Junjie Zhang

Materials Science Division
Argonne National Laboratory
9700 S Cass Ave, Argonne, IL 60439

Cell: (773)344-4267
Office: (630)252-3185
Email: junjie@anl.gov

Education

2008-2013 **Ph.D.** (Supervisor: Prof. Xutang Tao) Institute of Crystal Materials, Shandong University
Dissertation: "*Crystal Growth, Characterization and Nonlinear Optical Frequency Conversion Investigation of New Molybdenum Tellurites*"

2004-2008 **B. Eng.** School of Materials Science and Engineering, Shandong University

Employment History

- **07/2013- Present**: Postdoctoral Researcher (Advisor: Dr. John F. Mitchell)
  Materials Science Division, Argonne National Laboratory, Argonne, IL
  Project: High-pressure floating-zone crystal growth and characterization of emerging materials

Expertise

- Crystal growth using high-pressure floating zone furnace and flux method
- Structural determination using X-ray diffraction
- Characterization of linear and nonlinear optical properties, thermal properties, piezoelectric properties, and magnetic properties

Highlights

- **16 publications** (9 first-author and 7 co-author) in peer-reviewed journals, including *Chem. Mater.*, *J. Mater. Chem.*, *Cryst. Growth & Des.*, *CrystEngComm*, and *Appl. Phys. Lett*. **Note** that the paper published on *CrystEngComm* was selected as a **Hot Article**.
- **2 issued Chinese patents**, inventor and assignee: (1) "*High-temperature phase of $BaTeMo_2O_9$, flux growth and its applications*"- ZL 201010297346.4; (2) "*$Cs_2TeMo_3O_{12}$ single crystals, its flux growth and applications*"- ZL 201010581219.7
- **2 research grants** (Funding summary: RMB 60,000)
- Selected for participation in the **63rd Lindau Nobel Laureate Meeting**, Germany (2013); Scholarship Award for Excellent Doctoral Student granted by the **Ministry of Education of People's Republic of China**, Outstanding Graduate Student of **Shandong Province** and **9 honors & awards from Shandong University**
- **4 orals and 4 posters** in international/national conferences.

Curriculum Vitae Addendum

Research Grants

Funding summary: RMB 60, 000

- **Graduate Innovation Foundation of Shandong University (GIFSDU)**: "*Growth and characterization of the nonlinear optical crystal $Cs_2TeMo_3O_{12}$*", 12/2010- 05/2013, RMB 30,000
  Role: Principal Investigator
- **Ministry of Education of People's Republic of China:** Scholarship Award for Excellent Doctoral Student, 12/2012- 06/2013, RMB 30, 000

Technical Experience

- ***Synthesis***: solid state, flux growth, hydrothermal and floating zone techniques.
- ***Bulk Crystal Growth***: top-seeded solution growth (TSSG) and high-pressure floating zone techniques.
- ***Characterization***: single-crystal and powder X-ray diffraction; high-resolution X-ray diffraction; optical spectroscopy (UV-Vis, IR, and Raman); elemental analysis by EDS, X-ray photoelectron spectroscopy (XPS) and X-ray fluorescence (XRF); measurements of the second-harmonic generation efficiency using the Kurtz method; characterization of thermal properties including melting point (DSC/TGA), specific heat (DSC), thermal expansion (TMA) and thermal diffusivity (LFA 457 Nanoflash); ferroelectric test; measurements of piezoelectric properties such as piezoelectric coefficients, elastic coefficients, and dielectric permittivity.
- ***Computer skills***: experienced with a wide range of software (Microsoft Office, SHELX, Crystallographica Search-Match, Mercury, Diamond, OirginPro, Adobe Photoshop, SigmaPlot, Materials Studio, EndNote, Fullprof, WinXmorph, etc.)

Honors and Recognitions

(1) Selected for participation in the 63rd Meeting of Nobel Laureates in Lindau, Germany (**25** nominees in China) 2013
(2) Outstanding Graduate Student of Shandong Province 2013
(3) Scholarship Award for Excellent Doctoral Student granted by Ministry of Education of People's Republic of China (RMB 30,000) 2012
(4) National Scholarship 2012
(5) President's Scholarship 2012
(6) "Wu-Si" Young Scientist Award 2012
(7) Supported by the Excellent Doctoral Training Program of Shandong University 2011
(8) Supported by the Graduate Innovation Foundation of Shandong University (GIFSDU, RMB 30,000) 2010
(9) National Scholarship 2006
(10) Scholarship for Excellent Student 2005, 2006 & 2007

Professional Activities

(1) Reviewer for *Journal of Materials Chemistry C*

(2) Reviewer for *CrystEngComm*

(3) Reviewer for *Journal of Crystal Growth*

(4) Reviewer for *European Journal of Inorganic Chemistry*

List of Publications

(16). Zeliang Gao; Xiangxin Tian; **Junjie Zhang**; Qian Wu; Qingming Lu; and Xutang Tao, "Large-sized crystal growth and electric-elastic properties of α-$BaTeMo_2O_9$ single crystal" ***Cryst. Growth Des.*** 2015, 15, 759-763.

(15). Zeliang Gao; Youxuan Sun; **Junjie Zhang**; Shanpeng Wang; Xutang Tao, "Investigations of the electro-optic behavior of $Cs_2TeMo_3O_{12}$ single crystal" ***J. Appl. Phys.*** 2014, 116, 043502.

(14). **Junjie Zhang**;* Hong Zheng; Christos D. Malliakas; Jared M. Allred; Yang Ren; Qing'an Li; Tian-Heng Han and J. F. Mitchell, "Brownmillerite $Ca_2Co_2O_5$: Synthesis, Stability, and Re-entrant Single Crystal to Single Crystal Structural Transitions" ***Chemistry of Materials*** 2014, 26, 7172-7182.

(13). Xiaoxiao Feng; **Junjie Zhang**; Zeliang Gao; Shaojun Zhang; Youxuan Sun and Xutang Tao, "Investigation of the second-order nonlinear optical properties of $Cs_2TeMo_3O_{12}$ single crystal" ***Applied Physics Letters*** 2014, 104, 081912.

(12). Shande Liu; **Junjie Zhang**; Zeliang Gao; Shaojun Zhang; Jingliang He; Xutang Tao, "Efficient Raman laser based on bulk α-$BaTeMo_2O_9$ crystals", ***Applied Physics Express*** 2013, 6, 042401.

(11). Zhonghan Zhang, Xutang Tao, **Junjie Zhang**, Youxuan Sun, Chengqian Zhang and Bo Li, "Synthesis, crystal growth, and characterization of the orthorhombic $BaTeW_2O_9$: a new polymorph of $BaTeW_2O_9$", ***CrystEngComm*** 2013, 15, 10197.

(10). Zeliang Gao; Shande Liu; Shaojun Zhang; **Junjie Zhang**; Weiguo Zhang; Shanpeng Wang; Jingliang He; Xutang Tao, "Self-frequency-doubled Raman laser emitting at 589 nm based on the monoclinic single crystal $BaTeBa_2O_9$", ***Optics Express*** 2013, 21, 7821-7827. (**Times Cited: 2**)

(9). Shutong Zhou, Yan Huang, W. Y. Qiu, Y. L. Li, S. M. He, **Junjie Zhang**; B. Zhang, X. S. Chen, X. T. Tao, and W. Lu, "Effects of structure distortion on optical phonon properties of crystalline beta-$BaTeMo_2O_9$—A novel nonlinear optical material: Infrared and Raman spectra as well as first-principles calculations", ***Journal of Applied Physics*** 2013, 114, 233505.

(8). **Junjie Zhang**; Zeliang Gao; Shande Liu; Shaojun Zhang; Xiaoxiao Feng; Peng Zhao; Weiguo Zhang; Jingliang He; and Xutang Tao, "Simultaneous dual-wavelength operation of β-$BaTeMo_2O_9$ Raman laser at 1320 and 1500 nm" ***Applied Physics Express*** 2013, 6, 072701.

(7). **Junjie Zhang**; Zhonghan Zhang; Youxuan Sun; Chengqian Zhang; Xutang Tao, "Anisotropic Thermal Properties of the Polar Crystal $Cs_2TeMo_3O_{12}$" ***Journal of Solid State Chemistry*** 2012, 195, 120-124. (**Times Cited: 2**)

(6). **Junjie Zhang**; Zeliang Gao; Xin Yin; Zhonghan Zhang; Youxuan Sun; Xutang Tao, "Investigation of the dielectric, elastic, and piezoelectric properties of $Cs_2TeMo_3O_{12}$ crystals" ***Applied Physics Letters*** 2012, 101, 062901. (**Times Cited: 2**)

(5). **Junjie Zhang**; Zhonghan Zhang; Youxuan Sun; Chengqian Zhang; Shaojun Zhang; Yang Liu; Xutang Tao, "$MgTeMoO_6$: A Neutral Layered Material Showing Strong Second-harmonic Generation" ***Journal of Materials Chemistry*** 2012, 22, 9921-9927. (**Times Cited: 12**)

(4). **Junjie Zhang**; Zhonghan Zhang; Xutang Tao, "Research advances of novel nonlinear optical crystals based on

second-order Jahn-Teller effects (SOJT)" ***Journal of Shandong University (Natural Science)*** 2011, 46, 99-120. (in Chinese)

(3). **Junjie Zhang**; Zhonghan Zhang; Youxuan Sun; Chengqian Zhang; Xutang Tao, "Bulk crystal growth and characterization of a new polar polymorph of $BaTeMo_2O_9$: α-$BaTeMo_2O_9$" ***CrystEngComm*** 2011, 13, 6985-6990. (**Highlighted in *CrystEngComm* blog**). (**Times Cited: 9**)

(2). **Junjie Zhang**; Zhonghan Zhang; Weiguo Zhang; Qingxin Zheng; Youxuan Sun; Chengqian Zhang; Xutang Tao, "Polymorphism of $BaTeMo_2O_9$: A New Polar Polymorph and the Phase Transformation" ***Chemistry of Materials*** 2011, 23, 3752-3761. (**Times Cited: 31**)

(1). **Junjie Zhang**; Xutang Tao; Youxuan Sun; Zhonghan Zhang; Chengqian Zhang; Zeliang Gao; Haibing Xia; Shengqing Xia, "Top-Seeded Solution Growth, Morphology, and Properties of a Polar Crystal $Cs_2TeMo_3O_{12}$" ***Crystal Growth & Design*** 2011, 11, 1863-1868. (**Times Cited: 12**)

Patents

(1) **ZL 201010297346.4** (**Issued**)

Title: "*High-temperature phase of $BaTeMo_2O_9$, its flux growth and applications*"
Assignee: Shandong University
Inventors: Xutang Tao; **Junjie Zhang**; Weiguo Zhang; Youxuan Sun; Chengqian Zhang; Minhua Jiang

(2) **ZL 201010581219.7** (**Issued**)

Title: "*$Cs_2TeMo_3O_{12}$ single crystals, its flux growth and applications*"
Assignee: Shandong University
Inventors: Xutang Tao; **Junjie Zhang**; Youxuan Sun; Chengqian Zhang; Minhua Jiang

(3) **ZL 201310289259.8** (**Pending**)

Title: "*Polarized prism based on α-$BaTeMo_2O_9$ crystals*"
Assignee: Shandong University
Inventors: Xutang Tao; Zeliang Gao; Qian Wu; **Junjie Zhang**

Presentations and Posters

- **Junjie Zhang**; Hong Zheng; Christos D. Malliakas; Jared M. Allred; Yang Ren; Qing'an Li; Tian-Heng Han and J. F. Mitchell, "Brownmillerite $Ca_2Co_2O_5$: Synthesis, Stability, and Re-entrant Single Crystal to Single Crystal Structural Transitions" ***Oral*** presentation, APS March Meeting, 03/2015, San Antonio, TX, USA

- **Junjie Zhang**, Xutang Tao,* "*Synthesis, Crystal Growth, Characterization and Structure-property Relationships of Alkali/Alkaline-earth Metal Molybdenum Tellurites*", ***invited Oral*** presentation, "Hai You" Doctoral Seminar, 12/2012, Jinan, China

- **Junjie Zhang**, Xutang Tao,* Youxuan Sun, Chengqian Zhang, "*Top-seeded solution growth and Characterization of the multifunctional crystal $Cs_2TeMo_3O_{12}$*", ***Oral*** *presentation*, 16th Chinese Conference on Crystal Growth and Materials (CCCG-16), 10/2012, Hefei, China

- **Junjie Zhang**, Xutang Tao,* Zhonghan Zhang, Youxuan Sun, Chengqian Zhang, "*Synthesis, Growth and Characterization of the Telluromolybdate Nonlinear Optical Crystals*", ***Oral*** *presentation*, The Conference on Technology for Advanced Crystal Growth Equipments, 07/2012, Weihai, Shandong, China

- **Junjie Zhang**, Xutang Tao,* Zhonghan Zhang, Youxuan Sun, Chengqian Zhang, "*Growth and Characterization of the Polar Crystal $Cs_2TeMo_3O_{12}$*", ***Oral*** *presentation*, 2012 Chinese Materials Conference Section H: Functional Crystal Materials, 07/2012, Taiyuan, Shanxi, China

- **Junjie Zhang**, Zhonghan Zhang, Weiguo Zhang, Youxuan Sun, Chengqian Zhang, Xutang Tao,* "*Synthesis, Crystal Growth of α-$BaTeMo_2O_9$ and the relationship between α- and β-$BaTeMo_2O_9$*", ***Poster,*** The 12th Conference on Solid State Chemistry and Inorganic Synthesis (CSSCIS), 06/2012, Qingdao, Shandong, China

- **Junjie Zhang**, Xutang Tao,* Youxuan Sun, Chengqian Zhang, "*Top-seeded solution growth, morphology, and properties of a polar crystal $Cs_2TeMo_3O_{12}$*", ***Poster,*** The 18th American Conference on Crystal Growth(ACCGE-18), 08/2011, Monterey, California, United States

- **Junjie Zhang**, Weiguo Zhang, Xutang Tao,* Youxuan Sun, Chengqian Zhang, "*Growth of high quality $BaTeMo_2O_9$ single crystals*", ***Poster,*** The 16th International Conference on Crystal Growth (ICCG-16), 08/2010, Beijing, China

- Weiguo Zhang, **Junjie Zhang**, Xutang Tao,* Chengqian Zhang, **"***Micro-morphology and Growth Mechanism of the $BaTeMo_2O_9$ crystal*", ***Poster,*** The 15th Chinese Conference on Crystal Growth and Materials (CCCG-15), 11/2009, Ningbo, China

References

- **Dr. John F. Mitchell**

  Materials Science Division, Argonne National Laboratory, 9700 South Cass Avenue, Lemont60439, IL, USA

  Email: mitchell@anl.gov Phone: 1-630-252-5852; Fax: 1-630-252-7777

- **Dr. Xutang Tao**

  Institute of Crystal Materials, Shandong University, 27 South Shanda Road, Jinan 250100, Shandong, China

  Email: txt@sdu.edu.cn Phone: 86-531-88364518; Fax: 86-531-88364518;

- **Dr. Shilie Pan**

  Xinjiang Key Laboratory of Electronic Information Materials and Devices, Xinjiang Technical Institute of Physics & Chemistry, Chinese Academy of Sciences, 40-1 South Beijing Road, Urumqi 830011, China

  E-mail: slpan@ms.xjb.ac.cn Fax: 86-991-3838957 ; Tel: 86-991-3674558