

# Curriculum Vitae

**First name:** Wenjie

**Surname:** Xie

## **Personal Information**

Birth: Aug. 15, 1983

Gender: Male

Citizenship: Chinese

## **Current Address**

State Key Laboratory of Advanced Technology for Materials Synthesis and Processing  
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## **Education**

### **PhD, Material Science, in progress (September 2007-2011)**

Complex Advanced Materials Laboratory, Department of Physics,  
Clemson University (CU)

State Key Laboratory of Advanced Technology for Materials Synthesis and Processing,  
Wuhan University of Technology (WUT)

Major: New energy materials

Advisors: Prof. Xinfeng Tang and Terry M. Tritt

### **Master of Science, Material Science, (September 2005-June 2007)**

State Key Laboratory of Advanced Technology for Materials Synthesis and Processing,  
Wuhan University of Technology (WUT)

Major: Materials science

Advisor: Prof. Xinfeng Tang

### **Bachelor of Science, Material Science & Engineering, (September 2001-July 2005)**

Department of Material Science & Engineering, Wuhan University of Technology

Major: Material Science & Engineering

Advisor: Prof. Xinfeng Tang

## **Work Experiences**

2008.09~2010.12      Clemson University

Research Associate

## Research Interest

- Preparation and thermoelectric transport properties characterization of nanocomposites, especially Bi<sub>2</sub>Te<sub>3</sub> and its alloys, BiSb alloys, and half-Heusler alloys
- Microstructure analysis, especially HRTEM characterisation
- Correlation between microstructure and related properties

## Skills

- Solid background on material science and engineering.
- Rich experience in preparation with solid-state reaction techniques; skillfully synthesize some nanostructures of materials (melt spinning method and chemical method).
- Experienced operate SPS-1050 and other solid-state reaction furnaces
- SEM & TEM techniques: rich experience in operating SEM-3400, 4800 (Hitachi) and preparing TEM samples; skillfully analyze HRTEM photos and SEAD results, and operate JEM-2100F under the guidance of instruction.

## Honors & Awards

- 2010-2011 **2011 Annual Goldsmid Award** awarded by The International Thermoelectric Society (ITS) and Marlow Industries
- 2008-2009 **Excellent Master Dissertation** awarded by Hubei Provincial Department of Education, China  
**Excellent Paper** awarded by WUT  
**Outstanding Graduated Student Award** awarded by WUT  
**Yangtze Scholarship for PhD Student** awarded by Yangtze Optical Fibre and Cable Company Ltd.
- 2007-2008 **Joint PhD student Fellowship** of China Scholarship Council, China  
**First-class Scholarship**, Excellent Graduate Student awarded by WUT  
**Excellent Master Dissertation** awarded by WUT  
**Excellent Paper** awarded by WUT
- 2006-2007 **Excellent Paper** awarded by WUT
- 2004-2005 **Excellent Outstanding Graduate** awarded by WUT
- 2003-2004 **Second-class Scholarship**, Outstanding Student awarded by WUT
- 2002-2003 **First-class Scholarship**, Excellent Outstanding Student awarded by WUT
- 2001-2002 **Third-class Scholarship**, Outstanding Student awarded by Department of Material Science & Engineering, WUT

## Participated Research Projects

- National Basic Research Program of China (Grant No. 2007CB607501)
- DOE/EPSCoR Implementation Grant of USA (#DE-FG02-04ER-46139)
- Natural Science Foundation of China (Grant No. 50731006)
- Natural Science Foundation of China (Grant No. 50672118)
- Major International Cooperation Program of the NSFC (Grant No. 50310353)
- Key Scientific and Technical Innovation Project, Ministry of China (Grant No. 705035)

## Professional membership and service

2007- Member, International Thermoelectric Society

2009- Member, Materials Research Society

**Referee for:** Journal of Alloy and compounds (~2008); Materials Chemistry and Physics (~2009); Journal of Electric Materials (~2010); Journal of Materials Research (~2011)

## Publications

### **2011~2012**

1. **Wenjie Xie**, Dale Hitchcock, Song Zhu, Hyejung Kang, Mark Laver, Shanyu Wang, Tim Holgate, Jian He, Xinfeng Tang, Qingjie Zhang, and Terry M. Tritt. "Controlled Multiscale Nanostructures and High Thermoelectric Performance in Melt-spun Spark-plasma-sintered  $(\text{Bi,Sb})_2\text{Te}_3$ ", submit to *Adv. Func. Mater.*
2. **Wenjie Xie**, Song Zhu, Shanyu Wang, Xinfeng Tang, and Terry M. Tritt, "High Thermoelectric Performance  $(\text{Bi,Sb})_2\text{Te}_3$  Nanocomposites Prepared by Single Element Melt Spinning combining with Spark Plasma Sintering", submit to *Intermetallics*.
3. **Wenjie Xie**, Jian He, Song Zhu, Tim Holgate, Shanyu Wang, Xinfeng Tang, Qingjie Zhang, and Terry M. Tritt. "Investigation of the sintering pressure and thermal conductivity anisotropy of melt-spun spark-plasma-sintered  $(\text{Bi,Sb})_2\text{Te}_3$  thermoelectric materials", *J. Mater. Res.* (in press)
4. Shanyu Wang, **Wenjie Xie**, Han Li, Xinfeng Tang, and Qingjie Zhang, "Melt spun  $\text{Bi}_2\text{Te}_3$  with high performances for n-type thermoelectric legs", *Intermetallics*, **19**, **2011**, **1024-1031**.
5. Song Zhu, **Wenjie Xie**, Menghan Zhou, Jian He and Terry M. Tritt Interplay of Electron Correlation, Indium Doping and Nanostructuring Process in Thermoelectric Study of  $\text{FeSb}_2$ , *J. Mater. Res.* (in press)
6. Shanyu Wang, **Wenjie Xie**, Han Li, and Xinfeng Tang, "The effects of cooling rate on the thermoelectric properties of  $\text{Bi}_2(\text{Se}_{0.4}\text{Te}_{0.6})_3$  compounds", *J. Elec. Mater.* **40**, **2011**, **1150**.
7. Xingxing Xiao, **Wenjie Xie**, Xinfeng Tang, Qingjie Zhang, "Phase Transition and High Temperature Thermoelectric Transport Properties of Copper Selenide  $\text{Cu}_{2-x}\text{Se}$  ( $0 \leq x \leq 0.25$ )", *Chinese Physics B*. (In press)
8. V. Ponnambalam, S. Lindsey, **Wenjie Xie**, D. Thompson, Fivos Drymiotis, Terry Tritt, "High Seebeck coefficient  $\text{AMXP}_2$  ( $A = \text{Ca}$  and  $\text{Yb}$ ;  $M, X = \text{Zn}, \text{Cu}$  and  $\text{Mn}$ ) Zintl Phosphides as high temperature thermoelectric materials", *J. Phys. D: Appl. Phys.* **44**, **2011**, **155406**
9. W. Wong-Ng, T. Luo, **W. Xie**, M. Tang, J.A. Kaduk, Q. Huang, Y. Yang, S. Chattopadhyay, T. Tang, and T. Tritt, Crystal Chemistry and Thermoelectric Properties of Compounds in the Ca-Co-Zn-O System, *J. Solid State Chem.* (in press)
10. Y. G. Yan, W. Wong-Ng, J. A. Kaduk, G. J. Tan, **W. J. Xie** and X. F. Tang, Correlation of Thermoelectric and Microstructural Properties of P-type  $\text{CeFe}_4\text{Sb}_{12}$  Melt-Spun Ribbons Using a Rapid Screening Method, *Appl. Phys. Lett.*, **98**, **2011**, **142106**
11. Shanyu Wang, Han Li, Dekui Qi, Wenjie Xie, Xinfeng Tang, Enhancement in thermoelectric performance by in-situ nanostructures and minute Cd-doping in  $\beta\text{-Zn}_4\text{Sb}_3$ , *Acta Mater.* **59**, **2011**, **4809-4811**

12. W. Wong-Ng, **W. Xie**, Y. Yan, G. Liu, J. Kaduk, E. Thomas, and T. Tritt, Structural and Thermoelectric properties of BaRCo4O7 (R=Dy, Ho, Er, Tm, Yb, and Lu), submitted to *Solid State Sciences*
13. J.W. Simonson, D. Wu, **W. J. Xie**, T.M. Tritt, and S.J. Poon, “Introduction of resonant states and enhancement of thermoelectric properties in half-Heusler alloys”, *Submit to Phys. Rev. B*.

#### 2010~2011

14. **Wenjie Xie**, Jian He, Hye Jung Kang, Xinfeng Tang, Song Zhu, Mark Laver, Shanyu Wang, John Copley, Craig Brown, Qingjie Zhang, and Terry M. Tritt, “Identifying the Specific Nanostructures Responsible for the High Thermoelectric Performance of (Bi,Sb)<sub>2</sub>Te<sub>3</sub> Nanocomposites”, *Nano Letters*, **10**, 2010, 3283-3289
15. **W. J. Xie**, J. He, S. Zhu, X. L. Su, S. Y. Wang, T. Holgate, J. W. Hubbard, V. Ponnambalam, S. J. Poon, X. F. Tang, Q. J. Zhang, and T. M. Tritt, “Simultaneously Optimizing the Independent Thermoelectric properties in (Ti,Zr,Hf)(Co,Ni)Sb Alloy by *In-situ* Forming InSb Nanoinclusions”, *Acta Materialia*, **58**, 2010, 4705–4713
16. Shanyu Wang, **Wenjie Xie**, Han Li, and Xinfeng Tang, “High Performance *n*-type (Bi,Sb)<sub>2</sub>(Te,Se)<sub>3</sub> for low Thermoelectric Generator”, *J. Phys. D: Appl. Phys.* **43**, 2010, 335404
17. Shanyu Wang, **Wenjie Xie**, Han Li, and Xinfeng Tang, “Microstructures and thermoelectric properties of *n*-type melting spun (Bi<sub>0.85</sub>Sb<sub>0.15</sub>)<sub>2</sub>(Te<sub>1-x</sub>Se<sub>x</sub>)<sub>3</sub> compounds”, *Acta Physica Sinica*, **59**, 2010, 8927 (In Chinese)
18. Shanyu Wang, **Wenjie Xie**, Han Li, and Xinfeng Tang, “Effects of Preparation Techniques on the Thermoelectric Properties and Pressive Strengths of *n*-type Bi<sub>2</sub>Te<sub>3</sub> Based Materials” *J. Inorg. Mater.*, **25**, 2010, 609 (In Chinese)

#### 2009~2010

19. **Wenjie Xie**, Song Zhu, Xinfeng Tang, Jian He, Yonggao Yan, V. Ponnambalam, Qingjie Zhang, S. Joseph Poon and Terry Tritt, “Synthesis and thermoelectric properties of (Ti,Zr,Hf)(Co,Pd)Sb half-Heusler Synthesis compound”, *J. Phys. D: Appl. Phys.* **42**, 2009, 235407
20. **Wenjie Xie**, Xinfeng Tang, Qingjie Zhang and Terry M. Tritt, “High Thermoelectric Performance BiSbTe Alloy with Unique Low-Dimensional Structure”, *J. Appl. Phys.*, **105**, 2009, 113713.
21. **Wenjie Xie**, Xinfeng Tang, Qingjie Zhang and Terry M. Tritt, “Unique Low-Dimensional Structure and Enhanced Thermoelectric Performance for P-type Bi<sub>0.52</sub>Sb<sub>1.48</sub>Te<sub>3</sub> Bulk Material”, *Appl. Phys. Lett.*, **94**, 2009, 102111.
22. Guo Chen, **Wenjie Xie**, Qiao Jin, Xinfeng Tang, Microstructure and electrical transport properties of *n*-type bismuth telluride based compounds prepared by melt spinning technique, *J. Wuhan Uni. Tech.* **31**, 2009, 16:1-4. (In Chinese)
23. Qiao Jin, **Wenjie Xie**, Guo Chen, and Xinfeng Tang, “The influence of anneal process on the microstructure of *p*-type Bi<sub>2</sub>Te<sub>3</sub> ribbons prepared by melt spinning technique, *J. Wuhan Uni. Tech.* **31**, 2009, 17: 1-3. (In Chinese)

#### 2008~2009

24. **Wenjie Xie**, Qiao Jin, Xinfeng Tang, “The preparation and thermoelectric properties of Ti<sub>0.5</sub>Zr<sub>0.25</sub>Hf<sub>0.25</sub>Co<sub>1-x</sub>Ni<sub>x</sub>Sb half-Heusler compounds”, *J. Appl. Phys.* **103**, 2008, 043711.

25. **W. J. Xie**, X. F. Tang, G. Chen, Q. Jin and Q. J. Zhang, “Nanostructure and thermoelectric properties of p-type  $\text{Bi}_{0.5}\text{Sb}_{1.5}\text{Te}_3$  compound prepared by melt spinning technique”, (The 26<sup>th</sup> international conference on thermoelectrics, ICT2007. Jeju, Korea.) **IEEE 2008, 23**

### 2007~2008

26. Xinfeng Tang, **Wenjie Xie**, Han Li, Wenyu Zhao, Qingjie Zhang and Masayuki Niino, “Preparation and thermoelectric transport properties of high-performance p-type  $\text{Bi}_2\text{Te}_3$  with layered nanostructure”, *Appl. Phys. Lett.* **90, 2007, 012102**. (Selected to *Virtual Journal of Nanoscale Science & Technology*, Volume 15, Issue 2, January 15, 2007.)
27. **Wenjie Xie**, Xinfeng Tang, Qingjie Zhang, “Fast preparation and thermal transport property of TiCoSb-based half-Heusler compounds”, *Chin. Phys.* **16, 2007, 3549**
28. Liu Taoxiang, Tang Xinfeng, **Xie Wenjie**, Yan Yonggao and Zhang Qingjie, Crystal structures and thermoelectric properties of Sm-filled skutterudite compounds  $\text{Sm}_y\text{Fe}_x\text{Co}_{4-x}\text{Sb}_{12}$ , *J. Rare Earth.* **25, 2007, 739**.

### Book chapter

1. Xinfeng Tang, **Wenjie Xie**, Han Li, Qingjie Zhang, Ctirad Uher, and Terry M. Tritt, “High Performance Nanostructured Thermoelectric Materials Prepared by Melt Spinning and Spark Plasma Sintering”, *CRC Handbook of Thermoelectrics 2010*. (In press)
2. Terry M. Tritt, Xinfeng Tang, Qingjie Zhang, and **Wenjie Xie**, Solar Thermoelectric: Direct Solar Thermal Energy Harvesting, **MRS and Cambridge University Press** (CUP) Chapter 22, Textbook: Fundamentals of Materials for Energy and Environmental Sustainability. *Edited by David Ginley and Daven Cahen*, Accepted and in press

### Conferences and workshops

1. **Wenjie Xie**, Song Zhu, Shanyu Wang, Jian He, Xinfeng Tang, Qingjie Zhang, and Terry M. Tritt, High Performance  $(\text{Bi,Sb})_2\text{Te}_3$  Nanocomposite Rapidly Prepared by Single Element Melt Spinning combined with Spark Plasma Sintering, The 30<sup>th</sup> international conference on thermoelectric (ICT2011), Michigan, USA. (Oral presentation)
2. **Wenjie Xie**, Jian He, Hye Jung Kang, Song Zhu, Dale Hitchcock, Shanyu Wang, Xinfeng Tang, Qingjie Zhang, and Terry M. Tritt, Investigation of the Relationship between Microstructure and High Thermoelectric Performance in p-type  $\text{BiSbTe}$  by Microscopy and Neutron Scattering Studies, **2011 E-MRS Spring Meeting**, Nice, France (Oral presentation)
3. Xinfeng Tang, **Wenjie Xie**, Han Li, Baoli Du, Qingjie Zhang, Enhancement of Thermoelectric Performance by a Nanostructuring Approach-Melt Spinning Combined with Spark Plasma Sintering, **2011 E-MRS Spring Meeting**, Nice, France (**Invited talk**)
4. **W. J. Xie**, J. He, S. Zhu, X. L. Su, S. Y. Wang, T. Holgate, J. W. Hubbard, V. Ponnambalam, S. J. Poon, X. F. Tang, Q. J. Zhang, and T. M. Tritt, “Simultaneously Optimizing the Independent Thermoelectric properties in  $(\text{Ti,Zr,Hf})(\text{Co,Ni})\text{Sb}$  Alloy by *In-situ* Forming InSb Nanoinclusions” **2010 MRS Fall Meeting**, Boston, Massachusetts USA (Oral presentation)
5. X. F. Tang, **W. J. Xie**, H. Li, Y. G. Yan, Q. J. Zhang, C. Uher and T. M. Tritt, “Rapid Solidification Methods for Fabrication of Novel Thermoelectric Materials”, **2010 MRS Fall Meeting**, Boston, Massachusetts USA (**Invited talk**)

6. Song Zhu, **Wenjie Xie**, Menghan Zhou, Jian He and Terry M. Tritt Interplay of Electron Correlation, Indium Doping and Nanostructuring Process in Thermoelectric Study of FeSb<sub>2</sub>, **2010 MRS Fall Meeting**, Boston, Massachusetts USA (Oral presentation)
7. **Wenjie Xie**, Jian He, Song Zhu, Shanyu Wang, Xinfeng Tang, Qingjie Zhang, and Terry M. Tritt, “Controlled Multiscale Nanostructures and High Thermoelectric Performance in Melt-spun Spark-plasma-sintered (Bi,Sb)<sub>2</sub>Te<sub>3</sub>”, The 29<sup>th</sup> international conference on thermoelectric (**ICT2010**), Shanghai, China. (Oral presentation)
8. **Wenjie Xie**, Xinfeng Tang, Yonggao Yan, Qingjie Zhang, and Terry Tritt, “Enhanced Thermoelectric Performance in BiSbTe Alloy with Novel Nanostructure”, **2009 MRS Spring Conference**, San Francisco, CA, USA (Oral presentation)
9. **Wenjie Xie**, Xinfeng Tang, Yonggao Yan, Qingjie Zhang, and Terry Tritt, “Enhanced Thermoelectric Performance in BiSbTe Alloy with Novel Nanostructure”, The 28<sup>th</sup> international conference on thermoelectric (**ICT2009**), Freiburg, Germany. (Oral presentation)
10. **Wenjie Xie**, Xinfeng Tang, Yonggao Yan, Qingjie Zhang, and Terry Tritt, “High Performance in p-Bi<sub>2</sub>Te<sub>3</sub> due to Unique Microstructures”, **2009 DOE/EPSCoR Review Meeting**, Clemson, SC, USA, (Oral presentation)
11. Terry M. Tritt, Jian He, K. Yang, A. Rao, **Wenjie Xie**, and Xinfeng Tang, “Controlled Microstructure Through Novel Processing routes for Thermoelectric Materials”, **2009 DOE DARPA Workshop**, Washington DC, USA, (Poster)
12. **Wenjie Xie**, “Nanostructure and thermal conductivity of Bi<sub>1-x</sub>Sb<sub>x</sub> alloys prepared by melt spinning technique”, The 27<sup>th</sup> international conference on thermoelectric (**ICT2008**). Oregon, USA, (Poster)
13. **Wenjie Xie**, Xinfeng Tang, Guo Chen, Qiao Jin and Qingjie Zhang, “Nanostructure and thermoelectric properties of p-type Bi<sub>0.5</sub>Sb<sub>1.5</sub>Te<sub>3</sub> compound prepared by melt spinning technique”, The 26<sup>th</sup> international conference on thermoelectric (**ICT2007**). Jeju, Korea. (Oral presentation)
14. Xinfeng Tang, **Wenjie Xie**, Han Li, Peng LI, Liqiang Wang and Qingjie Zhang, “The preparation and thermoelectric transport properties of nanostructured thermoelectric materials induced by melt spinning technique”, **Tri-University Workshop, Monosh, Australia** (Oral presentation)

## **Patents**

1. Xinfeng Tang, **Wenjie Xie**, Yonggao Yan, Shanyu Wang, and Qingjie Zhang “Preparation method of high performance Bi<sub>x</sub>Sb<sub>y</sub>Te<sub>3-z</sub> thermoelectric materials”, **Pending No. 200910062324.5 (Chinese patent)**
2. Xinfeng Tang, Shanyu Wang, **Wenjie Xie**, Yonggao Yan, and Qingjie Zhang, “A fast preparation method of n-type Bi<sub>2</sub>(Se<sub>x</sub>Te<sub>1-x</sub>)<sub>3</sub> thermoelectric materials”, **Pending No. 200910063194.9 (Chinese patent)**
3. Xinfeng Tang, **Wenjie Xie**, and Qingjie Zhang “Preparation method of high performance Bi<sub>2</sub>Te<sub>3</sub> thermoelectric semiconductor materials”, **ZL 2006 1 0019607.X (Chinese Patent)**
4. Xinfeng Tang, **Wenjie Xie**, and Qingjie Zhang “Preparation method of TiCoSb-based thermoelectric semiconductor materials”, **ZL 2006 1 0019184.1 (Chinese Patent)**