Heng Wang

Education

Ph.D. **California Institute of Technology**, Materials Science, 2014

High Temperature Transport Properties of Lead Chalcogenides and Their Alloys

Dr. G. Jeffrey Snyder

M. E. **Tsinghua University,** China, Materials Science, 2008

Tokyo Institute of Technology, Japan, Physical Electronics,

Microstructure Characterization and Process Optimization of $AgPb_{18+x}SbTe_{20}$ Thermoelectric Material

Dr. Jingfeng Li

AlGaN/GaN Heterostructure Temperature Sensors

Dr. Adarsh Sandhu

B. E. **Tsinghua University,** China, Materials Science, 2005

Career development

Assistant Professor, MMAE, Illinois Institute of Technology 2017

Postdoc. Lawrence Berkeley National Laboratory, the Molecular Foundry 2015 – 2017

Dr. Jeffrey Urban

Postdoc. California Institute of Technology, Materials Science, 2014 – 2015

Dr. G. Jeffrey Snyder

Honors and Awards

- International Thermoelectric Society Goldsmid Award for graduate study, 2014
- Chinese Government Award for Outstanding Students Studying Abroad, 2012

Publications

First author/equally contributing first author/corresponding author, most recent first:

- Zhoug, Min; Gibbs, Zachary M.; **Wang, Heng***; Han, Yemao; Li, Laifeng*; and Snyder, G. Jeffrey, Thermoelectric performance of co-doped SnTe with resonant levels, **Applied Physics Letters 109**, 042102 (2016)
- **Wang, Heng**; Cao, Xianlong; Takagiwa, Yoshiki; and Snyder, G. Jeffrey, Higher mobility in bulk semiconductors by separating the dopants from the charge- conducting band – a case study of thermoelectric PbSe, **Materials Horizons 2**, 323 – 329 (2015)
- **Wang, Heng**; Fedorov, Mikhail I.; Shabaldin, Aleksander A.; Konstantinov, Piotr P.; and Snyder, G. Jeffrey, Comparison of thermoelectric transport measurement techniques using *n*-type PbSe, **Journal of Electronic Materials 44,** 1967-1971 (2015)
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- Chen, Cheng-Lung*; **Wang, Heng***; Chen, Yang-Yuan; Day, Tristan; and Snyder, G. Jeffrey, Thermoelectric properties of p-type polycrystalline SnSe doped with Ag, **Journal of Materials Chemistry A 2**, 11171 (2014)
- **Wang, Heng;** Wang, Jianli; Cao, xianlong; and Snyder, G. Jeffrey, Thermoelectric alloys between PbSe and PbS with effective thermal conductivity reduction and high figure of merit, **Journal of Materials Chemistry A 2**, 3169 (2014)
- **Wang, Heng;** Gibbs, Zachary M.; Takagiwa, Yoshiki; and Snyder, G. Jeffrey, Tuning bands of PbSe for better thermoelectric efficiency, **Energy&Environmental Science 7**, 804 (2014)
- **Wang, Heng;** Pei, Yanzhong; LaLonde, Aaron D; and Snyder, G. Jeffrey, Material Design Considerations Based on Thermoelectric Quality Factor, **in *Thermoelectric Nanomaterials*, Springer Series in Materials Science** Vol 182, 2013, pp 3-32
- **Wang, Heng;** Schechtel, Eugen; Pei, Yanzhong; and Snyder, G. Jeffrey, High Thermoelectric Efficiency of n-type PbS, **Advanced Energy Materials 3**, 488 (2013)
- **Wang, Heng**; LaLonde, Aaron D.; Pei, Yanzhong; and Snyder, G. Jeffrey, The Criteria for Beneficial Disorder in Thermoelectric Solid Solutions, **Advanced Functional Materials 23**, 1586 (2013)
- Wang, Jianli*; **Wang, Heng***; Snyder, G. Jeffrey; Zhang, Xi; Ni, Zhonghua; and Chen, Yunfei, Characteristics of lattice thermal conductivity and carrier mobility of undoped PbSe-PbS solid solutions, **Journal of Applied Physics D - Applied Physics 46**, 405301, (2013)
- **Wang, Heng**; Pei, Yanzhong; LaLonde, Aaron D.; and Snyder, G. Jeffrey, Weak electron-phonon coupling contributing to high thermoelectric performance in n-type PbSe, **Proceedings of the National Academy of Sciences of the United States of America 109**, 9705, (2012)
- **Wang, Heng**; Pei, Yanzhong; LaLonde, Aaron D.; and Snyder, G. Jeffrey, Heavily Doped p-Type PbSe with High Thermoelectric Performance: An Alternative for PbTe, **Advanced Materials 23**, 1366, (2011)
- **Wang, Heng**; Charoenphakdee, Anek; Kurosaki, Ken; Yamanaka, Shinsuke; and Snyder, G. Jeffrey, Reduction of thermal conductivity in PbTe:Tl by alloying with $TlSbTe_2$, **Physical Review B 83**, 024303, (2011)
- **Wang, Heng**; Li, Jing-Feng; Zou, Minmin; and Sui, Tao, Synthesis and transport property of $AgSbTe_2$ as a promising thermoelectric compound, **Applied Physics Letters 93**, 202106, (2008)
- **Wang, Heng**; Li, Jing-Feng; and Kita, Takuji, Thermoelectric enhancement at low temperature in nonstoichiometric lead-telluride compounds, **Journal of Applied Physics D - Applied Physics 40**, 6839, (2007)
- **Wang, Heng**; Li, Jing-Feng; Nan, Ce-Wen; Zhou, Min; Liu, Weishu; Zhang, Boping; and Kita, Takuji, High-performance $Ag_{0.8}Pb_{18+x}SbTe_{20}$ thermoelectric bulk materials fabricated by mechanical alloying and spark plasma sintering, **Applied Physics Letters 88**, 092104, (2006)

Contributing author, most recent first:

- Bajaj, Saurabh; **Wang, Heng**; Doak, Jeff W; Wolverton, Chris; and Snyder, G Jeffrey, Calculation of dopant solubilities and phase diagrams of X–Pb–Se (X = Br, Na) limited to defects with localized charge, **Journal of Materials Chemistry C 4**, 1769 (2016)
- Gibbs, Zachary M.; Kim, Hyun-Sik; **Wang, Heng**; and Snyder, G. Jeffrey, Band gap estimation from temperature dependent Seebeck measurement – Deviations from the $2e|S|_{max}T_{max}$ relation, **Applied Physics Letters 106**, 022112 (2015)
- Borup, Kasper A; De Boor, Johannes; **Wang, Heng**; Drymiotis, Fivos; Gascoin, Franck; Shi, Xun; Chen, Lidong; Fedorov, Mikhail I; Muller, Eckhard; Iversen, Bo B; and Snyder, G. Jeffrey, Measuring thermoelectric transport

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- Chen, Y.; Jaworski, C. M.; Gao, Y. B.; **Wang, H.**; Zhu, T. J.; Snyder, G. J.; Heremans, J. P.; and Zhao, X. B., Transport properties and valence band feature of high performance $(GeTe)_{85}(AgSbTe_2)_{15}$ thermoelectric materials, **New Journal of Physics 16**, 013057, (2014)
- Zhou, Min; Gibbs, Zachary M.; **Wang, Heng**; Han, Yemao; Xin, Caini; Li, Laifeng; and Snyder, G. Jeffrey, Optimization of thermoelectric efficiency in SnTe: the case for the light band, **Physical Chemistry Chemical Physics 16**, 20741, (2014)
- Xie, Hanhui; **Wang, Heng**; Pei, Yanzhong; Fu, Chenguang; Liu, Xiaohua; Snyder, G. Jeffrey; Zhao, Xinbing; and Zhu, Tiejun, Beneficial Contribution of Alloy Disorder to Electron and Phonon Transport in Half-Heusler Thermoelectric Materials, **Advanced Functional Materials 23,** 5123, (2013)
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- Zhang, Yichi; **Wang, Heng**; Kraeemer, Stephan; Shi, Yifeng; Zhang, Fan; Snedaker, Matt; Ding, Kunlun; Moskovits, Martin; Snyder, G. Jeffrey; and Stuck, Galen D., Surfactant-Free Synthesis of Bi_2Te_3-Te Micro-Nano Heterostructure with Enhanced Thermoelectric Figure of Merit, **ACS Nano 5**, 3158, (2011)
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Teaching

- MMAE 520, Advanced Thermodynamics, Fall 2017