

## Pai-Chun Wei (魏百駿)

**Project Assistant Research Fellow (專案助理研究員)**

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*National Taiwan University*

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### Education

2004-2009

**National Tsing Hua University**

Ph.D. in Materials Science and Engineering

Thesis: Molecular beam epitaxy growth indium nitride thin films and nanomaterials: optical, electrical and thermal properties

2002-2004

**National Tsing Hua University**

MS in Materials Science and Engineering

Thesis: Improvement of the thermal oxidation of buried AIAs using low-temperature grown GaAs

1998-2002

**National Tsing Hua University**

BS in Materials Science and Engineering

### Experience

Oct, 2020 – Present

**Project Assistant Research Fellow**

Center for Condensed Matter Physics, National Taiwan University

Nov, 2017 – Jun, 2020

**Research Scientist**

CEMSE, King Abdullah University of Science and Technology

Aug, 2012 – Oct, 2017

**Post-Doctor Researcher**

Institute of Physic, Academia Sinica

Jan, 2011 – Jul, 2012

**Post-Doctor Researcher**

Institute of atomic and molecular sciences, Academia Sinica

### Expertise

**Thermoelectric alloys and compounds; Thermoelectric phase diagram; Single crystal growth (metals and compounds); Molecular beam epitaxy**

### Other research Interest

**Organic-inorganic perovskites; Inelastic neutron scattering; First-principle molecular dynamic simulations; Superionic compounds**

## Publication

### I. SCI Journal

- 2021 **Pai-Chun Wei**, Cheng-Rong Hsing, Chun-Chuen Yang, Yung-Hsiang Tung, Hsin-Jay Wu, Yen-Chung Lai, Yamei Liu, Wan-Ting Yen, Jey-Jau Lee, Chin-Wei Wang, Hung-Cheng Wu, Hung-Duen Yang, Xiaohe Miao, Venkatesh Singaravelu, Andrea Giugni, Enzo Di Fabrizio, Jui-Han Fu, Vincent Tung, Jian He, Ching-Ming Wei, Jr-Hau He, "Liquid-like silver ions eliciting ultralow thermal conductivity and heat capacity in  $\text{Ag}_8\text{SiTe}_6$  argyrodite" *Submitted*.
- 2021 Dedi, Ping-Chung Lee, **Pai-Chun Wei**, Yang-Yuan Chen, "Thermoelectric characteristics of a single-crystalline topological insulator  $\text{Bi}_2\text{Se}_3$  nanowire" *Nanomaterials*, **Accepted**. (IF: 4.034)
- 2021 Tobias Biesnery,\* Weiwu Li,\* Alexander A. Tsirlin, Seulki Roh, **Pai-Chun Wei**,\* Ece Uykur, Martin Dressel, "Spectroscopic trace of the Lifshitz transition and multi-valley activation in the thermoelectric SnSe under high pressure" *NPG Asia Materials*, **13**, 12. (Corresponding author) (IF: 8.131)
- 2021 Wen-Hsien Li, Chi-Hung Lee, Tsu-Yin Ling, Ma-Hsuan Ma, **Pai-Chun Wei**, Jr-Hau He, Chun-Min Wu, Jen-Chih Peng, Guangyong Xu, Yang Zhao & Jeffrey W. Lynn, "Dual lattice incommensurabilities and enhanced lattice perfection by low-temperature thermal annealing in photoelectric  $(\text{CH}_3\text{NH}_3)\text{PbBr}_3$ " *Physical Review Materials* **5**, 025401. (IF: 3.337)
- 2021 Ashoka Karunaratne, Prakash Parajuli, Gautam Priyadarshan, Sriparna Bhattacharya, Rahul Rao, **Pai-Chun Wei**, Yang Yuang Chen, Apparao M. Rao, Joseph R. Gladden, "Anisotropic elasticity-driven negative thermal expansion in single-crystalline SnSe" *Physical Review B* **103**, 054108. (IF: 3.575)
- 2021 Yi-Fen Tsai<sup>+</sup>, **Pai-Chun Wei**<sup>\*,+</sup>, Liuwen Chang, Kuang-Kuo Wang, Chun-Chuen Yang, Yen-Chung Lai, Cheng-Rong Hsing, Ching-Ming Wei, Jian He, G. Jeffrey Snyder, Hsin-Jay Wu<sup>\*</sup>, "Compositional fluctuations locked by athermal transformation yielding high thermoelectric performance in GeTe" *Advanced Materials* **33**, 2005612 (+Co-first author, Corresponding author, Selected as back cover) (IF: 27.398)
- 2020 Chun-Ho Lin, Ting-You Li, Jing Zhang, Zong-Yi Chiao, **Pai-Chun Wei**, Hui-Chun Fu, Meng-Ju Yu, Ghada H. Ahmed, Boon S. Ooi, Omar F. Mohammed, Yu-Jung Lu, Jr-Hau He, "Designed Growth and Patterning of Perovskite Nanowires for Lasing and Wide Color Gamut Phosphors with Long-Term Stability" *Nano Energy* **104801**. (IF: 16.602)
- 2020 **Pai-Chun Wei**, Chien-Neng Liao, Hsin-Jay Wu, Dongwang Yang, Jian He, Gill V. Biesold-McGee, Shuang Liang, Wan-Ting Yen, Xinfeng Tang, Jien-Wei Yeh, Zhiqun Lin, Jr-Hau He, "Thermodynamic routes to ultra-low thermal conductivity and high thermoelectric performance" *Advanced*

*Materials* **32**, 1906457. (IF: 27.398)

- 2019 C. H. Lee, M. H. Ma, W. H. Li, **P. C. Wei**, Y. Y. Chen, Y. Zhao, J.W. Lynn, “Extremely space and time restricted thermal transport in the high temperature Cmcm phase of thermoelectric SnSe” *Materials Today Physics* **11**, 100171. (IF: 10.443)
- 2019 Hsin-Jay Wu,<sup>\*,+</sup> **Pai-Chun Wei**,<sup>\*,+</sup> Hui-Yi Su, Kuang-Kuo Wang, Wan-Ting Yen, I-Lun Jen, and Jian He “Designing environmentally friendly high-zT Zn<sub>4</sub>Sb<sub>3</sub> via thermodynamic routes” *ACS Applied Energy Materials* **2**, 7564. (+Co-first author, Corresponding author) (IF: 4.473)
- 2019 **Pai-Chun Wei**<sup>\*</sup>, Cheng-Xun Cai, Cheng-Rong Hsing, Ching-Ming Wei, Shih-Hsun Yu, Hsin-Jay Wu, Cheng-Lung Chen, Da-Hua Wei, Duc-Long Nguyen, Mitch M. C. Chou, Yang-Yuan Chen<sup>\*</sup> “Enhancing thermoelectric performance by Fermi level tuning and thermal conductivity degradation in (Ge<sub>1-x</sub>Bi<sub>x</sub>)Te crystals” *Scientific Reports* **9**, 8616 (Corresponding author) (IF: 3.998)
- 2019 Huile Jin<sup>+</sup>; Jun Li<sup>+</sup>, James Iocozzia<sup>+</sup>, Xin Zeng<sup>+</sup>, **Pai-Chun Wei**<sup>+</sup>, Chao Yang, Nan Li, Jr Hau He, Tiejun Zhu, Jichang Wang, Zhiqun Lin, Shun Wang “Hybrid Organic-Inorganic Thermoelectric Materials and Devices” *Angewandte Chemie International Edition* **131**, 2-25 (+Co-First author) (IF: 12.959)
- 2019 **Pai-Chun Wei**, Sriparna Bhattacharya, Yu-Fei Liu, Fengjiao Liu, Jian He, Yung-Hsiang Tung, Chun-Chuen Yang, Cheng-Rong Hsing, Duc-Long Nguyen, Ching-Ming Wei, Mei-Yin Chou, Yen-Chung Lai, Tsu-Lien Hung, Syu-You Guan, Chia-Seng Chang, Hsin-Jay Wu, Chi-Hung Lee, Wen-Hsien Li, Raphael P. Hermann, Yang-Yuan Chen and Apparao M. Rao “Thermoelectric figure-of-merit of fully dense single-crystalline SnSe” *ACS Omega* **4**, 5442. (IF: 2.87)
- 2018 F. Liu, P. Parajuli, R. Rao, **Pai-Chun Wei**, A. Karunarathne, S. Bhattacharya, R. Podila, J. He, B. Maruyama, G. Priyadarshan, J. R. Gladden, Y. Y. Chen, and A. M. Rao “Ponon anharmonicity in single-crystalline SnSe” *Physical Review B* **98**, 224309. (IF: 3.575)
- 2018 Bin Cheng, Ting-You Li, **Pai-Chun Wei**, Jun Yin, Kang-Ting Ho, José Ramón Durán Retamal, Omar F. Mohammed and Jr-Hau He “Layer-Edge Device of two-dimensional Hybrid Perovskites” *Nature Communications* **9**, 5196. (IF: 12.121)
- 2018 Ting-You Li, Bin Cheng, Partha Maity, **Pai-Chun Wei**, Dennis Nordlund, Kang-Ting Ho, Der-Hsien Lien, Chun-Ho Lin, Ru-Ze Liang, Xiaohe Miao, Idris A. Ajia, Jun Yin, Sokaras Dimosthenis, Ali Javey, Iman S. Roqan, Omar F. Mohammed and Jr-Hau He “Extremely reduced dielectric confinement in two-dimensional hybrid perovskites with large polar organics” *Communication Physics* **1**, 80. (IF: 4.684)
- 2018 Ashoka Karunarathne, Joseph R. Gladden<sup>\*</sup>, Gautam Priyadarshan, **Pai-Chun Wei**, Tsu-Lien Hung, Prakash Parajuli, Sriparna Bhattacharya<sup>\*</sup>, Yang-Yuan Chen and Apparao M. Rao, “Room temperature

- resonant ultrasound spectroscopy of single crystalline SnSe”, *ACS Applied Energy Materials* **1**, 6123–6128. (IF: 4.473)
- 2018 Hsin-jay Wu\*, Albert T. Wu, Pai-Chun Wei and Sinn-wen Chen, “Interfacial reactions in thermoelectric modules” *Materials Research Letters* **6**, 244-248. (IF: 6.60)
- 2017 Hsin-Jay Wu, Pai-Chun Wei, Hao-Yen Cheng, Jie-Ru Deng and Yang-Yuan Chen, “Ultralow thermal conductivity in n-type Ge-doped AgBiSe<sub>2</sub> thermoelectric materials” *Acta Materialia* **141**, 217-229. (IF: 7.293)
- 2016 Pai-Chun Wei, S. Bhattacharya\*, J. He, S. Neeleshwar, R. Podila, Y. Y. Chen and A. M. Rao, “The intrinsic thermal conductivity of SnSe”, *Nature* **539**, E1-E2. (IF: 42.778)
- 2016 Tessera Alemneh Wubieneh, Cheng-Lung Chen, Pai-Chun Wei, Szu-Yuan Chen and Yang-Yuan Chen, “The effects of Ge doping on the thermoelectric performance of p-type polycrystalline SnSe”, *RSC Advances* **6**, 114825. (IF: 3.070)
- 2016 Shih-chang Tong, Jyh-Shyang Wang\*, Chii-Bin Wu, Chih-Hung Wu, Jung-Ting Chang, Pai-Chun Wei\*, “The reduction of antiphase boundary defects by the surfactant antimony and its application to the III-V multi-junction solar cells”, *Solar Energy Materials & Solar Cells* **144**, 418. (Corresponding author) (IF: 6.984)
- 2016 Tessera Alemneh Wubieneh, Pai-Chun Wei\*, Szu-yuan Chen, Yang-Yuan Chen\*, “Thermoelectric properties of Zintl phase compounds of Ca<sub>1-x</sub>Eu<sub>x</sub>Zn<sub>2</sub>Sb<sub>2</sub> (0 ≤ x ≤ 1)”, *Journal of Electronic Materials* **45**, 1942. (Corresponding author) (IF: 1.676)
- 2015 Pai-Chun Wei\*, Chun-Chuen Yang, Jeng-Lung Chen, Raman Sankar, Chi-Liang Chen, Chia-Hao Hsu, Chung-Chieh Chang, Cheng-Lung Chen, Chung-Li Dong, Fang-Cheng Chou, Kuei-Hsien Chen, Maw-Kuen Wu, and Yang-Yuan Chen\*, “Enhancement of thermoelectric figure of merit in β-Zn<sub>4</sub>Sb<sub>3</sub> by indium doping control”, *Applied Physics Letters* **107**, 123902. (Corresponding author) (IF: 3.597)
- 2015 Pai-Chun Wei\*, Ta-Sung Huang, Shu-Wei Lin, Guang-Yu Guo, Yang-Yuan Chen\*, “Thermoelectric properties optimization of Fe<sub>2</sub>VGa by tuning electronic density of states via titanium doping”, *Journal of Applied Physics* **118**, 165102. (Corresponding author) (IF: 2.328)
- 2014 Pai-Chun Wei\*, Shih-Chang Tong, Chuan-Ming Tseng\*, Chung-Chieh Chang, Chia-Hao Hsu, and Ji-Lin Shen, “Structural, compositional, and photoluminescence characterization of thermal chemical vapor deposition-grown Zn<sub>3</sub>N<sub>2</sub> microtips”, *Journal of Applied Physics* **116**, 143507. (Corresponding author) (IF: 2.328)
- 2014 Pai-Chun Wei\*, Li-Chyong Chen, and Kuei-Hsien Chen, “Surface diffusion controlled formation of

- high quality vertically aligned InN nanotubes”, *Journal of Applied Physics* **116**, 124301. (Corresponding author) (IF: 2.328)
- 2010 **Pai-Chun Wei**, Surojit Chattopadhyay\*, Min-De Yang, Shih-Chang Tong, Ji-Lin Shen, Chien-Yao Lu, Han-Chang Shih, Li-Chyong Chen, and Kuei-Hsien Chen\*, “Room-temperature negative photoconductivity in degenerate InN thin films with a supergap excitation”, *Physics Review B* **81**, 045306. (IF: 3.575)
- 2010 A. M. Basilio; Y. K. Hsu, C. C. Chang, **Pai-Chun Wei**, A. Ganguly, H. C. Shih, Y. T. Chen, L. C. Chen, K. H. Chen, “Electrochemical Characterization of InN Thin Films for Biosensing Applications”, *Journal of New Materials for Electrochemical Systems* **13**, 337-343 (2010). (IF: 0.259)
- 2009 **Pai-Chun Wei**, Surojit Chattopadhyay\*, Fang-Sheng Lin, Chih-Ming Hsu, Shyankay Jou, Jr-Tai Chen, Ping-Jung Huang, Hsu-Cheng Hsu, Han-Chang Shih\*, Kuei-Hsien Chen and Li-Chyong Chen\*, “Origin of the anomalous temperature evolution of photoluminescence peak energy in degenerate InN nanocolumns”, *Optics Express* **17**, 11690. (IF: 3.669)
- 2008 **Pai-Chun Wei**, Han-Chang Shih\*, Surojit Chattopadhyay\*, Chih-Ming Hsu, Fang-Sheng Lin, Kuei-Hsien Chen, Abhijit Ganguly, and Li-Chyong Chen “Thermal diffusivity study in supported epitaxial InN thin films by the Traveling-Wave technique”, *Journal of Applied Physics* **104**, 064920. (IF: 2.328)
- 2007 J. T. Chen, C. L. Hsiao, H. C. Hsu, C. T. Wu, C. L. Yeh, **Pai-Chun Wei**, L. C. Chen, and K. H. Chen\*, “Epitaxial growth of InN films by molecular-beam epitaxy using hydrazoic acid (HN<sub>3</sub>) as an efficient nitrogen source”, *Journal of Physics Chemistry A*, **111**, 6755. (IF: 2.60)

## II. International Conference and Invited talks

- 2020 (Keynote speaker) **Pai-Chun Wei**, “Exotic lattice dynamics leading to the ultralow thermal conductivity of compound semiconductors” **Taiwan Neutron Science Society Annual Meeting 2020**.
- 2018 **Pai-Chun Wei** and Jr-Hau He “Structure and phase transition in hybrid lead-halide perovskite (CH<sub>3</sub>NH<sub>3</sub>)PbBr<sub>3</sub>”, **Nano 2018** (Oral presentation, Hong Kong)
- 2016 (Invited) **Pai-Chun Wei et al.**, “Thermoelectric properties of single-crystalline SnSe”, **The 35th International Conference & The 1st Asia Conference on Thermoelectrics ICT/ACT**.
- 2014 (Invited) **Pai-Chun Wei et al.**, “Probing the phonon-glass electron-crystal character in high-performance In-doped  $\beta$ -Zn<sub>4</sub>Sb<sub>3</sub>”, **International Union of Materials Research Societies – International Conference on Electronics Materials 2014, Taiwan, June 10-14**.
- 2014 **Pai-Chun Wei et al.**, “Probing the phonon-glass electron-crystal character in thermoelectric  $\beta$ -

- Zn<sub>4</sub>Sb<sub>3</sub> through X-ray absorption spectroscopy”, **The 7th Vacuum and Surface Sciences Conference of Asia and Australia (VASSCAA-7)**.
- 2013 **Pai-Chun Wei**, *et al.*, “High Thermoelectric Figure of Merit and Nanostructuring in Bulk *p*-type β-Zn<sub>4</sub>Sb<sub>3</sub>”, **The 32nd International Conference on Thermoelectrics, Japan, June 30 – July 4**.
- 2007 **Pai-Chun Wei**, *et al.*, “Epitaxial Growth of InN Films by Molecular-beam Epitaxy Using Hydrazoic Acid (HN<sub>3</sub>) as an Efficient Nitrogen Source” **2007 European Materials Research Society Fall Meeting, September 17-21**.
- 2007 Chih-Ming Hsu, **Pai-Chun Wei**, Li-Chyong Chen, and Kuei-Hsien Chen, “Thermal Diffusivity in InN and GaN Thin Films” **2007 European Materials Research Society Fall Meeting, September 17-21**.
- 2006 C. Y. Lu, R. S. Chen, M. T. Lee, **Pai-Chun Wei**, K. H. Chen, and L. C. Chen, “Photoconductivity and Persistent Photoconductivity in GaN Nanowire”, **International Workshop on Nitride Semiconductors in 2006, October 22-27**.
- 2006 Ching-Lien Hsiao, Jr-Tai Chen, **Pai-Chun Wei**, Kuei-Hsien Chen, and Li-Chyong Chen, “The Use of Hydrazoic Acid (HN<sub>3</sub>) as an Efficient Nitrogen Source for High Quality InN Growth at Low Temperature”, **International Workshop on Nitride Semiconductors in 2006, October 22-27**.

### III. Other publications

- 2017 **魏百駿**, “導電不導熱的熱電材料新契機” **科學月刊 568 期**
- 2016 葉建志, 柯心怡, **魏百駿**, 徐瑋宏, “雷射閃光法熱導率量測技術的介紹” **量測資訊 171, pp.55-59**
- 2008 施智超, 方偉權, 呂明生, **魏百駿**, 林麗瓊, “薄膜熱傳導特性應用分析技術介紹” **工業材料雜誌 八月號, pp.144**.
- 2005 葉俊樑, 陳瑞山, 蕭慶廉, 吳建霆, **魏百駿**, 陳貴賢, 林麗瓊, 周賢鎧, “Indium Nitride Thin Film Growth Using Chemical Beam Epitaxy”, **真空科技, 18, pp.96**.

### Journal referee

*Science; Journal of Materials Chemistry A; iScience; Applied Physics Letters; Scientific report; Journal of Applied Physics; Crystal Growth & Design; Journal of Crystal Growth; Journal of Materials Science; JOM; Journal of Materiomics; Materials Science in Semiconductor Processing, etc.*