MATERIALS SCIENCE and ENGINEERING SEMINAR

Dr. Stephen Craig

Department of Chemistry

Duke University

What Single Molecule Reactivity Can Tell Us About Polymer Material Behavior (and how to change it)

MSEG SEMINAR
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When and where soft polymeric materials mechanically break down has an impact that is felt individually (biomedical implants) and globally (the environmental impact of tire wear). The mechanical limits of polymers are often considered through the lens of continuum mechanics, but buried under the continuum behavior is the collective contribution of many molecular constituents. This talk will describe how the behavior of individual polymer strands as they stretch to their limiting length and eventually break can be controlled by embedding chemical reactivity, characterized at the single molecule level, and used to establish quantitative structure-activity relationships that are typically hidden in the statistical complexity of polymer networks. The principles uncovered through these investigations inspire new mechanochemical reaction strategies to access previously unattainable combinations of properties.

BIOGRAPHY

Steve Craig received his undergraduate degrees (B.S. in Chemistry, A.B. in Math) from Duke in 1991. After a year at Cambridge (M. Phil.), he began doctoral work at Stanford, where he received his Ph.D. in 1997. Following his Ph.D., he took a position as a Research Chemist in DuPont Central Research until early 1999, when he moved to a postdoctoral position at The Scripps Research Institute. In 2000, he joined the Department of Chemistry at Duke, where he is now William T. Miller Professor of Chemistry and the Director of the NSF Center for the Chemistry of Molecularly Optimized Networks.

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