

Mechanical Engineering Department Seminar

3:35pm March 25, 2015

1130 Mechanical Engineering

111 Church Street SE, Minneapolis, MN 55455

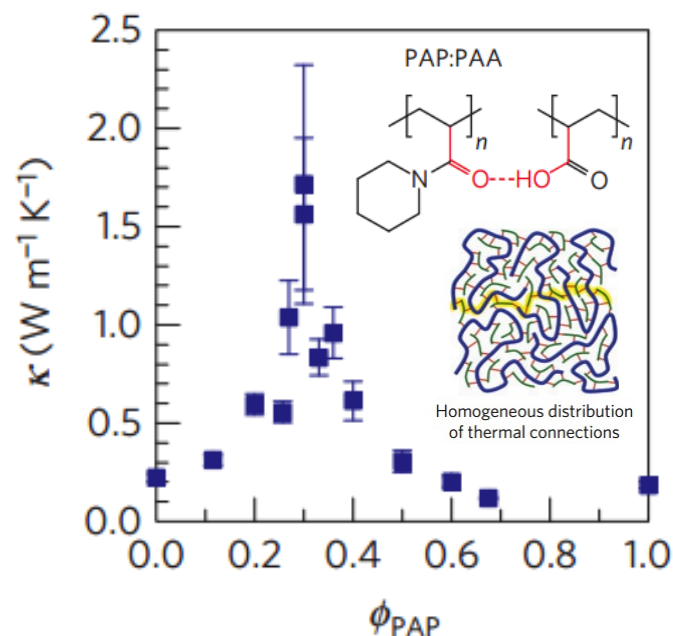


Engineering Thermal and Thermoelectric Transport in Polymers

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Polymers have numerous applications and are ubiquitous in modern life. For the past several decades, a growing understanding of the optical and electrical transport properties of polymers has yielded materials that are suitable for commercial products such as organic LEDs as well as emerging devices such as organic photovoltaics. Recently my group (in collaboration with others) has focused on building understanding of the thermal and thermoelectric transport properties of polymers, with the goal of engineering properties such as thermal conductivity and thermoelectric energy conversion efficiency. In this talk I will discuss our efforts on these two topics, in particular our studies of the effects of doping on the thermoelectric properties of PEDOT:PSS and our measurements of thermal conductivity in blends of certain polymers having strong hydrogen bonding (e.g., PAP:PAA), for which we have seen increases of an order of magnitude at certain blend ratios.



Bio: Kevin Pipe received Bachelor's and Master's degrees in Electrical Engineering & Computer Science from MIT in 1999, and a Ph.D. in Electrical Engineering from MIT in 2004. He then joined the Mechanical Engineering faculty at the University of Michigan, where he is currently an Associate Professor and Associate Chair for Graduate Education, with joint appointments in EECS and Applied Physics. His research interests include microscale heat transfer (especially as related to electronic and optoelectronic devices), thermoelectric energy conversion, scanning probe techniques, photovoltaic energy conversion, and organic and hybrid organic/inorganic devices.