



四川大学原子核科学技术研究所
Institute of Nuclear Science and Technology, Sichuan University

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昂然 Ran Ang

博士, 研究员, 博士生导师

Ph.D, Professor, Doctoral Supervisor

主要研究领域:

新能源热电转换材料与器件研发, 关联电子体系量子序调控研究, 基于加速器平台的材料辐射改性及应用技术研究

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昂然, 男, 1981年9月生, 博士, 研究员, 博士生导师, 四川省特聘专家, 四川省有突出贡献的优秀专家, 四川省侨联特聘专家, 四川省“青年科技奖”获得者。2003年7月本科毕业于安徽师范大学物理系, 2008年7月在中国科学院合肥物质科学研究院固体物理研究所获凝聚态物理专业博士学位。2008年8月至2015年5月分别在新加坡南洋理工大学、新加坡国立大学、日本东北大学、日本国家物质材料研究所从事科学研究, 先后担任新加坡千年基金会SMF研究员、日本学术振兴会JSPS特别研究员等职务。2015年5月作为海外引进人才加盟四川大学, 担任新能源材料实验室课题组长。

长期致力于新能源材料与器件、材料物理领域的研究, 掌握了国际上具有原创性热电转换材料与器件以及关联电子体系量子序调控等关键技术, 对于研究和发​​展新能源热电材料产业、电子器件产业具有重要意义和应用价值。在国际上首次通过天然深海黄铜矿实现热电发电, 并通过合金化效应、低固溶度效应、多相工程、能带工程等一系列优化策略大幅度提高材料的热电性能; 首次通过原子有序超结构实现层状二硫化物超导以及金属-绝缘体量子相变。主持国家重点研发计划“变革性技术关键科学问题”重点专项课题、国家自然科学基金(面上项目、联合基金项目)、四川省专项基金、四川省青年科技基

金等国家和省部级基金项目多项，已在国际重要期刊包括Nature Communications, Angewandte Chemie International Edition, Physical Review Letters, Journal of Materials Chemistry A, ACS Applied Materials & Interfaces, Physical Review B, Applied Physics Letters等发表SCI论文90篇，总影响因子超300以上，被Nature Nanotechnology, Nature Physics, Nature Communications等国际顶级SCI论文他引千余次，H因子为19，并撰写英文专著1个章节，申请国内发明专利7项，授权专利3项。先后担任SCI国际学术期刊Advances in Condensed Matter Physics客座主编、Journal of Nanomaterials客座编辑、Chinese Journal of Engineering客座主编、中国物理学会《物理学报》Acta Physica Sinica和Chinese Physics B两刊青年编辑。现为Nature Communications, Physical Review Letters, Advanced Materials, Journal of the American Chemical Society等30余种知名SCI期刊的审稿人和仲裁评审人。曾荣获“科学中国人2016年度杰出青年科学家奖”、“四川省青年科技奖”、“四川大学青年科技人才奖”、“中国科学院优秀博士学位论文奖”、“安徽省优秀博士学位论文奖”、“中国科学院院长优秀奖”等多个奖项。还担任四川省欧美同学会·四川省留学人员联谊会常务理事、社委会副主任，成都市欧美同学会·成都市留学人员联谊会常务理事，四川大学归国华侨联合会主席、四川大学党外知识分子联谊会副会长等职务。

主要研究领域：

1. 新能源热电转换材料与器件研发
2. 关联电子体系中的量子物理和量子序调控研究
3. 基于串列静电加速器平台的材料辐射改性及应用技术研究

拟招收博士后、博士生、硕士生。

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Education:

Sep.2003--Jul.2008, Institute of Solid State Physics, Chinese Academy of Sciences, Ph.D

Sep.1999--Jul.2003, Anhui Normal University, B.S

Appointments:

May 2015--Present, Sichuan University, China, Professor

Jan. 2014--May 2015, National Institute for Materials Science, Japan, Research Fellow

Jan. 2013--Jan. 2014, Tohoku University, Japan, Research Fellow

Nov. 2010--Jan. 2013, Tohoku University, Japan, JSPS Research Fellow

Jul. 2010--Nov. 2010, Nanyang Technological University, Singapore, Research Fellow

Aug. 2009--Jul. 2010, National University of Singapore, Singapore, SMF Research Fellow

Aug. 2008--Aug. 2009, Nanyang Technological University, Singapore, Research Fellow

Interests:

- **High-Performance Thermoelectric Materials and Devices**

Thermoelectric Materials, Thermoelectric Devices, Thermoelectric Performance

- **Quantum-Ordering Tuning in Strongly Correlated Electron System**

Superconductivity, Charge-Density Wave, Transport Properties, Electronic and Atomic Structures

- **Radiation Modification of Functional Materials Based on Accelerator Platform**

Radiation Modification of Polycrystals, Single Crystals, and Thin Films Based on Tandem Electrostatic Accelerator

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代表性论文和成果Selected Publications and Achievements: (*Corresponding Author)

1. **R. Ang***, Chapter Title "Layered Cobaltites and Natural Chalcogenides for Thermoelectrics" , "Thermoelectrics for Power Generation - A Look at Trends in the Technology" , Book edited by Sergey Skipidarov and Mikhail Nikitin, ISBN 978-953-51-2846-5, Print ISBN 978-953-51-2845-8, Pages: 3-25, 2016.
2. **R. Ang**, Z. C. Wang, C. L. Chen, J. Tang, N. Liu, Y. Liu, W. J. Lu, Y. P. Sun, T. Mori, and Y. Ikuhara; Atomistic origin of ordered superstructure induced superconductivity in layered chalcogenides; **Nature Commun.** 6, 6091 (2015).
3. **R. Ang***, A. U. Khan, N. Tsujii, K. Takai, R. Nakamura, and T. Mori; Thermoelectricity generation and electron-magnon scattering in a natural chalcopyrite mineral from a deep-sea hydrothermal vent; **Angew. Chem. Int. Ed.** 54, 12909 (2015).
4. **R. Ang***, Y. Tanaka, E. Ieki, K. Nakayama, T. Sato, L. J. Li, W. J. Lu, Y. P. Sun, and T. Takahashi; Real-space coexistence of the melted Mott state and superconductivity in Fe-substituted 1T-TaS₂; **Phys. Rev. Lett.** 109, 176403 (2012).
5. C. Yin, H. T. Liu, Q. Hu, J. Tang, Y. Z. Pei, and **R. Ang***; Texturization induced in-plane high-performance thermoelectrics and inapplicability of the Debye model to out-of-plane lattice thermal conductivity in misfit-layered chalcogenide; **ACS Appl. Mater. Interfaces** 11, 48079 (2019).
6. H. X. Liu, X. Y. Zhang, J. Li, Z. L. Bu, X. Meng, **R. Ang***, and W. Li; Band and Phonon Engineering for Thermoelectric Enhancements of Rhombohedral GeTe; **ACS Appl. Mater. Interfaces** 11, 30756 (2019).
7. B. Q. Zhou, C. Sun, X. Wang, Z. L. Bu, W. Li, **R. Ang***, and Y. Z. Pei; Transport Properties of CdSb Alloys with a Promising Thermoelectric Performance; **ACS Appl. Mater. Interfaces** 11, 27098 (2019).
8. Z. Y. Chen, X. M. Guo, J. Tang, F. Xiong, W. Li, Y. Chen, and **R. Ang***; Extraordinary Role of Bi for Improving Thermoelectrics in Low Solubility SnTe-CdTe Alloys; **ACS Appl. Mater. Interfaces** 11, 26093 (2019).
9. Z. Y. Chen, B. Gao, J. Tang, X. M. Guo, W. Li, and **R. Ang***; Low lattice thermal conductivity by alloying SnTe with AgSbTe₂ and CaTe/MnTe; **Appl. Phys. Lett.** 115, 073903 (2019).

10. C. Yin, Q. Hu, M. J. Tang, H. T. Liu, Z. Y. Chen, Z. S. Wang, and **R. Ang***; Boosting the thermoelectric performance of misfit-layered $(\text{SnS})_{1.2}(\text{TiS}_2)_2$ by a Co- and Cu-substituted alloying effect; **J. Mater. Chem. A** 6, 22909 (2018).
11. Z. S. Wang, G. Y. Wang, R. F. Wang, X. Y. Zhou, Z. Y. Chen, C. Yin, M. J. Tang, Q. Hu, J. Tang, and **R. Ang***; Ga-Doping-Induced Carrier Tuning and Multiphase Engineering in n-type PbTe with Enhanced Thermoelectric Performance; **ACS Appl. Mater. Interfaces** 10, 22401 (2018).
12. C. Yin, Q. Hu, G.Y. Wang, T. Y. Huang, X. Y. Zhou, X. Zhang, Y. W. Dou, B. Kang, J. Tang, N. Liu, and **R. Ang***; Intriguing substitution of conducting layer triggered enhancement of thermoelectric performance in misfit-layered $(\text{SnS})_{1.2}(\text{TiS}_2)_2$; **Appl. Phys. Lett.** 110, 043507 (2017).
13. Y. Liu, **R. Ang***, W. J. Lu, W. H. Song, L. J. Li, and Y. P. Sun; Superconductivity induced by Se-doping in layered charge-density-wave system $1\text{T-TaS}_{2-x}\text{Se}_x$; **Appl. Phys. Lett.** 102, 192602 (2013).
14. **R. Ang***, Y. Miyata, E. Ieki, K. Nakayama, T. Sato, Y. Liu, W. J. Lu, Y. P. Sun, and T. Takahashi; Superconductivity and bandwidth-controlled Mott metal-insulator transition in $1\text{T-TaS}_{2-x}\text{Se}_x$; **Phys. Rev. B** 88, 115145 (2013).
15. **R. Ang**, K. Nakayama, W.-G. Yin, T. Sato, Hechang Lei, C. Petrovic, and T. Takahashi; Electronic structure of the iron-chalcogenide KFeAgTe_2 revealed by angle-resolved photoemission spectroscopy; **Phys. Rev. B** 88, 155102 (2013).
16. L. H. Yin, **R. Ang***, Z. H. Huang, Y. Liu, S. G. Tan, Y. N. Huang, B. C. Zhao, W. H. Song, and Y. P. Sun; Exotic reinforcement of thermoelectric power driven by Ca doping in layered $\text{Bi}_2\text{Sr}_{2-x}\text{Ca}_x\text{Co}_2\text{O}_y$; **Appl. Phys. Lett.** 102, 141907 (2013).
17. L. H. Yin, **R. Ang***, Y. N. Huang, H. B. Jiang, B. C. Zhao, X. B. Zhu, Z. R. Yang, W. H. Song, and Y. P. Sun; The contribution of narrow band and modulation of thermoelectric performance in doped layered cobaltites $\text{Bi}_2\text{Sr}_2\text{Co}_2\text{O}_y$; **Appl. Phys. Lett.** 100, 173503 (2012).

18. **R. Ang***, T. P. Chen, Z. Liu, J. I. Wong, M. D. Yi, M. Yang, Z. H. Cen, S. Zhu, W. Zhu, and E. S. M. Goh; Charging effect and capacitance modulation of Ni-rich NiO thin film; **Appl. Phys. Lett.** 95, 012104 (2009).

19. **R. Ang**, Y. P. Sun, X. Luo, C. Y. Hao, X. B. Zhu, and W. H. Song; The evidence of the glassy behavior in the layered cobaltites; **Appl. Phys. Lett.** 92, 162508 (2008).

20. **R. Ang**, W. J. Lu, R. L. Zhang, B. C. Zhao, X. B. Zhu, W. H. Song, and Y. P. Sun; Effects of Co doping in bilayered manganite $\text{LaSr}_2\text{Mn}_2\text{O}_7$: Resistivity, thermoelectric power, and thermal conductivity; **Phys. Rev. B** 72, 184417 (2005).

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