**In Pursuit of Mechanically Strong, Conducting**

**Polymer Electrolytes**

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**Abstract:**

The design of polymer electrolytes often revolve around the goal of achieving simultaneously enhanced conductivities and mechanical strengths in the same material. Indeed, electrolytes possessing high conductivities but low mechanical strengths, exhibit undesirable features such as dendrite formation of the metallic lithium anode which leads to short circuit of the electrodes. Unfortunately however, factors that enhance the mechanical strength of a material often lead to a deterioration of the conductivity and vice versa. Hence, there is an outstanding interest in strategies which can simultaneous enhance both the conductivity and mechanical strength of the electrolyte material. In this talk, I will discuss some results emerging out of our research in using computational techniques to study three strategies which have been examined in this regard: (i) Addition of ceramic nanoparticles to the polymer electrolytes; (ii) Creating block copolymer versions of the polymeric electrolyte; (iii) Use of ionic liquids (either directly or in polymerized form) in the polymer electrolyte. In each case, a short overview of the new insights which emerged from computer simulations will be discussed.

 **Biography:**

 Venkat Ganesan holds the position of Kobe Endowed Professor in the Department of Chemical Engineering atThe University ofTexas at Austin. He obtained his Bachelor's degree in Chemical Engineering from the Indian Institute of Technology, Madras, and his Master's and Ph.D. in Chemical Engineering in 1999 under the supervision of Prof. Howard Brenner from the Massachusetts Institute of Technology. He joined University ofTexas in 2001 after spending two years as a postdoctoral fellow at the Materials Research Laboratory in University of California Santa Barbara (with Prof. Glenn Fredrickson). His research interests center around the development of novel multiscale simulation approaches for predicting the dynamical and equilibrium properties of complex fluids. He is the author of more than 125 technical publications and more than 85 invited talks and seminars. He is a recipient of an Alfred P. Sloan Fellowship, a National Science Foundation's CAREER award, the American Physical Society's Dillon Medal award (2009), a National Academy of Sciences Kavli Fellow (2009) and was elected a fellow of American Physical Society (2013). He has held the position of honorary visiting professor at the Indian Institute of Science, Bangalore {2008)..

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