Materials for Energy Conversion II: What We've Done in the Lab

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New theoretical approaches and first principles calculations (see for instance "Materials for Energy Conversion: Design Rules from First Principles" presented in this seminar series by CMU's Marco Fornari in September) have been introduced recently to guide the search for new materials with enhanced thermoelectric energy conversion efficiency. This talk will focus on our efforts to implement some of these new concepts in the laboratory. Thermoelectric efficiency increases with thermoelectric figure of merit $Z = \alpha^2\sigma/\kappa$, where α is the Seebeck coefficient, σ the electrical conductivity, and κ the thermal conductivity. Two distinct routes for increasing Z are thus i) thermal conductivity reduction; and ii) enhancement of the power factor $\alpha^2\sigma$. We will present an overview of our work on several materials systems, including filled skutterudites, I-V-VI_2 semiconductors, nanocomposites, and hybridization gap semiconductors, which are chosen with these design rules in mind and on which promising results have been demonstrated.

Host: Marco Fornari

Cookies and coffee @ 3:30pm in Dow 201.