



MSEN 681 Seminar Series

4:10 PM, Monday, November 3, 2014 • 104 Jack E. Brown

Polymerizations of Elemental Sulfur: Novel Materials for Sustainability, Energy and Defense Applications

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We will present our recent work on sulfur utilization chemistry for polymeric materials. Elemental sulfur is manufactured at a level of 70 million tons every year, which is primarily produced via hydrodesulfurization of crude petroleum. However, there are only a few utilization technologies for sulfur, hence, over 6 million tons of elemental sulfur is generated in excess, which creates exciting opportunities to develop new chemistry and processing to utilize sulfur as a feedstock for polymers. We will present our recent efforts in the direct utilization of sulfur using a process termed, *inverse vulcanization*, to prepare thermosetting polymeric sulfur that exhibits unique electrochemical, optical and self-healing properties. These types of polymeric materials exhibit very high charge capacity again Li-insertion and have tremendous potential as inexpensive, high performance cathodes for Li-S batteries. Furthermore, these sulfur-rich copolymers exhibit unusually high refractive indices ($n = 2.0$) and can be easily processed in thin lenses for IR thermal imaging applications.

abstract

