



Weekly Seminar

Electron and phonon Engineering in thermoelectrics



裴艳中

同济大学材料科学与工程学院

Time: 4:00 pm, May.14, 2014 (Wednesday)

时间: 2014年5月14日 (周三) 下午4:00

Venue: Conference Room A (607), No. 5 Science Building

地点: 理科五号楼607会议室

Thermoelectric generators which directly convert heat into electricity have long been relegated to use in space or other niche applications, but are now actively considered for a variety of waste heat recovery systems (such the conversion of automobile exhaust heat into electricity) to combat the global energy dilemma. Although the devices are supremely reliable and compact, the thermoelectric materials themselves are relatively inefficient requiring advancing the thermoelectric figure of merit, zT above 1.5 for widespread application. In this talk, several strategies to achieve high zT , regarding band structure^[1] and phonon engineering^[2], are proposed and demonstrated experimentally. The achieved extraordinary high peak zT of 1.8 and high average zT support the possibility of further development of existing materials. With any luck, the improvements resulting from these approaches will be large enough to promote thermoelectric devices from niche applications into the mainstream technology market.



[1]Y. Pei, *et. al.*, **Nature** 2011, 473, 66; H. Wang, Y. Pei*, *et. al.*, **PNAS** 2012, 109, 9705; Y. Pei, *et. al.*, **Adv Mater** 2012, 24, 6125; Y. Pei, *et. al.*, **Energ Environ Sci** 2012, 5, 7963; Y. Pei*, *et. al.*, **NPG Asia Mater** 2012, 4, e28,

[2]Y. Pei, *et. al.*, **Adv Funct Mater** 2011, 21, 241; Y. Pei, *et. al.*, **Adv Energy Mater** 2011, 1, 291; Y. Pei, *et. al.*, **Energ Environ Sci** 2011, 4, 3640.

裴艳中获得中南大学工学学士及中科院上海硅酸盐研究所工学博士学位，并先后在美国加州理工学院及密西根州立大学访学5年。2012年获国家青年千人计划资助任同济大学材料科学与工程学院教授。他从事先进热电半导体材料研究十余年，研究内容涵盖从材料的合成到理解和分析所涉及到的材料物理和化学问题整个过程。近三年来在Nature, PNAS, Adv Mater, Energy & Environ. Sci. Adv Funct Mater, Adv energy Mater, JACS期刊上发表论文约20篇，其中包括这些刊物的封面/插图故事论文2篇。