



~~Special Polymer Physics Seminar ~~

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10:00 AM Tuesday
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301 Steidle Bldg.

Design of triazole bearing sol-gel and polymer membranes as ion transporting membranes for renewable energy applications

A common challenge facing the development of new renewable energy alternatives, such as hydrogen fuel cells (PEMFC's), lithium ion batteries and dye-sensitized solar cells (DSSC's), is the low ionic mobility within polymer matrices. Regardless of the specific application, most materials development must overcome two main hurdles: Increase the ionic mobility without affecting the mechanical properties and maximize the free ion concentration by promoting full ion pair dissociation. Research efforts in our group focus on generating new polymeric membranes to address these issues. This talk will summarize the latest results on the preparation of proton iodide and lithium conducting sol-gel membranes where the ion mobility has been decoupled from the polymer matrix mechanical strength. These freestanding membranes show comparable or higher ionic conductivities than their linear, liquid, polysiloxane analogs and fall within an order of magnitude of the target ion mobilities for use in PEMFC's and DSSC's. The effects of charge carrier concentration and crosslink density on ionic conductivity will be discussed. Preliminary results on ion conducting block copolymer synthesis will also be presented.