes"

University of Tennessee, Knoxville
Department of Chemistry

Host: John Matson

Abstract: Coordination-insertion based polymerization methods provide a multitude of opportunities for enhanced control over catalytic activity, selectivity, and reactivity. Through tailored catalyst development and macromolecular design, the Long Research Group leverages these advantages to synthesize unique and/or tailored polymeric structures for a variety of applications. In this talk, we will demonstrate the potential power of these coordination-insertion based polymerization methods through two studies. First, we will provide fundamental evidence that redox-active olefin polymerization catalysts can be effectively used to modulate polyolefin microstructure and copolymer composition via simple *in situ* changes in a catalyst's oxidation-state. Second, we will demonstrate that careful catalyst selection can enable access to a unique class of polymers that was previously believed to be inaccessible, and that those materials are extremely attractive as highly efficient gas separation membranes.

Bio: Brian studied chemistry as an undergraduate at North Georgia College & State University and as an REU student at Furman University. After completion of his B.S. degree in 2003, Brian attended the University of Texas at Austin for his doctoral studies with Professors C. Grant Willson and Christopher W. *(bio cont.)* Bielawski. After graduating in 2009, he moved to Ithaca, NY to begin his postdoctoral studies at Cornell University under the supervision of Professor Geoffrey W. Coates. Brian has since returned to the southeast and is currently an assistant professor of chemistry at the University of Tennessee. Brian received an Army Research Office Young Investigator Award in 2013 and received the Ffrancon Williams Endowed Faculty Award in 2015 and 2016. Brian's current research interests include the synthesis of tailored polymers, design of advanced polymerization catalysts, and development of next-generation gas separation membranes.

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