



College of Engineering
Department of
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The Robert W. Courter Seminar Series

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ZOOM: <https://lsu.zoom.us/meeting/register/tJApd-mhqzssHNAtbx8xlujIXfCf28JLgcJB>

Designing Smart Multifunctional Thermoset Polymers Using Dynamic Covalent Crosslinking

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Compared to thermoplastics, thermoset polymers have played more important role in many fields due to their high mechanical strength, excellent solvent resistance, and thermal stability. However, one critical limitation of thermosets is their end-of-life disposal. Unlike thermoplastics, thermosets cannot be reshaped, reprocessed, or recycled by heat or by solvent. Another severe problem facing both thermoset and thermoplastic polymers persists in their high flammability, especially in the electrical and electronic fields. Fire hazard due to their flammability almost always leads to a great loss of lives and properties. So far, various dynamic covalent bonds were explored to develop thermosets with covalent adaptable networks for achieving vitrimer characteristics, such as transesterification. However, some major problems facing this community persist in the limited raw materials, complicated synthesis process, use of expensive or toxic catalyst, weak mechanical performance of the resulted thermosets and high recycling temperature. Most importantly, none of them possesses intrinsic fire-proof ability. In this talk, I will describe our recent work on developing novel multifunctional thermoset polymers through dynamic covalent crosslinking strategy and how these functional properties work together. The potential applications of these new thermoset polymers will be discussed.

* Dr. Xiaming Feng is currently a postdoctoral researcher in the Department of Mechanical & Industrial Engineering at Louisiana State University. He received his Ph.D. in Safety Science and Engineering from University of Science and Technology of China in 2017, and his joint Ph.D. from City University of Hong Kong in 2018. His research focuses on developing multifunctional polymers and composites with shape memory effect, self-healing ability, and flame retardancy. He has published over 40 peer-reviewed journal articles and two book chapters.