XUN SHI, Shanghai Institute of Ceramics, Chinese Academy of Sciences

Statement

Prof. Xun Shi has been engaging in the research of thermoelectric materials and devices for 25 years. He discovered exceptional plasticity in a few semiconductors like Ag_2S and InSe crystals, and defective Bi_2Te_3 crystals, and subsequently created high-performance ductile thermoelectric materials and devices. He revealed the damping effect of transverse phonons in ionic conductors, and proposed the idea to decouple the electrical and thermal transports by utilizing two sublattices, which initiated the research of the new-concept "phonon-liquid" thermoelectric materials. He also uncovered the wide-spectrum scattering of phonons by resonant oscillators with different frequencies and created high-performance multiple-filled skutterudites. Prof. Shi has over 350 peer-reviewed publications in e.g., Science and Nature Materials, as well as more than 60 granted or pending patents. He has delivered more than 50 invited talks at academic conferences, including ICT, MRS, EMRS, and TMS. He has been awarded with the second prize of the State Natural Science Award of China (2013, ranked 3rd), the first prize of the Shanghai Natural Science Award (2020 ranked 1st & 2012 ranked 3rd). He was also granted with the China National Science Fund for Distinguished Young Scholars (2016) and the Young Investigator Award of International Thermoelectric Society (2010). He currently serves as the deputy director of the Chinese thermoelectric society, dedicating himself to the scientific advancement, education, and communication in the field of thermoelectrics in China and abroad.

Selected publications

1. Liu, Huili; **Shi, Xun***; Xu, Fangfang; Zhang, Linlin; Zhang, Wenqing; Chen, Lidong*; Li, Qiang; Uher, Ctirad; Day, Tristan; Snyder, G. Jeffrey; "Copper ion liquid-like thermoelectrics", ***NATURE MATERIALS***, 11 (5), 422-425 (2012).
2. **Shi, Xun***; Chen, Lidong*; "Thermoelectric materials step up", ***NATURE MATERIALS***, 15 (7), 691-692 (2016).
3. **Shi, Xun***; Chen, Hongyi; Hao, Feng; Liu, Ruiheng; Wang, Tuo; Qiu, Pengfei; Burkhardt, Ulrich; Grin, Yuri*; Chen, Lidong*; "Room-temperature ductile inorganic semiconductor", ***NATURE MATERIALS***, 17 (5), 421-426 (2018).
4. Wei, Tian-Ran; Jin, Min; Wang, Yuecun; Chen, Hongyi; Gao, Zhiqiang; Zhao, Kunpeng; Qiu, Pengfei; Shan, Zhiwei; Jiang, Jun; Li, Rongbin; Chen, Lidong*; He, Jian*; **Shi, Xun***; "Exceptional plasticity in the bulk single-crystalline van der Waals semiconductor InSe", ***SCIENCE***, 369 (6503), 542-545 (2020).
5. **Shi, Xun***; He, Jian; "Thermopower and harvesting heat", ***SCIENCE***, 371 (6527), 343-344 (2021).
6. Yang, Qingyu; Yang, Shiqi; Qiu, Pengfei*; Peng, Liming; Wei, Tian-Ran; Zhang, Zhen; **Shi, Xun***; Chen, Lidong*; "Flexible thermoelectrics based on ductile semiconductors", ***SCIENCE***, 377 (6608), 854-858 (2022).
7. Deng, Tingting; Gao, Zhiqiang; Li, Ze; Qiu, Pengfei*; Li, Zhi; Yuan, Xinjie; Ming, Chen; Wei, Tian-Ran; Chen, Lidong*; **Shi, Xun***; "Room-temperature exceptional plasticity in defective Bi_2Te_3-based bulk thermoelectric crystals", ***SCIENCE***, 386 (6726), 1112-1117 (2024).
8. Gao, Zhiqiang; Yang, Shiqi; Ma, Yupeng; Wei, Tian-Ran*; Chen, Xiaohui; Zheng, Wenwen; Qiu, Pengfei; Zeng, Xiaoqin; Chen, Lidong*; **Shi, Xun***; "Warm metalworking for plastic manufacturing in brittle semiconductors", ***NATURE MATERIALS***, (2025), doi: 10.1038/s41563-025-02223-9.

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EDUCATION

Sep. 2000-Jul. 2005	**Ph.D. in Material Science and Engineering, Shanghai Institute of Ceramics, Chinese Academy of Sciences, China** (Adviser: Prof. Lidong Chen)
Sep. 1995-Jul. 2000	**Bachelor of Material Science and Engineering, Tsinghua University, China**

WORK EXPERIENCE

Apr. 2010-present	**Professor, Shanghai Institute of Ceramics, Chinese Academy of Science, Shanghai, China**
Oct. 2007-Apr. 2010	**Material Processing Scientist, General Motors R&D Center (Optimal), Plymouth, Michigan, USA**
Nov. 2005-Sep. 2007	**Research Staff, Department of Physics, University of Michigan, Ann Arbor, Michigan, USA**
Sep. 2001-Oct. 2005	**Research Assistant, Shanghai Institute of Ceramics, Chinese Academy of Sciences, Shanghai, China**

PROFESSIONAL MEMBERSHIP AND SERVICE

2004-Present	**Member, International Thermoelectric Society**
2023-Present	**Fellow, Chinese Materials Research Society**
2018-Present	**Vice President, Thermoelectric Branch of Chinese Materials Research Society**
2020-Present	**Standing Director, Shanghai Ceramic Society**
2024-Present	**Editor in Chief, Journal of Inorganic Materials**

AWARDS AND HONORS

2010	**Young Investigator Award, International Thermoelectric Society**
2012	**Frist prize of the Shanghai Natural Science Award (ranked 3rd)**
2013	**Second prize of the State Natural Science Award of China (ranked 3rd)**
2016	**National Science Fund for Distinguished Young Scholars of China**
2017	**Leading Talent of "Ten Thousand Plan"**
2020	**Frist prize of the Shanghai Natural Science Award (ranked 1st)**