



The 35<sup>TH</sup> INTERNATIONAL CONFERENCE &  
The 1<sup>ST</sup> ASIAN CONFERENCE ON THERMOELECTRICS  
(ICT /ACT 2016)



第35届国际热电大会暨第一届亚洲热电会议

MAY 29–JUNE 2, 2016 WUHAN, CHINA

**CONFERENCE PROGRAM**





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The 1<sup>ST</sup> ASIAN CONFERENCE ON THERMOELECTRICS  
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## Conference Information

**The 35<sup>th</sup> International Conference on Thermoelectrics &  
The 1<sup>st</sup> Asian Conference on Thermoelectrics  
(ICT/ACT 2016)**

- Date** May 29 (Sunday) to June 2 (Thursday), 2016
- Venue** Wanda Reign Hotel Wuhan & Wanda Realm Hotel Wuhan  
138 Donghu Rd, Wuchang District, Wuhan, Hubei P. R. China
- Organizer** Wuhan University of Technology
- Co-organizer** Shanghai Institute of Ceramics, CAS  
Zhejiang University  
Tsinghua University
- Member Societies** International Thermoelectric Society  
Asian Association on Thermoelectrics  
Chinese Material Research Society  
Chinese Thermoelectric Society
- Supporters** Ministry of Science and Technology of P. R. China  
Ministry of Education of P. R. China  
National Natural Science Foundation of P. R. China  
The People's Government of Hubei Province  
The People's Government of Wuhan Municipality

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Conference Honorary Chairman: Prof. Qingjie Zhang

Conference Chairman: Prof. Xinfeng Tang

### Organizing Committee

Name	Affiliation
Prof. Xinfeng Tang	Wuhan University of Technology, China
Prof. Lidong Chen	Shanghai Institute of Ceramics, CAS, China
Prof. Xinbing Zhao	Zhejiang University, China
Prof. Jingfeng Li	Tsinghua University, China
Prof. Wenqing Zhang	Shanghai University, China
Prof. Kefeng Cai	Tongji University, China
Prof. Jiaqing He	South University of Science and Technology of China, China
Dr. Yonggao Yan	Wuhan University of Technology, China
Dr. Xianli Su	Wuhan University of Technology, China

### International Advisory Board

Name	Affiliation
Prof. Ctirad Uher	University of Michigan, USA
Prof. Donald T. Morelli	Michigan State University, USA
Prof. Terry Tritt	Clemson University, USA
Prof. Jeff Snyder	Northwestern University, USA
Prof. Jihui Yang	University of Washington, USA
Prof. Gang Chen	Massachusetts Institute of Technology, USA
Prof. Mercouri G. Kanatzidis	Northwestern University, USA
Prof. Zhifeng Ren	University of Houston, USA
Dr. Qiang Li	Brookhaven National Laboratory, USA
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Prof. Yuri Grin	Max Plank Institute, Germany

**International Advisory Board**

Prof. Alexander Burkov	Ioffe Physical-Technical Institute of the Russian Academy of Sciences, Russia
Prof. Mike Reece	Queen Mary University of London, UK
Prof. Lasse Rosendahl	Aalborg University, Denmark

**Scientific Program Committee**

<b>Name</b>	<b>Affiliation</b>
Prof. Ferdinand Poudeu Poudeu	University of Michigan, USA
Prof. Jian He	Clemson University, USA
Prof. Xun Shi	Shanghai Institute of Ceramics, CAS, China
Prof. Tiejun Zhu	Zhejiang University, China
Prof. Yanzhong Pei	Tongji University, China
Prof. Lidong Zhao	Beihang University, China
Prof. Guoyu Wang	Chongqing Institute of Green and Intelligent Technology, Chinese Academy of Sciences, China
Prof. Wenyu Zhao	Wuhan University of Technology, China
Dr. Yonggao Yan	Wuhan University of Technology, China
Dr. Xianli Su	Wuhan University of Technology, China



## Sponsors & Exhibitors

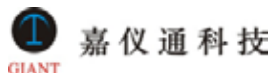
The organizing committee would like to thank our Sponsors and Exhibitors for the support of the conference.

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### GOLD SPONSOR

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Wuhan Giant Science & Technology Co., Ltd.



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### SILVER SPONSOR

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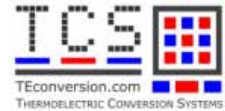
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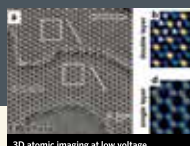


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Hangzhou Dahe Thermo-Magnetics Co., Ltd



# Titan™ Themis G2



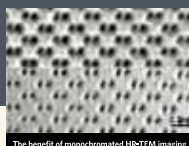
3D atomic imaging at low voltage

Reconstructed phase image of graphene double and single sheet acquired at 80 kV. A contrast difference between a top and bottom layer single carbon atom in the double sheet is resolved.



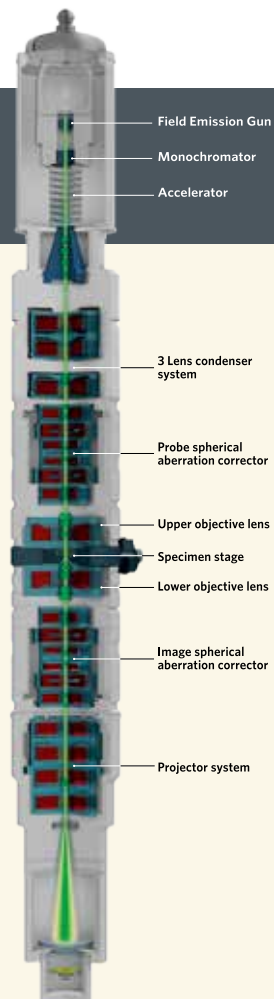
Sub-Angstrom HR-TEM imaging at 300 kV

HR-TEM image of Ge[112] acquired at 300 kV using a monochromator. The dumbbell distance of 81 pm is resolved. A negative Cs value was chosen to enhance the contrast.



The benefit of monochromated HR-TEM imaging

Comparison between a Cs-corrected HR-TEM image with and without the use of a monochromator. The improvement in resolution in Ge[110] is clearly visible in the lower image.



# 变革材料研发到产品创制的新型SPS系统 提供从基础研发到成品试制的多元机型配套

New SPS system Renovating "Manufacturing" from the stage of materials  
Wide range of models applicable to the fields from basic research to trial productions

## 小型台式SPS系统 Small size Tabletop type SPS system

**LABOX™-100 series**  
**LABOX™-300 series**

"高性能、易操作、紧凑化"的设计理念  
凝聚了新材料研发中不可或缺的功能  
The principal is "High-Performance & Simple Operation"  
Major functionalities needed for the development of advanced materials are integrated in the compact hardware.



LABOX-315 (高配机型示例)  
LABOX-315 with option item

## 中型SPS系统 The principal is "High-Performance & Simple Operation"

**LABOX™-600 series**  
**LABOX™-1500 series**  
**LABOX™-3000 series**

应用广泛的研发用标准机系列  
Standard models for R & D of versatile applications

## 带手套操作箱的SPS系统 SPS System with Glove Box

**LABOX™ GH series**

从粉末充填到烧结制备、整个过程可在无氧环境中进行  
SPS process is possible to complete from powder filling to sintering without exposing in the atmosphere.



LABOX-325GH (高配机型示例)  
LABOX-325GH (with option item)



LABOX-1575 (高配机型示例)  
LABOX-1575 with option item

## LABOX系列SPS主要技术参数 Basic Specifications of LABOX-series

型号	LABOX-110	LABOX-125	LABOX-315	LABOX-325	LABOX-625	LABOX-650	LABOX-1550	LABOX-1575	LABOX-3050	LABOX-3010K
最大烧结压力 Maximum Sintering Pressure	10kN [1.02tonf]		30kN [3.06tonf]		60kN [6.12tonf]		150kN [15.3tonf]		300kN [30.6tonf]	
压缩行程 Z-axis Stroke	50mm (开放高度150mm) 50mm (Open height 150mm)		80mm (开放高度200mm) 80mm (Open height 200mm)		150mm (开放高度250mm) 150mm (Open height 250mm)		150mm (开放高度250mm) 150mm (Open height 250mm)		180mm (开放高度280mm) 180mm (Open height 280mm)	
加压控制方式 Pressurizing Control System	AC伺服电机纵一轴高精度加压控制 Vertically Single Axis Press with AC Servo Motor									
烧结工作台规格 Table Size	φ 70mm		φ 90mm		φ 90mm		φ 150mm		φ 200mm	
最高温度 Maximum Temperature	2500°C (常用工作温度2200°C) ※ 2500°C (2200°C for normal use)									
最大脉冲直流输出 Maximum Pulse Current Output	1200A	2500A	1500A	2500A	2500A	5000A	5000A	7500A	5000A	10000A

※标准机型均采用伺服电机加压控制和直流脉冲变频电源

※Standard machines are with AC servo motor for pressure control and Inverter Pulse Current Power Supply for sintering current.

制造商

**SL SINTER LAND** New Materials & Sintering 123, Amaike, Nagaoka, Niigata, 940-2055 JAPAN  
SINTER LAND INC., Tel: (+81) 258-25-8008 / www.sinterland.jp

中国国内服务机构 广州精思立贸易有限公司

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Tel: (+81) 45-475-1611 www.njs-japan.co.jp

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东方电子

# 香河东方电子有限公司

## XIANGHE ORIENTAL ELECTRONIC CO.,LTD.



### 公司介绍

### Company profile

### 产品介绍

### Product introduction

香河东方电子有限公司是一家集新品研发、生产加工、市场销售的高新技术企业，主要产品有半导体致冷器件、小型制冷系统、温差发电器件等，年产量200万只。质量管理体系符合ISO9001-2008标准，产品符合欧盟Rohs和Reach要求。香河东方电子有限公司热诚欢迎各界前来参观、考察、洽谈业务。

Orient Electric is engaged in designing, developing and producing thermoelectric cooling module (TEMS) and TEMS application products. The Company occupies an area of 20,000 m2 with a covered area of 10,000 m2 There are 150 employees serving for the Company, amongst them 25 are technical staffs. The Company has successfully obtained ISO9001 and SGS and Rohs and Reach .

#### ■ 致冷组件 Thermoelectric cooling module



#### ■ 温差发电器件 Thermoelectric generation module



#### 产品证书 Product certificate

#### ■ 异型定制 Profiled custom



#### ■ 联系我们 Contact us



电话 ( Tel ) : +86-0316-8580378  
 传真 ( Fax ) : +86-0316-8327666  
 邮箱 ( E-mail ) : xhdfdz@163.com  
<http://www.xhdfdz.com.cn>



## Conference Venue

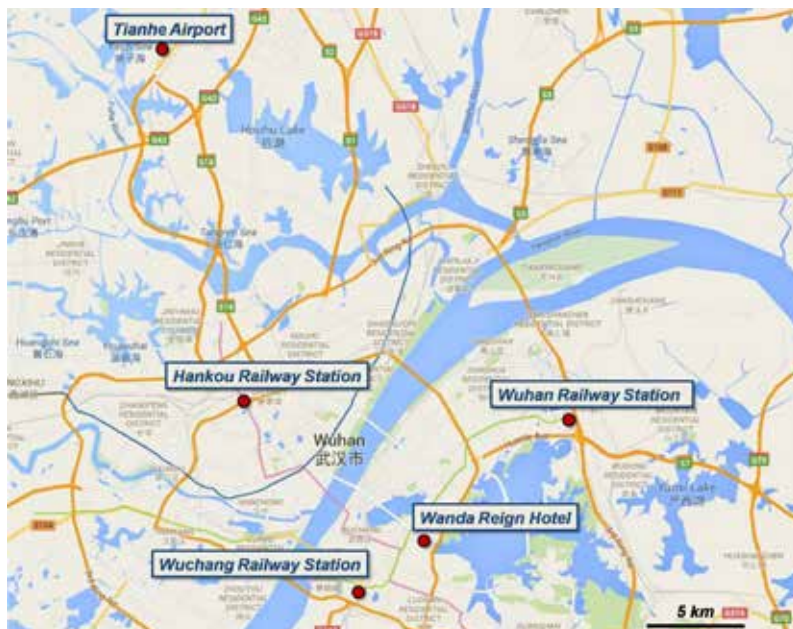
ICT/ACT 2016 will be held at the Wanda **Reign** Hotel Wuhan and the Wanda **Realm** Hotel Wuhan, 138 Donghu Road, Shuiguohu Street, Wuchang, Wuhan, China, which are opposite to each other. Wanda Reign Hotel Wuhan is one of the premier hotel in the central China, located in between South of Chu River & Han Street and North of East Lake & Shuiguo Lake. Nearby there are a lot of options for dining and entertainment. **The plenary sessions and oral sessions** will be held in the Wanda **Reign** Hotel Wuhan. **The poster session** will be held in the Wanda **Realm** Hotel Wuhan.



*Wanda Reign Hotel Wuhan( 武汉万达瑞华酒店 )*  
*138 Donghu Road, Shuiguohu Street, Wuchang, Wuhan, China*  
武汉市 武昌区 水果湖东湖路 138 号



## Roadmap



Relative location for Wuhan Tianhe Airport, Hankou Railway Station, Wuhan Railway Station and Wuchang Railway Station. Copyright: [www.google.com](http://www.google.com)



Roadmap near the Conference Venue. Copyright: [www.google.com](http://www.google.com)



## Access

Free Shuttle service will be provided from Wuhan Tianhe Airport to conference venue (Wanda Reign Hotel Wuhan) every hour on the 29<sup>th</sup> of May beginning at 10 am and the last shuttle will leave the airport at 11 pm. There will be some staff holding an “ICT/ACT 2016” sign and waiting for you at the domestic arrival gate.

If you arrive in Wuhan via high speed train, we strongly recommend you take taxi from Railway Station to Wanda Reign Hotel Wuhan. Please tell the driver your destination (Wanda Reign Hotel Wuhan, “武汉万达瑞华酒店” in Chinese). Taxis run all day and night.

Three passenger railway stations in the city are located separately, with Wuhan and Wuchang Railway Stations in the town of Wuchang, and Hankou Railway Station in the town of Hankou. It takes about 30 minutes and costs you about CNY 40 from Wuchang Railway Stations to conference venue. It takes about 30 minutes and costs you about CNY 40 from Wuhan Railway Station to conference venue. It takes about 50 minutes and costs you about CNY 120 from Hankou Railway Station to conference venue.

For more information and help, you can call the local organizer or request helps from a person nearby. The following sign/interpretation will be helpful for you.

Please take me to Wanda Reign Hotel Wuhan  
Address: 138 Donghu Road, Shuiguohu Street, Wuchang, Wuhan, China  
请到武汉市武昌区水果湖街东湖路 138 号万达瑞华酒店

## Registration desk (Lobby of Wanda Reign Hotel Wuhan, 1F)

May 29, 2016	14:00-22:00
May 30, 2016	07:00-21:00
May 31, 2016	07:00-18:00
June 1, 2016	08:00-18:00
June 2, 2016	08:00-15:00

**Contact Person:** Yonggao Yan

Tel: +86-133-9714-3561

E-mail: yanyonggao@whut.edu.cn

### Registration fee on site

Regular:	USD 850
Students:	USD 550
Accompany Person:	USD 350

### Registration fee for regular participants and students includes

Attendance of all scientific sessions, access to conference facilities, program booklet, welcome reception (+drinks), conference banquet (+drinks), night cruise on Yangtze and Han rivers, coffee, tea and refreshments during conference breaks as well as four business lunch buffets including beverages.

### Registration fee for accompany person includes

Welcome reception (+drinks), banquet (+drinks), night cruise on Yangtze and Han rivers, four business lunch buffets including beverages as well as guided tour to the Yellow Crane Tower and Wuhan botanical garden (additional tours can be arranged with an extra charge).

### Industrial exhibition

The Industrial Exhibition will take place throughout the whole conference. The Industrial exhibition is held in the Grand Ballroom Foyer and VIP Room on the third floor of Wanda Reign Hotel Wuhan. It will be open from 08:00 to 18:00 from Monday to Thursday.

### Electricity

The 220 volts AC current and three-prong or two-prong outlets are used in China (see the image in the right). It is suggested to bring an adapter with you if it does not match the plug of your electrical equipment.



### Telephone and internet service

Please check your mobile provider to make sure your phone will work in China. Or if you might need some special arrangements before traveling.

Free Wi-Fi is available in conference venue.

### Climate

Wuhan has a comfortable climate in late May and early June and temperature ranges between 23°C – 28°C (73°F – 82°F). An umbrella is needed as its local rainy season in May and June.





### Guideline for oral presentation

1. Presentation rooms:
  - Grand Ballroom (3F, Wanda **Reign** Hotel Wuhan)
  - Ballroom 2 (3F, Wanda **Reign** Hotel Wuhan)
  - Ballroom 3 (3F, Wanda **Reign** Hotel Wuhan)
  - Hong Kong Room (2F, Wanda **Reign** Hotel Wuhan)
2. A laptop computer / projector will be provided to all oral presenters.
3. Please check dates and times of your contribution at the scientific program.  
Please bring your presentations on powerpoint .ppt or Acrobat .pdf files.
4. Please be sure to load you file or data (in USB or CD) at least 30 min before your presentation. It purposes to confirm the operation of your data with the projector.
5. Duration of talks including time for discussion:
  - Oral presentations: 12 minutes (including 3 minutes for discussion)
  - Invited talks: 24 minutes (including 4 minutes for discussion)
  - Keynote lectures: 40 minutes (including 5 minutes for discussion)

### Guideline for poster session presentation

1. Presentation venue: Wanda **Realm** Hotel Wuhan
2. Presentation rooms: Poster Session Room (Grand Ballroom, 3F)
3. Please place your poster on Tuesday between 10:00 am to 21:00 pm. Please do not remove your poster until the Poster Award period will finish on Wednesday 21:00 pm. The organizing committee is not responsible for posters which have not removed by this time.
4. Poster boards will be labeled with numbers corresponding to the poster number assigned in the programs. A poster must fit in a space of 120 cm in height and 90 cm in width or smaller. Please also be reminded there will be no poster printing facilities at the conference site.
5. During the poster session authors are kindly asked to be present in the area of their posters in order to answer questions that interested viewers may have.

### Proceedings

The ICT2016 proceedings will be published as a special issue of the Journal of Electronic Materials (JEM).

### Official language

The conference language is English.



### **Name badges**

Participants and accompanying persons are required to wear the official conference name badge on all conference occasions. Without name badge no entrance!

### **Tourism information**

At the registration desk in the Lobby of Wanda **Reign** Hotel Wuhan (1F), we will have a tourism information desk for those who wish to explore the city.

### **Conference staff**

Conference staffs and student volunteers will be on hand to assist you with any conference-related issues and questions. Please look for special **“yellow” T-shirt**.

### **Emergency medical care**

At the registration desk in the Lobby of Wanda **Reign** Hotel Wuhan (1F), we will have a Emergency medical care desk.



### Welcome Evening

Date: Sunday, May 29, 2016  
Time: 18:00-20:00  
Place: Wanda **Reign** Hotel Wuhan, Grand Ballroom, 3F  
Cost: Included in registration fee

### Excursion

Excursion includes Night cruising on Yangtze and Han Rivers and Hankou Yangtze River Beach Park.

Date: Tuesday, May 31, 2016  
Time: 16:30-21:00  
Assembling Place: At the gate of Wanda **Reign** Hotel Wuhan  
Cost: Included in registration fee

The buses to the Hankou Yangtze River Beach Park will be available at the gate of Wanda Reign Hotel Wuhan at 16:30.

We will board a ship at 18:00 from the dock near the Hankou Yangtze River Beach Park. The Cruising ship will sail at 18:30 and return around 20:00. Please bring your name badge.

During the cruise, buffet and drinks will be served.



### Award ceremony & banquet

Date: Wednesday, June 1, 2016

Time: 18:30-21:00

Place: Wanda **Reign** Hotel Wuhan, Grand Ballroom, 3F

Cost: Included in registration fee

On Wednesday evening, the conference Diner and award ceremony will be held as the social highlight of the ICT/ACT to give you the opportunity for social networking and to reminisce about the conference. You will enjoy a delicious Chinese food and Chinese traditional show.

### Accompany persons' program

Excursion to the Yellow Crane Tower and Wuhan botanical garden

Date: Monday, May 30, 2016

Time: 9:00-17:00

Assembling Place: At the gate of Wanda Reign Hotel Wuhan

Cost: Included in registration fee of accompany person

### Wuhan Botanical Garden

The Wuhan Botanical Garden (WBG) of the Chinese Academy of Sciences (CAS) was founded in 1956 and opened to the public in 1958. As one of three research-oriented botanical gardens in China, WBG's mission is to develop and maintain plant collections for display, conservation, education and research.

### Yellow Crane Tower

Yellow Crane Tower, located on Snake Hill in Wuchang, is one of the Three Famous Towers South of Yangtze River (the other two: Yueyang Tower in Hunan





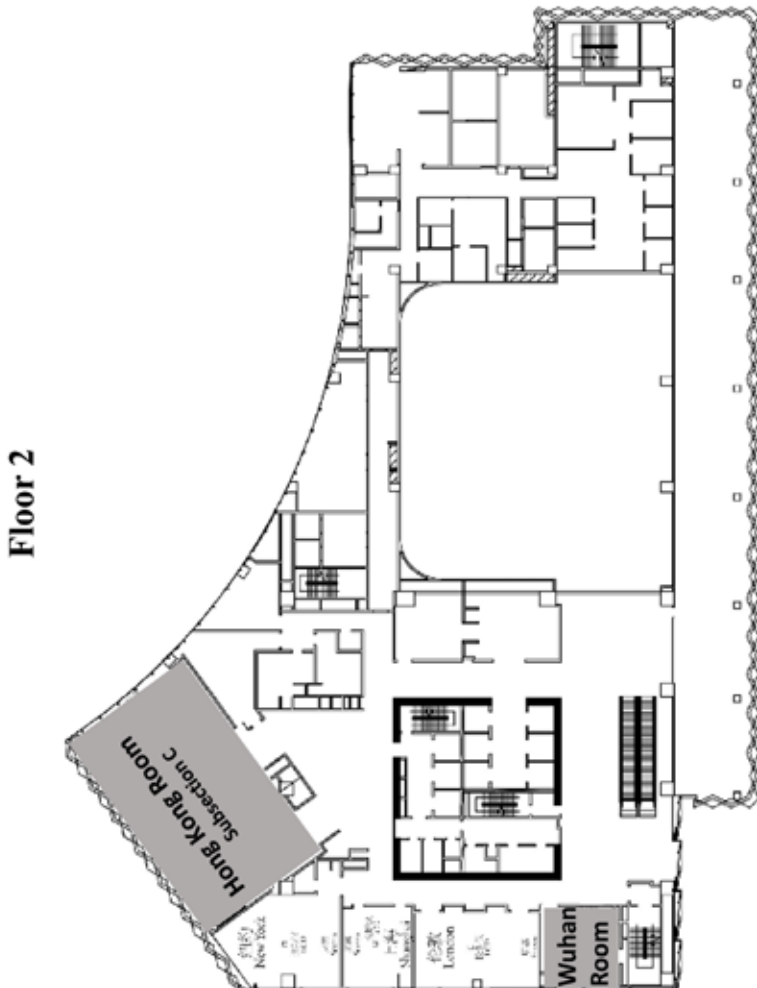
and Tengwang Tower in Jiangxi). Yellow Crane Tower is regarded as the symbol of Wuhan city.

### Lunch

Lunch will be provided in Wanda Reign Hotel Wuhan (1F) and Wanda Realm Hotel (1F). Please check the detailed place for Lunch on your lunch ticket.

### Floor plan

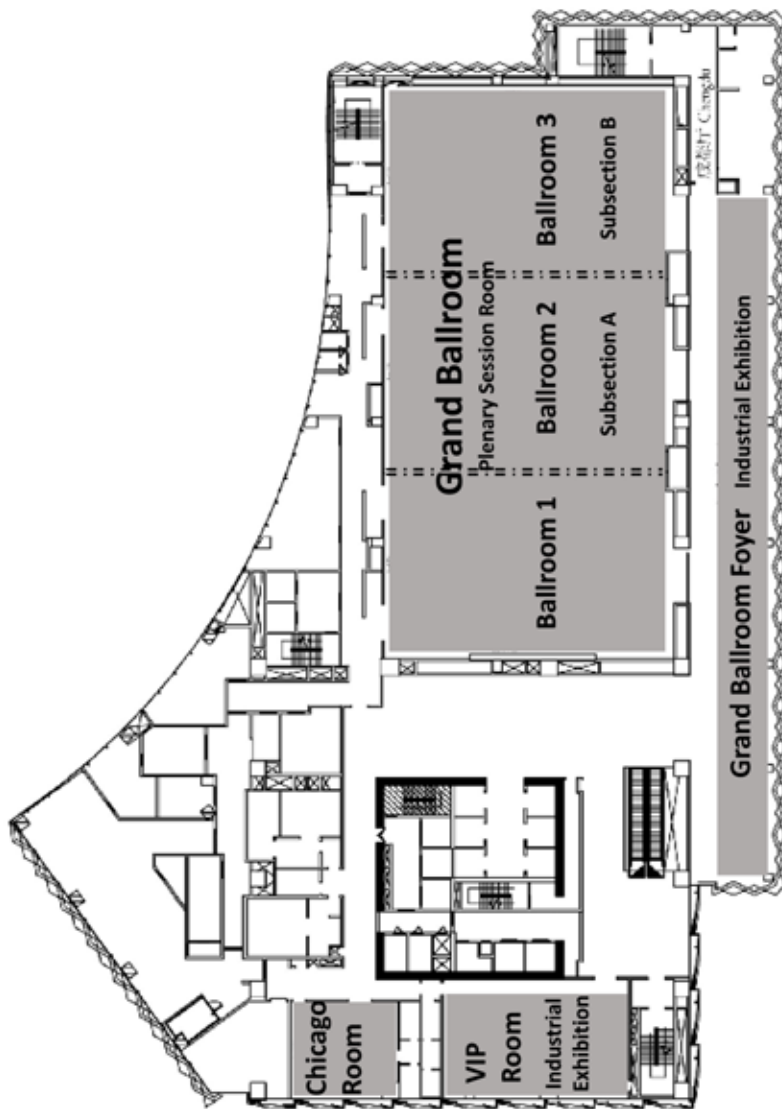
#### Wanda Reign Hotel Wuhan





Floor plan  
Wanda Reign Hotel Wuhan

**Floor 3**





Floor plan  
Wanda Realm Hotel Wuhan

Floor 3





## On Foundation of Asian Association of Thermoelectrics

Asian Association of Thermoelectrics (AAT) is starting today from the combined efforts of the Chinese Thermoelectric Society, the Thermoelectrics Society of Japan and the Korean Thermoelectric Society. AAT is a non-profit scientific association and aims to represent the interests of everyone involved in thermoelectricity. The aim of AAT is to promote cooperation and the exchange of information and ideas between individuals and groups working on or with interest in thermoelectricity in Asia, and also to raise the public awareness of thermoelectricity and its applications.

The delegates from the thermoelectric societies of China, Japan and Korea gathered together in Shenzhen, China, in April 2015, and discussed the scopes toward the formation of AAT. The details about AAT was further discussed and determined by the organizing committee meeting during ICT 2015 in Dresden, Germany.

The activities and affairs of AAT shall be conducted and all corporate powers shall be exercised by or under the direction of the board. The board of AAT shall consist of nine to fifteen members as the delegate(s) from the adhering bodies, and the delegate(s) shall be determined by the governance body of the adhering societies. Board members are expected to participate consistently in all activities of the board and annual meeting of AAT. Three from each of the original member societies were determined as the initial board members: Lidong Chen, Xinbing Zhao, and Xinfeng Tang from the Chinese Thermoelectric Society; Takao Mori, Ryoji Funahashi, and Michitaka Ohtaki from the Thermoelectrics Society of Japan; Wonseon Seo, Sudong Park, and Wooyoung Kim from the Korean Thermoelectric Society. The board determines the executive committee of AAT, and the first executive committee is composed of Lidong Chen from China as the President, Takao Mori from Japan and Wonseon Seo from Korea as the Vice-Presidents.

Holding the Asian Conferences on Thermoelectrics (ACT) and short course schools is among the major activities of AAT. The 1<sup>st</sup> ACT is combined with ICT 2016, and AAT appreciates the great help from the organizing committee of ICT 2016. The first summer school on thermoelectrics would be held on May 29<sup>th</sup>, 2016, in Wuhan. More than 80 young researchers and students from academia and industries participate in the 1<sup>st</sup> AAT summer school. The 2<sup>nd</sup> ACT will be held in Kyoto, Japan, in 2017, as the thermoelectric symposium of IUMRS-ICAM 2017. All researchers and students in Asia in the field of thermoelectricity will be welcome to the 2<sup>nd</sup> ACT.





## Important Issues for the Societies

### 1. International Thermoelectric Society board meeting on Sunday

Time: 14:00-17:00, Sunday, May 29, 2016  
Place: Wuhan Room, Wanda Reign Hotel Wuhan 2F  
Participants: Board members of ITS

### 2. International Thermoelectric Society board meeting on Wednesday

Time: 15:30-17:30, Wednesday, June 1, 2016  
Place: Wuhan Room, Wanda Reign Hotel Wuhan 2F  
Participants: Board members of ITS

### 3. Vote for new board members of International Thermoelectric Society (ITS)

Fill in the ballot ticket and put in the selected box on Registration Desk during 9:00-16:30 on 31 May, 2016.

Time: 9:00-16:30, Tuesday, May 31, 2016  
Place: Wanda Reign Hotel Wuhan, Registration desk, 1F  
Participants: All Attendees

### 4. Vote for executive directors and new board members for Chinese Thermoelectric Society (CTS)

Fill in the ballot ticket and put in the selected box on Registration Desk during 9:00-17:00 on 30 May, 2016.

Time: 9:00-17:00, Monday, May 30, 2016  
Place: Wanda Reign Hotel Wuhan, Registration desk, 1F  
Participants: Chinese Attendees

### 5. Asian Association of Thermoelectrics (AAT) first board meeting

Time: 15:00-16:00, Monday, May 30, 2016  
Place: Chicago Room, Wanda Reign Hotel Wuhan 3F  
Participants: Board members of AAT

### 6. Chinese Thermoelectric Society (CTS) second board meeting

(中国材料研究学会热电材料及应用分会第二届理事会第二次会议)

Time: 15:30-16:30, Tuesday, May 31, 2016  
Place: Chicago Room, Wanda Reign Hotel Wuhan 3F  
Participants: Board members of CTS



## AAT Summer School

**Time: 9:00-17:00**

**Place: Hong Kong Room**

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- |             |   |
|-------------|---|
| AAT1        | Wenqing Zhang, Shanghai University, China   |
| 9:00-10:15  | On the tuning of electrical and thermal transport in thermoelectrics                              |
| 10:15-10:30 | Coffee Break  |
| AAT2        | Min-Wook Oh, Hanbat National University, South Korea  |
| 10:30-11:45 | Computational thermoelectric properties and materials   |
| 11:45-13:30 | Lunch   |
| AAT3        | Jiaqing He, South University of Science and Technology of China, China                            |
| 13:30-14:45 | Structural characterization and structure-property correlation of thermoelectric materials        |
| 14:45-15:00 | Coffee Break  |
| AAT4        | Tsutomu Kanno, Panasonic Corporation, Japan   |
| 15:00-16:15 | Device consideration for applications in power generation, radiation sensing, and Peltier cooling |
| 16:15-17:00 | Coffee Break  |



	Sunday, May 29	Monday, May 30	Tuesday, May 31	Wednesday, June 1	Thursday, June 2
08:00-08:30					
08:30-09:00				Subsection 8 <b>Award &amp; Plenary</b>	Subsection 11A <b>Slide</b>
09:00-09:30		Subsection 1 <b>Opening &amp; Plenary</b>	Subsection 5 <b>Plenary</b>	<b>Coffee Break</b>	<b>Coffee Break</b>
09:30-10:00		<b>Coffee Break</b>	<b>Coffee Break</b>		
10:00-10:30				Subsection 9A <b>Cu<sub>2</sub>X-based materials</b>	Subsection 12A <b>Chalcogenide 2</b>
10:30-11:00			Subsection 6A <b>Organic thermoelectric material 1</b>		
11:00-11:30		Subsection 2A <b>Half Heusler</b>		<b>Lunch</b>	
11:30-12:00					
12:00-12:30					
12:30-13:00		<b>Lunch</b>	<b>Lunch</b>		<b>Lunch</b>
13:00-13:30					
13:30-14:00					
14:00-14:30		Subsection 3A <b>Chalcogenide 1</b>	Subsection 7A <b>Skutterudite &amp; Clathrates</b>	Subsection 10A <b>SnSe and related materials</b>	Subsection 13 <b>Close &amp; Plenary</b>
14:30-15:00					
15:00-15:30					
15:30-16:00		<b>Coffee Break</b>	<b>Coffee Break</b>	<b>Coffee Break</b>	
16:00-16:30	<b>Registration</b>	<b>Coffee Break</b>	<b>Coffee Break</b>		
16:30-17:00		Subsection 4A <b>New thermoelectric material</b>	<b>Poster Session</b>		
17:00-17:30				<b>Poster Session</b>	
17:30-18:00			Excursion		
18:00-18:30			Hankou Yangtze River Beach Park & Night cruising on Yangtze River and Han River		
18:30-19:00	<b>Welcome Reception</b>				
19:00-19:30				<b>Banquet Award ceremony &amp; Conference Dinner</b>	
19:30-20:00					
20:00-20:30					
20:30-21:00					

	Sunday, May 29	Monday, May 30	Tuesday, May 31	Wednesday, June 1	Thursday, June 2
08:00-08:30					
08:30-09:00		Subsection 1 Opening & Plenary	Subsection 5 Plenary	Subsection 8 Award & Plenary	Subsection 11B Bismuth telluride and related materials 2
09:00-09:30				Coffee Break	
09:30-10:00		Coffee Break	Coffee Break	Coffee Break	Coffee Break
10:00-10:30				Subsection 9B Organic thermoelectric material 2	Subsection 12B Material development strategies 2
10:30-11:00		Subsection 2B Materials development strategies 1	Subsection 6B Theory		
11:00-11:30					
11:30-12:00					
12:00-12:30					
12:30-13:00		Lunch	Lunch	Lunch	Lunch
13:00-13:30					
13:30-14:00					
14:00-14:30		Subsection 3B Measurements and simulations	Subsection 7B Nano materials 2	Subsection 10B Bismuth telluride and related materials 1	Subsection 13 Close & Plenary
14:30-15:00					
15:00-15:30					
15:30-16:00	Registration	Coffee Break	Coffee Break	Coffee Break	
16:00-16:30			Poster Session		
16:30-17:00		Subsection 4B Nano materials 1	Excursion	Poster Session	
17:00-17:30			Hankou Yangtze River Beach Park & Night cruising on Yangtze River and Han River		
17:30-18:00					
18:00-18:30	Welcome Reception				
18:30-19:00					
19:00-19:30					
19:30-20:00				Banquet Award ceremony & Conference Dinner	
20:00-20:30					
20:30-21:00					



	Sunday, May 29	Monday, May 30	Tuesday, May 31	Wednesday, June 1	Thursday, June 2
08:00-08:30					
08:30-09:00				Subsection 8 <b>Award &amp; Plenary</b>	Subsection 11C <b>Strategies for high performance thermoelectrics</b>
09:00-09:30		Subsection 1 <b>Opening &amp; Plenary</b>	Subsection 5 <b>Plenary</b>	Coffee Break	Coffee Break
09:30-10:00		Coffee Break	Coffee Break		
10:00-10:30				Subsection 9C <b>Oxides</b>	Subsection 12C <b>Thermoelectric generators 2</b>
10:30-11:00		Subsection 2C <b>Thermoelectric generators 1</b>	Subsection 6C <b>Material development strategies 3</b>		
11:00-11:30				Lunch	Lunch
11:30-12:00					
12:00-12:30		Lunch	Lunch		
12:30-13:00					
13:00-13:30					
13:30-14:00				Subsection 10C <b>Oxides &amp; Chalcogenide</b>	Subsection 13 <b>Close &amp; Plenary</b>
14:00-14:30		Subsection 3C <b>Space applications &amp; power generator</b>	Subsection 7C <b>Module and related Applications</b>		
14:30-15:00				Coffee Break	
15:00-15:30		Coffee Break	Coffee Break		
15:30-16:00	Registration		Poster Session		
16:00-16:30		Subsection 4C <b>Measurement technique and Module</b>	Excursion		
16:30-17:00			Hankou Yangtze River Beach Park & Night cruising on Yangtze River and Han River	Poster Session	
17:00-17:30					
17:30-18:00					
18:00-18:30	Welcome Reception				
18:30-19:00					
19:00-19:30					
19:30-20:00				Banquet Award ceremony & Conference Dinner	
20:00-20:30					
20:30-21:00					

**ADVANCE RIKO, Inc. Workshop**  
**Linseis Workshop**

**Date:** June 1

**Time:** 12:00-13:00  
**Time:** 16:15-17:15

**Place:** Hong Kong Room  
**Place:** Hong Kong Room



8:20-10:00 Grand Ballroom

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Subsection 1: Opening & Plenary

Chair: Qingjie Zhang

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08:20-08:40 Welcome address

1. **Donald T. Morelli**, President, the International Thermoelectric Society.

2. **Mayor**, Wuhan City.

3. **Jianing Cai**, Deputy Director General, Ministry of Science and Technology of The P. R. China, Director, U. S. -China Clean Energy Research Center.

1K.1 (Keynote) **Julian Goldsmid**, University of New South Wales, Australia

08:40-09:20 Towards Improved Thermoelectric Generator Materials

1K.2 (Keynote) **Ctirad Uher**, University of Michigan, USA

09:20-10:00 Multi-Scale Thermoelectric Materials: Non-Equilibrium Preparation, Transport Behavior, and Applications

10:00-10:30 Coffee Break



<b>10:30-12:30</b>	<b>Ballroom 2</b>
<b>Subsection 2A:</b>	<b>Half Heusler</b>
<b>Chair:</b>	Pierre Ferdinand P. Poudeu
<b>2A.1 (Invited)</b>	<b>Peter Franz Rogl</b> , Andriy Grytsiv, Matthias Guerth, Jan Vrestal, Vitaliy Romaka, Kunio Yubuta, Gerda Rogl, Ernst Bauer
<b>10:30-10:54</b>	<b>A Phase Diagram Approach to {Ti,Zr}NiSn - based High ZT Spinodal Thermoelectrics</b>
<b>2A.2 (Oral)</b>	<b>Wenjie Xie</b> , Krzysztof Gałazkab, Tianhua Zou, Marc Widenmeyer, Anke Weidenkaff
<b>10:54-11:06</b>	<b>The Role of Excess Ni in ZrNiSn Based Half-Heusler Compound</b>
<b>2A.3 (Invited)</b>	<b>Tiejun Zhu</b>
<b>11:06-11:30</b>	<b>High performance p-type Half-Heusler thermoelectric materials with <math>zT &gt; 1</math></b>
<b>2A.4 (Oral)</b>	<b>Alexander Page</b> , Anton Van der Ven, Pierre F. P. Poudeu, Ctirad Uher
<b>11:30-11:42</b>	<b>Understanding phase separation in (Ti,Zr,Hf)NiSn Half-Heusler Alloys</b>
<b>2A.5 (Oral)</b>	<b>Chenguang Fu</b> , Tiejun Zhu, Xinbing Zhao
<b>11:42-11:54</b>	<b>Enhancing the Figure of Merit of Heavy-Band Thermoelectric Materials through Hierarchical Phonon Scattering</b>
<b>2A.6 (Oral)</b>	<b>G. Rogl</b> , A. Grytsiv, E. Bauer, M. Zehetbauer, P. Rogl
<b>11:54-12:06</b>	<b>High ZT p- and n-type Half-Heusler alloys and skutterudites and their mechanical properties in comparison with other thermoelectric materials</b>
<b>2A.7 (Invited)</b>	<b>Joseph Poon</b> , Long Chen, Sheng Gao, Xiaoyu Zeng, A. M. Dehkordi, Gezhou Zhang, Terry Tritt
<b>12:06-12:30</b>	<b>Half-Heuslers: Promising Mid-to-High Temperature Thermoelectric Materials</b>
<b>12:30-13:30</b>	<b>Lunch</b>



10:30-12:30 Ballroom 3

Subsection 2B: Materials development strategies

Chair: Ryoji Funahashi

2B.1 (Invited) **Anke Weidenkaff**, Wenjie Xie, Marc Widenmeyer, Songhak Yoon

10:30-10:54 **The European Thermoelectric Society, Complex oxides and intermetallics for future Thermoelectric Technologies**

2B.2 (Oral) **Yanliang Zhang**, Tony Varghese, Courtney Hollar, Nick Kempf

10:54-11:06 **High efficiency flexible nanostructured thermoelectric materials fabricated by screen printing of bismuth telluride nanocrystals**

2B.3 (Invited) **Zhifeng Ren**

11:06-11:30 **Engineering (ZT)eng vs. Efficiency and Power Factor vs. Output Power**

2B.4 (Oral) **Kornelius Nielsch**, Johannes Gooth, Ho Sun Shin, Svenja Bäessler, Bacer Hamdou

11:30-11:42 **Chalcogenide-type Nanowires: An Ideal Model for the Study of Topological Insulator Nature versus Thermoelectric Performance**

2B.5 (Oral) **Ruoming Tian**, Chunlei Wan, Qingshuo Wei, Takao Ishida, Atsushi Yamamoto, Woosuck Shin, Kunihiro Koumoto

11:42-11:54 **Development of n-type flexible TiS<sub>2</sub>/organics superlattice film by liquid exfoliation and self-assembly approach**

2B.6 (Oral) **R. Pothin**, R. M. Ayrat, A. Berche, F. Rouessac, P. Jund

11:54-12:06 **Differential Thermal Analysis, a useful tool for the improvement of the thermoelectric properties of ZnSb**

2B.7 (Invited) **M. J. Reece**, B. Du, F. Gucci, S. Grasso, G. D. Mastrorillo, G. Maizza

12:06-12:30 **Progress and Developments in Electric Current Assisted Sintering of Thermoelectric Materials**

12:30-13:30 Lunch





**10:30-12:30**      **Hong Kong Room**  
**Subsection 2C:**    **Thermoelectric Generators**  
**Chair:**             Thierry Caillat

- 2C.1 (Invited)      **Baoxing Chen**, Jane Cornett, Samer Haidar, Helen Berney, Pat McGuinness, Bill Lane, Yun Gao, Yifen He, Nian Sun, Marc Dunham, Mehdi Asheghi, Ken Goodson, David Kryskowski, Yi Yuan, Khalil Najafi  
**10:30-10:54**      **Material and Device Optimization For Energy Harvesting Application**
- 2C.2 (Oral)         **P. Aranguren**, D. Astrain, A. Martínez, A. Rodríguez, G. Pérez  
**10:54-11:06**      **Thermoelectric generation optimization through the thermal design of the system**
- 2C.3 (Oral)         **Dario Narducci**, Bruno Lorenzi, Gaetano Contento, Vincenzo Sabatelli, Antonella Rizzo  
**11:06-11:18**      **Efficiency Enhancement of Hybrid Solar Harvesters by Radiative Coupling between Photovoltaic and Thermoelectric Stages**
- 2C.4 (Oral)         **S. M. Mir Hosseini**, A. Rezaniakolaei, L. A. Rosendahl, A. A. Enkeshafi  
**11:18-11:30**      **Power Generation by Zinc Antimonide Thin Film under Various Load Resistances at its Critical Operating Temperature**
- 2C.5 (Oral)         **Andrea Montecucco**, J. Siviter, P. Mullen, M. Compadre Torrecilla, E. A. Man, A. R. Knox  
**11:30-11:42**      **Comparison of maximum power point tracking algorithms for constant temperature difference and constant heat**
- 2C.6 (Oral)         **Jane Cornett**, Baoxing Chen, Samer Haidar, Helen Berney, Pat McGuinness, Bill Lane, Yuan Gao, Yifen He, Nian Sun, Marc Dunham, Mehdi Asheghi, Ken Goodson, Yi Yuan, Khalil Najafi  
**11:42-11:54**      **Fabrication and Characterization of Bi<sub>2</sub>Te<sub>3</sub>-Based Chip-Scale Thermoelectric Energy Harvesting Devices**
- 2C.7 (Oral)         **Martin J. Prest**, G. Min  
**11:54-12:06**      **Design considerations and simulation of thermoelectric modules for concentrated solar energy conversion**
- 2C.8 (Invited)      **Matthew L. Scullin**  
**12:06-12:30**      **Commercial Progress in Thermoelectric Waste Heat Recovery**  
**12:30-13:30**      **Lunch**



13:30-15:30 Ballroom 2

Subsection 3A: Chalcogenide

Chair: Alexander Burkov

3A.1 (Invited)

**Franck Gascoin**

13:30-13:54

**New polar chalcogenides and antimonides: Chemistry, Bonding and transport properties**

3A.2 (Oral)

**S. Aminorroaya Yamini**, D. Mitchell, Tong Li, M. Avdeev, Julie Cairney

13:54-14:06

**In-situ structural study of multiphase Pb-chalcogenide thermoelectric materials at elevated temperatures**

3A.3 (Oral)

**Kaya Wei**, Artem Khabibullin, Troy Stedman, Lilia Woods, George Nolas

14:06-14:18

**Multinary Chalcogenides with Polaronic Transport and Enhanced Thermoelectric Performance**

3A.4 (Oral)

**Jared Williams**, Donald Morelli

14:18-14:30

**Understanding the Superior Thermoelectric Performance of Sb-precipitated  $\text{Ge}_{17}\text{Sb}_2\text{Te}_{20}$**

3A.5 (Oral)

**Stefan Schwarzmüller**, Christina Fraunhofer, Frederik Nietschke, Daniel Souchay, Oliver Oeckler

14:30-14:42

**Heterostructures of transition metal tellurides and Sn/Sb/Te or Ge/Sb/Te thermoelectric materials**

3A.6 (Oral)

**Qingfeng Song**, Pengfei Qiu, Feng Hao, Kunpeng Zhao, Xun Shi, Lidong Chen

14:42-14:54

**Thermoelectric properties of quaternary chalcogenides  $\text{Cu}_2\text{XSnSe}_4$  (X=Mn/Fe/Co)**

3A.7 (Oral)

**Qian Zhang**, Eyob Kebede Chere, Feng Cao, Qing Zhu, Keshab Dahal, Gang Chen, Zhifeng Ren

14:54-15:06

**High Thermoelectric Performance of n-type PbTe and  $\text{PbTe}_{1-y}\text{S}_y$  due to Deep Lying States Induced by Indium Doping**

3A.8 (Invited)

**Emmanuel Guillemeau**, T. Barbier, P. Lemoine, M. Eriksson, G. Guélou, P. Vaqueiro, A. Powell

15:06-15:30

**Progress and challenges in tetrahedrite compounds**

15:30-16:00

**Coffee Break**



13:30-15:30 Ballroom 3

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Subsection 3B: Measurements and simulations

Chair: Wenqing Zhang

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- 3B.1 (Invited) **Olivier Delaire**  
 13:30-13:54 Anharmonic Phonons Near Lattice Instabilities in SnSe, SnTe, and PbTe: Investigations with Neutron/X-ray Scattering Measurements and First-Principles Simulations
- 3B.2 (Oral) **Wu Li**, Natalio Mingo  
 13:54-14:06 Role of the filler in the reduction of thermal conductivity in fully filled skutterudites
- 3B.3 (Oral) **Mei-Jiau Huang**, Pei-Sheng Chien, Kuan-Chung Su  
 14:06-14:18 An Investigation into the Full-Spectrum Monte-Carlo Simulation of Phonon Flow
- 3B.4 (Oral) **Fei Ren**, Robert Schmidt, Eldon Case, Jong K. Keum, Bosen Qian, Ke An  
 14:18-14:30 Neutron scattering study of temperature-induced nanostructural evolution in PbTe-PbS thermoelectric material
- 3B.5 (Oral) **Hyun-Sik Kim**, Stephen D. Kang, Yinglu Tang, Riley Hanusa, G. Jeffrey Snyder  
 14:30-14:42 Dislocation strain as the mechanism of phonon scattering at grain boundaries
- 3B.6 (Oral) **Chongze Hu**, Xiaoyu Zeng, Jingsong Huang, Jian He, Bobby G. Sumpter, Menghan Zhou, Yufei Liu, Huijuan Zhao, Terry M. Tritt  
 14:42-14:54 Probing the Role of La Fillers and Sb Vacancies in CoSb<sub>3</sub> Skutterudites
- 3B.7 (Oral) **Cheng-Tang Li**, Yao-Hsiang Chen, Chien-Neng Liao  
 14:54-15:06 Electrically-induced Ag Migration in Bi-Sb-Te Compounds
- 3B.8 (Invited) **Raphaël P. Hermann**  
 15:06-15:30 An experimental phonon perspective on resonance bonding  
 15:30-16:00 Coffee Break



13:30-15:30 Hong Kong Room

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Subsection 3C: Space applications & power generator

Chair: Terry Tritt

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3C.1 (Invited)

**Thierry Caillat**

13:30-13:54

Skutterudite-Based Thermoelectric Technology for Integration into an eMMRTG for Space Power Applications

3C.2 (Oral)

**David Woerner**

13:54-14:06

Risk reduction for the system design of an enhanced MMRTG

3C.3 (Oral)

**Jean-Pierre Fleurial**

14:06-14:18

A Technology Roadmap for Thermoelectric-Based Space and Terrestrial Power Systems

3C.4 (Invited)

**Lei PENG**, Baoguo REN

14:18-14:42

Prospect of Radioisotope Thermoelectric Generator Application in China's Space Exploration

3C.5 (Oral)

**Doug Crane**, J. Chase, H. Arora, M. Melikian, L. Miller, D. Freeman, J. Weisse, B. Carreon, J. Reifenberg, A. Lorimer, M. Scullin

14:42-14:54

Reliability and Performance of PowerCard™ and PowerModule™ Tetrahedrite Thermoelectric Devices

3C.6 (Oral)

**Dongchen Zhu**, Chuqi Su, Yadong Deng, Yiping Wang

14:54-15:06

Effect of cooling units on the performance of automotive exhaust-based thermoelectric generator

3C.7 (Invited)

**Hsin Wang**, Keith J. Leonard

15:06-15:30

Effect of High Fluence Neutron Irradiation on Transport Properties of Thermoelectrics

15:30-16:00

Coffee Break



16:00-18:00 Ballroom 2

Subsection 4A: New thermoelectric material

Chair: Yuri Grin

4A.1 (Invited)

**Holger Kleinke**

16:00-16:24

Thermoelectric Properties of  $Tl_5Te_3$  Variants

4A.2 (Oral)

**Svilen Bobev**

16:24-16:36

Synthesis and characterization of the extended series of quaternary Zintl phases  $Ca_{13}REMnSb_{11}$  (RE = La-Nd, Sm, Gd-Dy)

4A.3 (Oral)

**Jing Shuai**

16:36-16:48

Thermoelectric properties of Bi-based Zintl compounds  $Ca_{1-x}Yb_xMg_2Bi_2$

4A.4 (Oral)

**Saneyuki Ohno**, Umut Aydemir, Alexandra Zevalkink, Sevan Chanakian, Sabah K. Bux, G. Jeffrey Snyder

16:48-17:00

$Ca_9Zn_{4+x}Sb_9$  Zintl phase as a cheap, non-toxic thermoelectric material with tunable carrier concentration

4A.5 (Oral)

**Tae-Soo You**, Gnu Nam, Woong-Jin Choi

17:00-17:12

Correlation between Thermoelectric Property and Phase Transition for the  $Ca_{5-x}Yb_xAl_2Sb_6$  ( $1.40 \leq x \leq 3.45$ ) Series: Theoretical and Experimental

4A.6 (Oral)

**Gnu Nam**, Tae-Soo You

17:12-17:24

Site-Preference between Yb and Ca in the  $Yb_{14-x}Ca_xAlSb_{11}$  ( $4.81 \leq x \leq 10.57$ ) Series: Theoretical and Experimental Investigations

4A.7 (Oral)

**Sheng-Qing Xia**

17:24-17:36

Size and electronic effects in some new Zintl phases and the related TE properties

4A.8 (Invited)

**Guoyu Wang**

17:36-18:00

Intrinsic low thermal conductivity and enhanced thermoelectric performance in low dimensional structured materials



16:00-18:00 Ballroom 3

Subsection 4B: Nano materials

Chair: Jingfeng Li

4B.1 (Invited) **Yimin Chao**, Tiezheng Bian, Jamie N. Peck, Stephen Cottrell, Upali A. Jayasooriya

16:00-16:24 **Hybrid silicon nanostructures with conductive ligands and their microscopic conductivities**

4B.2 (Oral) **G. Gadea**, A. Morata, A. Tarancon, I. Donmez, M. Salleras, C. Calaza, L. Fonseca

16:24-16:36 **Power response of planar microgenerators with different lengths of silicon nanowires**

4B.3 (Oral) **Yasuhiro Hasegawa**, Ryobi Homma, Mioko Otsuka

16:36-16:48 **Thermoelectric property of single crystal bismuth nanowire possessing from 300 nm- to 600 nm-order-diameter encased in quartz glass**

4B.4 (Oral) **Masoud Aminzare**, Deniz P Wong, I-Nan Chen, Cheong-Wei Chong, Liang-Ming Lyu, Wei-Lun Chien, Wen-Pin Hsieh, Yang-Fang Chen, Li-Chyong Chen, Kuei-Hsien Chen

16:48-17:00 **RF Magnetron Sputtered  $\text{Ge}_{19}\text{Sb}_2\text{Te}_{22}$  Thin Films: Towards Improved Performance for Thermoelectric Microdevices**

4B.5 (Oral) **Satoshi Hiroi**, Tsunehiro Takeuchi

17:00-17:12 **Thermoelectric properties of full-Heusler  $\text{Fe}_2\text{VAI}$ -based thin-films**

4B.6 (Oral) **Kentaro Watanabe**, Shuto Yamasaka, Shunya Sakane, Kentarou Sawano, Yoshiaki Nakamura

17:12-17:24 **Independent control of phonon and electron transport in Si films including epitaxial Ge nanodots**

4B.7 (Oral) **Chia-Hua Chien**, Ping-Chung Lee, Wei-Han Tsai, Tai-Hsiang Huang, Fan-Yun Chiu, Chih-Hao Lee, Yang-Yuan Chen

17:24-17:36 **Observation of Size and Irradiation Effects on Thermal and Electrical Properties of Bi-Sb-Te Nanowire**

4B.8 (Invited) **Chia-Jyi Liu**

17:36-18:00 **Low temperature synthesis and transport properties of some thermoelectric materials**



16:00-18:00 Hong Kong Room

Subsection 4C: Measurement technique and Module

Chair: Winnie Wong-Ng

- 4C.1 (Invited) **Joshua Martin**, Winnie Wong-Ng, Martin L. Green  
 16:00-16:24 **Progress in Developing Measurement Protocols and Standard Reference Materials for Thermoelectric Applications at NIST**
- 4C.2 (Oral) **Binghui Ge**, Yumei Wang  
 16:24-16:36 **Study of microstructure of thermoelectric materials by means of TEM**
- 4C.3(Oral) **Amer MELHEM**, Thomas LECAS, Cyril TCHIFFO, Abderazak TALBI, Arnaud SOLTZ, Eric MILLON, Chantal BOULMER-LEBORGNE, Nadjib SEMMAR  
 16:36-16:48 **Simultaneously measurements of thermo-electrical properties ( $\sigma$ ,  $\kappa$ , S) of thin film materials by a new homemade microscale device based on laser beam sample heating**
- 4C.4 (Oral) **Aijun Zhou**, Weihang Wang, Bin Yang, Jingze Li  
 16:48-17:00 **Thermal and electrical property characterization of micro- and meso-scale thick thermoelectric films**
- 4C.5 (Oral) **D. Vasilevskiy**, J.-M. Simard, R. A. Masut, S. Turenne  
 17:00-17:12 **Minimization of Specimen Size for Full Simultaneous Thermoelectric Performance Characterization of Materials**
- 4C.6 (Oral) **François GIBELLI**, Laurent LOMBEZ, Christophe GOUPIL, Jean-François GUILLEMOLES  
 17:12-17:24 **Optical contactless measurement of semiconductor thermoelectric transport properties**
- 4C.7 (Oral) **Xiao-yu Wang**, Bin Zhu, Yuan Yu, Na Gao, Fang-qiu Zu  
 17:24-17:36 **Analysis and amendments about Measurement methods of Seebeck Coefficient**
- 4C.8 (Oral) **Yuan-yuan Li**, Meng-qian Yang, Wei-fang Yang, Xiao-qing Liu, Zheng-wu Shen, Yun Yi, Wei Wang  
 17:36-17:48 **Investigations on the electrochemical reduction behaviors of Cu-Se compound in sulfuric acid solutions**
- 4C.9 (Oral) **Lindsay M. Miller**, B. Carreon, J. Weisse, J. Reifenberg, H. Arora, D. T. Crane, J. Chase, M. Scullin  
 17:48-18:00 **Achieving Reliable PowerCard™ Thermoelectric Devices with Stable Tetrahedrite & Magnesium Silicide Stannide Thermoelectric Materials**



8:00-10:00 Grand Ballroom

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Subsection 5: Plenary

Chair: Jihui Yang

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5K.1 (Keynote) **Donald Morelli**, Michigan State University, USA

08:00-08:40 **Anharmonicity: A new design tool for thermoelectric materials?**

5K.2 (Keynote) **Ryoji Funahashi**, National Institute of Advanced Industrial Science and Technology (AIST), Japan

08:40-09:20 **An example of translational research using thermoelectric oxides**

5K.3 (Keynote) **Lidong Chen**, Shanghai Institute of Ceramics, Chinese Academy of Sciences, China

09:20-10:00 **Thermoelectrics in China**

10:00-10:30 **Coffee Break**





10:30-12:30 Ballroom 2

Subsection 6A: Organic thermoelectric material

Chair: Jingkun Xu

6A.1 (Invited)

**Bin Hu**

10:30-10:54

Exploring New Driving Force To Develop Seebeck and Cooling Effects by Using Temperature-Dependent Surface Polarization Based on Semiconducting Organic and Perovskite Materials with Hybrid Conductor/Semiconductor/Conductor Thin-Film Design

6A.2 (Oral)

**Stephen D. Kang**, G. J. Snyder

10:54-11:06

Generalized charge transport analysis for polymer thermoelectrics

6A.3 (Oral)

**Weifang Yang**, Xiaoqing Liu, Han Xu, Zhengwu Shen, Yun Yi, Wei Wang

11:06-11:18

Fabrications of The Polyaniline Films by Pulse Potentiostatic Method in Acidic Solutions with Different Anions and Their Thermoelectric Performances

6A.4 (Oral)

**Sedat Ballikaya**, Alex Page, Abdulhadi Baykal, Muhammet Toprak, Ctirad Uher

11:18-11:30

Thermoelectric Enhancement in PEDOT:PSS Hybrid Polymer by Aligning Polymer Chains via Magnetic Nanoparticles

6A.5 (Oral)

**Amina Mirsakiyeva**, Håkan W. Hugosson, Anna Delin

11:30-11:42

Quantum Molecular Dynamics Studies of Thermoelectric Polymer Systems

6A.6 (Oral)

**Guangming Chen**

11:42-11:54

Conducting Polymer/Carbon Nanoparticle Thermoelectric Composites

6A.7 (Oral)

**Naoki Toshima**, Keisuke Oshima, Junta Inoue, Shifumi Sadakata, Yukihide Shiraishi

11:54-12:06

Hybrid-type Organic Thermoelectric Materials Containing Nanoparticles as a Carrier Transport Promoter

6A.8 (Invited)

**Wei Xu**, Yuanhui Sun, Lin Qiu, Hua Geng, Hanfu Wang, Fengjiao Zhang, Dazhen Huang, Peng Yue, Ying-shi Guan, Fei Jiao, Yi Meng Sun, Dawei Tang, Chong' an Di, Yuanping Yi, Daoben Zhu

12:06-12:30

Flexible n-type high-performance thermoelectric thin films of poly(nickle-ethylenetetra-thiolate) prepared by an electro-chemical method

12:30-13:30

Lunch



10:30-12:30 Ballroom 3

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Subsection 6B: Theory

Chair: Olivier Delaire

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6B.1 (Invited) **Wenging Zhang**, Yancheng Wang, Wujie Qiu, O. Hellman

10:30-10:54 Diverse Lattice dynamics in complex thermoelectric materials

6B.2 (Oral) **Hezhu Shao**

10:54-11:06 A first-principles investigation on the intrinsic phonon transport in  $\text{Cu}_2\text{GeSe}_3$

6B.3 (Oral) **Yue Chen**, Hulei Yu, Shuai Dai

11:06-11:18 Pressure induced high power factor in SnSe from first-principles calculations

6B.4 (Oral) **M. Miyata**, T. Ozaki, M. Koyano

11:18-11:30 Exploration of novel sulfide thermoelectric materials using first-principles calculation

6B.5 (Oral) **Lan (Samantha) Li**

11:30-11:42 First-Principles Investigation on Improving Thermoelectric Materials

6B.6 (Oral) **Jiawang Hong**, Chen W. Li, A. F. May, D. Bansal, S. Chi, T. Hong, G. Ehlers, Olivier Delaire

11:42-11:54 First-principles investigations of electronic instability and phonon anharmonicity in thermoelectric SnSe

6B.7 (Oral) **Min-Wook Oh**

11:54-12:06 Thermoelectric properties with modulated band structures

6B.8 (Invited) **Yukari Katsura**, Jun-ichi Iwata, Atsushi Oshiyama

12:06-12:30 Unfolded band structures of alloyed thermoelectric materials: visualization of band degeneracy in solid solutions

12:30-13:30 Lunch



10:30-12:30 Hong Kong Room

Subsection 6C: Material development strategies

Chair: Hsin Wang

6C.1 (Invited) **W. Wong-Ng**, Y. Yan, J. Martin, M. Otani, S. Barron, N. Nguyen, E.L. Thomas, K. Talley, X. Tang, M.L. Green

10:30-10:54 **Combinatorial approach in Thermoelectric Materials**

6C.2 (Oral) **Hiromasu Tamaki**, Hiroki K. Sato, Tsutomu Kanno

10:54-11:06 **Computational screening and discovery of high thermoelectric performance in n-type  $Mg_3(Sb,Bi)_2$**

6C.3 (Oral) **Sam Miller**, Prashun Gorai, Brenden Ortiz, Eric Toberer, Vladan Stevanovic

11:06-11:18 **Validation of semi-empirical thermal conductivity model across structure and chemical space**

6C.4 (Oral) **Gao Mina**, Nicholas J. E. Adkinsb, Jorge García-Cañadasa, Stephen McCainb, Ashley Brewa, Bastian Hauptsteinb, David J. Jarvis

11:18-11:30 **A combinatorial approach for accelerated discovery of new thermoelectric intermetallic compounds**

6C.5 (Oral) **Ruizhi Zhang**, Kan Chen, Baoli Du, Michael J. Reece

11:30-11:42 **New thermoelectric sulphide ceramics identified by high-throughput screening**

6C.6 (Oral) **Pingjun Ying**, Jiong Yang, Xiaohua Liu, Chenguang Fu, Wenqing Zhang, Xinbing Zhao, Tiejun Zhu

11:42-11:54 **Weak chemical bonding leads to intrinsically low thermal conductivity in  $\alpha$ -MgAgSb thermoelectric materials**

6C.7 (Oral) **Cheng-Lung Chen**, Wan-Ting Chiu, Tai-Hsiang Huang, Yang-Yuan Chen

11:54-12:06 **Optimize the thermoelectric performance of  $Sb_{2-x}In_xTe_3$  in a spark plasma sintering process**

6C.8 (Invited) **Prashun Gorai**, E. S. Toberer

12:06-12:30 **New approaches to thermoelectric materials discovery and design**

12:30-13:30 Lunch



13:30-15:30 Ballroom 2

Subsection 7A: Skutterudite & Clathrates

Chair: Qiang Li

- 7A.1 (Invited) **Jihui Yang**  
13:30-13:54 **Electronegative Guests in CoSb<sub>3</sub>**
- 7A.2 (Oral) **Yinglu Tang**, Estelle Sanz, Stéphane Gorsse, G. Jeffrey Snyder  
13:54-14:06 **Phase diagram study of Ce-Co-Fe-Sb quaternary system and solubility region of Ce<sub>y</sub>Co<sub>4-x</sub>Fe<sub>x</sub>Sb<sub>12</sub> skutterudites at 973 K**
- 7A.3 (Oral) **Junqing Guo**, Ge Nie, Atsuro Sumiyoshi, Taketoshi Tomida, Kenji Mukaiyama, Takahiro Ochi, Shogo Suzuki, Masaaki Kikuchi  
14:06-14:18 **Development of skutterudite thermoelectric materials and modules**
- 7A.4 (Oral) **Ken Kurosaki**, Seongho Choi, Yuji Ohishi, Hiroaki Muta, Shinsuke Yamanaka, Satoshi Maeshima  
14:18-14:30 **Enhanced thermoelectric properties of Ga and In co-added CoSb<sub>3</sub>**
- 7A.5 (Oral) **Tsuneyoshi Nakayama**, Yaping Liu, Qing Xi, Jun Zhou, Baowen Li  
14:30-14:42 **Glasslike Phonon Dynamics in Thermoelectric Clathrates**
- 7A.6 (Oral) **Hazel Reardon**, Kasper A. Borup, Anders B. Blichfeld, Bo B. Iversen  
14:42-14:54 **Defining the Thermal Stability of Ba<sub>8</sub>Ga<sub>16-x</sub>Ge<sub>30+x</sub> and its Future in Thermoelectrics**
- 7A.7 (Oral) **Elvis Shoko**, Udo Schwingenschloegl  
14:54-15:06 **Understanding Rattler-Cage Interactions by Cross-Spectral Analysis of Molecular Dynamics Trajectories**
- 7A.8 (Invited) **G. S. Nolas**, K. Wei, A. Khabibullin, L. M. Woods  
15:06-15:30 **Low thermal conductivity thermoelectric materials: Clathrates and new materials research from a synergistic theoretical and experimental research approach**
- 15:30-16:00 **Coffee Break**



13:30-15:30 Ballroom 3

Subsection 7B: Nano materials

Chair: Mercouri G. Kanatzidis

- 7B.1 (Invited) **Jong-Soo Rhyee**  
 13:30-13:54 Nano precipitation and interface effect in thermoelectric bulk composites
- 7B.2 (Oral) **Di Wu**, L. D. Zhao, F. Zheng, L. Jin, M. G. Kanatzidis, J. Q. He  
 13:54-14:06 Understanding the Process of Nanostructuring in Thermoelectrics and its Effects on Lattice Thermal Conductivity
- 7B.3 (Oral) **Zhi-Gang Chen**, Lei Yang, Min Hong, Jin Zou  
 14:06-14:18 Interfacial Phonon Scattering Enhance the Thermoelectric Performance
- 7B.4 (Oral) **Maria Ibáñez**, Zhishan Luo, Aziz Genç, Laura Piveteau, Silvia Ortega, Doris Cadavid, Oleksandr Dobrozhan, Yu Liu, Maarten Nachtegaal, Mona Zebarjadi, Jordi Arbiol, Maksym V. Kovalenko, Andreu Cabot  
 14:18-14:30 High-Performance Thermoelectric Nanocomposites from Nanocrystal Building Blocks
- 7B.5 (Oral) **Seokwoo Jeon**, Kisun Kim  
 14:30-14:42 Thermoelectric Enhancement of Al-doped ZnO Thin Shell 3D Nanostructures via Proximity Field Nanopatterning
- 7B.6 (Oral) **Maria Eugenia Toimil-Molares**, M. Cassinelli, P. Kühn, C. Trautmann, F. Völklein, K.-O. Voss, M. F. Wagner  
 14:42-14:54 Thermoelectrical characterization of  $\text{Bi}_{1-x}\text{Sb}_x$  nanowire arrays as a function of wire diameter and geometrical arrangement
- 7B.7 (Oral) **Yu Liu**, Doris Cadavid, Silvia Ortega, Oleksandr Dobrozhan, Andreu Cabot  
 14:54-15:06 Thermoelectric properties of I-V-VI nanomaterials produced from the bottom up assembly of colloidal nanocrystal building blocks
- 7B.8 (Invited) **Takao Mori**  
 15:06-15:30 Utilizing nanotechnology and novel materials to develop viable thermoelectrics
- 15:30-16:00 Coffee Break



13:30-15:30 Hong Kong Room

Subsection 7C: Module and related Applications

Chair: Jean-Pierre Fleurial

- 7C.1 (Invited) **Yuri Grin**  
13:30-13:54 **Thermoelectric modules on base of intermetallic clathrates: pro and contra**
- 7C.2 (Oral) **Karina R. Tarantik**, M. Kluge, K. Bartholomé, E. Geczi, U. Vetter, M. Vergez, U. Nusse, K. Schnürle, J. König  
13:54-14:06 **Reproducibility and Reliability in Manufacturing Thermoelectric Modules based on half-Heusler Compounds**
- 7C.3 (Oral) **Tsunehiro Takeuchi**, Yohei Kinoshita, Yoshio Ohashi, Taizo Yoshinaga, Takeo Yamaguchi, Mamoru Ishikiriya  
14:06-14:18 **Development thermal rectifiers using thermoelectric chalcogenide  $Ag_2Ch$  (Ch = S, Se, and Te)**
- 7C.4 (Oral) **Manikandan Sundararaj**, S. C Kaushik  
14:18-14:30 **Transient Thermal Behaviour of Annular Thermoelectric Cooling system**
- 7C.5 (Oral) **Ming Chen**, Xuexun Guo, Gangfeng Tan  
14:30-14:42 **Novel Engine Exhaust-based TEG solid medium for Hot-side Temperature Stability Control**
- 7C.6 (Oral) **Jonathan Siviter**, A. Montecucco, P. Mullen, M. Compadre, E. Man, A. Knox  
14:42-14:54 **Comparative analysis of characterisation of THP and maximum efficiency power electronics**
- 7C.7 (Oral) **Qiushi Wan**, Yadong Deng, Chuqi Su, Yiping Wang  
14:54-15:06 **Optimization of a localized air conditioning system using thermoelectric devices for commercial vehicle**
- 7C.8 (Invited) **Michihiro Ohta**, Priyanka Jood, Koichiro Suekuni, Toshiro Takabatake, Mercuri G. Kanatzidis, Atsushi Yamamoto  
15:06-15:30 **Nanostructured PbTe and Colusite-based Thermoelectrics: Comprehensive Development from Materials to Modules**  
15:30-16:00 **Coffee Break**



16:00-16:30 Grand Ballroom of Wanda Realm Hotel

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Poster Session

**Chair:** Wenyu Zhao, Ctirad Uher, F. Gascoin, K. Koumoto, Jong-Soo Rhyee

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8:00-10:00 **Grand Ballroom**

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**Subsection 8:** **Award & Plenary**

**Chair:** Donald Morelli

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8K.1 **Outstanding Achievement Awardee**

**08:00-08:40**

8K.2 **Young Investigator Awardee**

**08:40-09:20**

**9:20-10:00** **Coffee Break**





10:00-12:00	Ballroom 2
Subsection 9A:	Cu <sub>2</sub> X-based materials
Chair:	Steven N. Girard
9A.1 (Invited)	<b>Xun Shi</b> , Pengfei Qiu, Lidong Chen
10:00-10:24	Stability study in Cu-based liquid-like thermoelectric materials
9A.2 (Oral)	<b>David Voneshen</b> , R. Bewley, J. P. Goff
10:24-10:36	Cu diffusion and its impact on the lattice dynamics of Cu <sub>2</sub> Se
9A.3 (Oral)	<b>Trevor P. Bailey</b> , S. Hui, A. Olvera, H. Chi, P. F. P. Poudeu, C. Uher
10:36-10:48	Enhanced ZT and Attempts to Chemically Stabilize Cu <sub>2</sub> Se via Sn Doping
9A.4 (Oral)	<b>Pengfei Qiu</b> , Xiaobei Wang, Tiansong Zhang, Xun Shi, Lidong Chen
10:48-11:00	Compound Defects and Thermoelectric Properties in Ternary CuAgSe-based Materials
9A.5 (Oral)	<b>Lei Yang</b> , Zhi-Gang Chen, Jin Zou
11:00-11:12	Nanostructure Engineering on Cu <sub>2</sub> Se-based Thermoelectric Materials
9A.6 (Oral)	<b>Sixin Wu</b> , Chunhong Luan, Ping Yang, Jing Jiang, Yinglin Liang, Yi Niu, Chao Wang
11:12-11:24	A one-step synthesis of high ZT Cu <sub>2-x</sub> S(0<x<0.2)
9A.7 (Oral)	<b>Jiong Yang</b> , Yongxing Sun, Lili Xi, Wenqing Zhang
11:24-11:36	The Chalcogen-Based Conductive Network in Copper Chalcogenide
9A.8 (Invited)	<b>Pierre F. P. Poudeu</b> , Alan Olvera, Nick Moroz, Alexander Page, Ctirad Uher
11:36-12:00	Electronic and thermal transports is nanostructured Cu <sub>2</sub> Se-based Thermoelectric Materials
12:00-13:30	Lunch



10:00-12:00 Ballroom 3

Subsection 9B: Organic thermoelectrics

Chair: Yimin Cao

9B.1 (Invited) Jingkun Xu, Fengxing Jiang, Congcong Liu

10:00-10:24 The development of PEDOT:PSS-based thermoelectric thin-film

9B.2 (Oral) Baoyang Lu, Hua Gu, Hongtao Liu, Jingkun Xu

10:24-10:36 Stable Thermoelectric Selenophene-3,4-Ethylenedioxythiophene Copolymers

9B.3 (Oral) Yong Du, Jun Li, Jiayue Xu

10:36-10:48 Flexible Polypyrrole/Cotton Thermoelectric Composite Fabrics

9B.4 (Oral) Ling Xu, Yunchun Liu, Bin Hu

10:48-11:00 Study the thermoelectric properties base on the Organic Materials and Thin Film Device

9B.5 (Oral) Jun Zhou, Yani Chen, Minhong He, Bin Liu, Ziqi Liang

11:00-11:12 n-Type PVDF/Ag Nanowire Composites with Large Power Factor

9B.6 (Oral) Haijun Song, Kefeng Cai

11:12-11:24 Preparation of Te Nanorod/PEDOT:PSS Composite Films for Flexible Thermoelectric Power Generator

9B.7 (Oral) Stephen D. Kang, G. J. Snyder

11:24-11:36 Impact of inhomogeneous disorder in polymer semiconductors on their charge transport properties and thermoelectric performance

9B.8 (Invited) Kunihito Koumoto, R. Tian, Y. F. Wang, Q. S. Wei, T. Ishida, W. S. Shin, A. Yamamoto, C. L. Wan

11:36-12:00 Exfoliation-Reassembly Process to Fabricate TiS<sub>2</sub>/Organic Hybrid Film with Large Area for Flexible Thermoelectric Module

12:00-13:30 Lunch



10:00-12:00 Hong Kong Room

Subsection 9C: Oxides

Chair: Yuanhua Lin

- 9C.1 (Invited) **Young Soo Lim**, Woo Hyun Nam, Jeong Yong Lee, Won-Seon Seo  
 10:00-10:24 **ZnO-Graphene Nanocomposites: A new approach to PGEC**
- 9C.2 (Oral) **Slavko Bernik**, Mojca Presecnik, Mateja Košir  
 10:24-10:36 **The role of microstructure in the enhancement of the thermoelectric characteristics of oxide ceramics**
- 9C.3 (Oral) **Kenji Tanabe**, Ryuji Okazaki, Hiroki Taniguchi, Ichiro Terasaki  
 10:36-10:48 **Optical sheet conductivities of thermoelectric Co oxides**
- 9C.4 (Oral) **Susumu Fujii**, M. Yoshiya  
 10:48-11:00 **Suppression Mechanism of Phonon Thermal Conductivity in Layered Cobaltites by Molecular Dynamics**
- 9C.5 (Oral) **Hiroshi Nakatsugawa**, Miwa Saito, Yoichi Okamoto  
 11:00-11:12 **High temperature thermoelectric properties of perovskite type  $\text{Pr}_{0.9}\text{Sr}_{0.1}\text{Mn}_{1-x}\text{Fe}_x\text{O}_3$  ( $0 \leq x \leq 1$ )**
- 9C.6 (Oral) **Hongchao Wang**, Jinze Zhai, Wenbin Su, Jian Liu, Chunlei Wang  
 11:12-11:24 **High temperature thermoelectric performance of delafossite**
- 9C.7 (Oral) **Li You**, Jiye Zhang, Jun Luo  
 11:24-11:36 **Thermoelectric performance optimization of layered-structure oxychalcogenides**
- 9C.8 (Invited) **Masato Yoshiya**, Daisuke Kanayama, Susumu Fujii  
 11:36-12:00 **Selective Control of Transport Properties in Layered Titanium Oxides**  
 12:00-13:30 Lunch



13:30-15:42

Ballroom 2

**Subsection 10A: SnSe and related materials****Chair:**

Lidong Zhao

10A.1 (Invited)

**Mercouri G. Kanatzidis**

13:30-13:54

**Hierarchical and single phase thermoelectrics**

10A.2 (Oral)

**Fu Li**, Yiwen Li, Feiyu Kang, Jing-Feng Li

13:54-14:06

**Enhanced Mid-temperature Thermoelectric Performance in Textured SnSe Polycrystals Made of Solvothermally Synthesized Powders**

10A.3 (Oral)

**Sunglae Cho**, Anh Tuan Duong, Van Quang Nguyen, Van Thiet Duong, Jungdae Kim

14:06-14:18

**The achievement of high ZT in n-type SnSe single crystal**

10A.4 (Oral)

**Jingtao Xu**, Yajie Fu, Xue Wang, Xiaojuan Tan, Guo-Qiang Liu, Hezhu Shao, Haochuan Jiang, Jun Jiang

14:18-14:30

**Thermoelectric properties of textured polycrystalline SnSe**

10A.5 (Oral)

**Jungdae Kim**, Trinh Thi Ly, Taehoon Kim, Anh Tuan Duong, Ganbat Duvjir, S.H. Rhim, Sunglae Cho

14:30-14:42

**STM study on the surface structures and defects of SnSe**

10A.6 (Oral)

**Xiaojuan Tan**, Jun He, Hezhu Shao, Jingtao Xu, Guoqiang Liu, Jun Jiang

14:42-14:54

**Convergence of valence bands and enhanced thermoelectric performance in SnTe**

10A.7 (Oral)

**Kunling Peng**, Xu Lu, HengZhan, Si Hui, Ctirad Uher, Guoyu Wang, Xiaoyuan Zhou

14:54-15:06

**Broad temperature plateau for high ZTs in heavily doped p-type SnSe single crystals**

10A.8 (Oral)

**Yuanhu Zhu**, Peng Jiang

15:06-15:18

**Enhanced thermoelectric performance of Ag<sub>2</sub>S doped SnSe with nanostructure**

10A.9 (Invited)

**Yang-Yuan Chen**, Pai-Chun Wei, S. Bhattacharya, J. He, S. Neeleshwar, R. Podila, Che-Yin Lee, Tsu-Lien Hung, A. M. Rao

15:18-15:42

**Thermoelectric properties of single-crystalline SnSe**

15:42-16:00

**Coffee Break**



13:30-15:42 Ballroom 3

Subsection 10B: Bismuth telluride and related materials

Chair: Jian He

10B.1 (Invited) **Jing-Feng Li**, Yu Pan

13:30-13:54 **Enhancing thermoelectric performance of n-type  $\text{Bi}_2(\text{TeSe})_3$  processed by mechanical alloying and spark plasma sintering**

10B.2 (Oral) **Chengcheng Zhang**, Xian Fan

13:54-14:06 **Vagaries of n-type  $\text{Bi}_2\text{Te}_3$  based polycrystalline bulks and the thermoelectric properties optimization**

10B.3 (Oral) **Wan-Ling Chu**, Chien-Neng Liao

14:06-14:18 **Thermoelectric Properties and Microstructure of Sputtered Bi-Sb-Te/Te Multilayered Thin Films**

10B.4 (Oral) **Sung-Jin Jung**, Hyung-Ho Park, Beomjin Kwon, Seong Keun Kim, Dow-Bin Hyun, Jin-Sang Kim, Seung-Hyub Baek

14:18-14:30 **Thermoelectric properties of n-type  $\text{Bi}_2\text{Te}_{3-x}\text{Se}_x$**

10B.5 (Oral) **Lydia Rathnam**, Yoo Jang Song, Jong Soo Rhyee, Jae Hoon Jung, Ohmyung Kwon, Su Dong Park, Bong Seo Kim

14:30-14:42 **Phase separation and interface thermoelectric properties in pseudo-quaternary composites of  $\text{Ag}_{2.5}\text{Te}/\text{Bi}_{0.5}\text{Sb}_{1.5}\text{Te}_3$**

10B.6 (Invited) **Xiaoying Qin**, Yuanyue Li, Di Li, Hongxing Xin, Jian Zhang

14:42-15:06 **Enhanced thermoelectric performance through carrier scattering at heterojunction potentials in BiSbTe based composites**

10B.7 (Oral) **Tanakorn Khumtong**, Rachsak Sakdanuphab, Aparporn Sakulalavek

15:06-15:18 **Microstructure and Electrical properties of Antimony telluride thin films deposited by RF magnetron sputtering on flexible substrate using different sputtered pressures**

10B.8 (Invited) **Guiying Xu**, Gang Liu, Tie Lin, Xiaofeng Wu, Sitong Niu

15:18-15:42 **Effect of minority carrier on the thermoelectric property of  $\text{Bi}_{0.5}\text{Sb}_{1.5}\text{Te}_{2.7}\text{Se}_{0.3}$**

15:42-16:00 **Coffee Break**



13:30-15:42 Hong Kong Room

Subsection 10C: Oxides & Chalcogenide

Chair: Mike Reece

- 10C.1 (Invited) **Yuan-Hua Lin**, Jinle Lan, Guangkun Ren, Chunyao Liu, Yong Liu, Ce-Wen Nan
- 13:30-13:54 **High-Performance Oxides-Based Thermoelectric Ceramics for Energy Conversion**
- 10C.2 (Oral) **Xiaolin Wu**, Shufang Wang
- 13:54-14:06 **Epitaxial growth and thermoelectric properties of c-axis oriented  $\text{Bi}_{1-x}\text{A}_x\text{CuSeO}$  single crystalline thin films**
- 10C.3 (Oral) **Dongwang Yang**, Xianli Su, Yonggao Yan, Tiezheng Hu, Hongyao Xie, Jian He, Ctirad Uher, Mercouri G. Kanatzidis, Xinfeng Tang
- 14:06-14:18 **Manipulating the combustion wave during self-propagating synthesis for high thermoelectric performance of layered oxychalcogenide  $\text{Bi}_{1-x}\text{Pb}_x\text{CuSeO}$**
- 10C.4 (Oral) **Hui-Ching Chang**, Raman Sankar, Deniz P. Wong, Ying-Jay Yang, Fang-Cheng Chou, Li-Chyong Chen, Kuei-Hsien Chen
- 14:18-14:30 **Enhanced Thermoelectric Properties of Bulk  $\text{BiCuTeO}$  via Formation of Secondary Phase**
- 10C.5 (Oral) **Yifeng Wang**, Yawei Shen, Yang Ye, Lin Pan
- 14:30-14:42  **$\text{Cu}_2\text{SnS}_3$  and  $\text{TiS}_2$  polycrystalline ceramics for environmentally friendly thermoelectric materials**
- 10C.6 (Invited) **Graeme R. Blake**, Anil Kumar, Paul A. Vermeulen, Bart J. Kooi, Jan-Willem Bos, Srinivas Popuri, Stefan Schwarzmüller, Oliver Oeckler
- 14:42-15:06 **Phase relations and thermoelectric properties of TAGS materials**
- 10C.7 (Oral) **Yubo Luo**, Junyou Yang, Qinghui Jiang
- 15:06-15:18 **Large enhancement of the thermoelectric performance of  $\text{CuInTe}_2$  by in-situ replacement reaction**
- 10C.8 (Invited) **Jiaqing He**, Dan Feng, Fengshan Zheng, Di Wu, Wei Li, Minghui Wu, Li Huang, Li-Dong Zhao
- 15:18-15:42 **Investigation into the Extremely Low Thermal Conductivity in Ba heavily doped  $\text{BiCuSeO}$**
- 15:42-16:00 **Coffee Break**



16:00-18:30 Grand Ballroom of Wanda Realm Hotel

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Poster Session

**Chair:** Junyou Yang, George S. Nolas, Emmanuel Guilmeau, Yukari Katsura, Won Seon Seo

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8:00-10:00 Ballroom 2

Subsection 11A: Silicide

Chair: Tiejun Zhu

- 11A.1 (Invited) **Alexander T. Burkov**  
08:00-08:24 **Silicide thermoelectrics: recent progress in research**
- 11A.2 (Oral) **Bo Zhang**, Tao Zheng, Qingxiao Wang, Yihan Zhu, Moon Kim, Bruce E. Gnade  
08:24-08:36 **Stability of Hf, Ti, Ni and Au electrical contacts on Mg<sub>2</sub>Si**
- 11A.3 (Oral) **Steven N. Girard**  
08:36-08:48 **Scalable Synthesis of Thermoelectric Silicide Nanomaterials by Molten Salt Magnesioreduction**
- 11A.4 (Oral) **Adrien Bercegol**, Mohsen K. Keshavarz, Dimitri Vasilevskiy, Remo A. Masut, Sylvain Turenne  
08:48-09:00 **Hot extruded polycrystalline Mg<sub>2</sub>Si with embedded XS<sub>2</sub> nanoparticles (X: W, Mo)**
- 11A.5 (Oral) **Hwijong Lee**, Gwansik Kim, Byunghoon Lee, Kyu Hyoung Lee, Wooyoung Lee  
09:00-09:12 **Microstructure and Thermoelectric Properties in Substituted Higher Manganese Silicides**
- 11A.6 (Oral) **Swapnil Ghodke**, A. Yamamoto, H. Ikuta, T. Takeuchi  
09:12-09:24 **Enhancement of power factor by energy filtering effect in Re substituted HMS**
- 11A.7 (Oral) **Gagan Kumar Goyal**, T Dasgupta  
09:24-09:36 **Excess Magnesium and its effects on the phase evolution and stability in Mg<sub>2</sub>Si<sub>0.3</sub>Sn<sub>0.7</sub> solid solution**
- 11A.8 (Invited) **Yuzuru Miyazaki**, Haruki Hamada, Hiroki Nagai, Masataka Kubouchi, Kei Hayashi  
09:36-10:00 **Strategies and approaches to enhance thermoelectric properties of silicide-based materials**
- 10:00-10:30 **Coffee Break**





8:00-10:00 Ballroom 3

Subsection 11B: Bismuth telluride and related materials

Chair: Xun Shi

- 11B.1 (Invited) **Sung Wng Kim**  
**08:00-08:24** Formation mechanism of Dense dislocation arrays in grain boundaries for high-performance bulk thermoelectrics
- 11B.2 (Oral) **Kwang-Chon Kim**, Beomjin Kwon, Seoung Hwan Lee, Chong Min Koo, Hyun Jae Kim, Dow-Bin Hyun, Seung-Hyub Baek, Seong Keun Kim, Jin-Sang Kim  
**08:24-08:36** High-Thermoelectric Performance of Metal-oxide Coated Bismuth Antimony Telluride Alloys
- 11B.3 (Oral) **Piya Jitthamapirom**, Rachsak Sakdanuphab  
**08:36-08:48** Effects of  $\text{Bi}_2\text{Te}_3\text{:Sb}_2\text{Te}_3$  thickness on Seebeck coefficient of the single junction thermoelectric modules fabricated by RF magnetron sputtering on flexible substrate
- 11B.4 (Oral) **Yongjun Kim**, Sun Jin Kim, Hyeongdo Choi, Ju Hyung We, Ji Seon Shin, Kevin K. Yi, Byung Jin Cho  
**08:48-09:00** Improvement in Contact Resistance of Screen-printed  $\text{Bi}_2\text{Te}_{2.7}\text{Se}_{0.3}$  Thick Films by Annealing in a Reduction Ambient
- 11B.5 (Oral) **Wenwen Zheng**, Peng Bi, Ziyu Wang, Jing Shi, Rui Xiong, Chunqing He  
**09:00-09:12** Positron Annihilation Study On Electrical and Thermal Property For Ternary  $\text{Sb}_2\text{Te}_{3-x}\text{Se}_x$
- 11B.6 (Oral) **Min Hong**, Zhi Gang Chen, Jin Zou  
**09:12-09:24**  $\text{Bi}_x\text{Sb}_{2-x}\text{Te}_3$  Nanoplates with Enhanced Thermoelectric Performance due to Sufficiently Decoupled Electronic Transport Properties and Strong Wide-Frequency Phonon Scatterings
- 11B.7 (Oral) **Lev Bulat**, Novotelnova A. V., Tukmakova A. S., Erezhep D. E., Osvenskii V. B., Sorokin A. I., Bochkov L. V.  
**09:24-09:36** Simulation of SPS process for fabrication of thermoelectric materials with predictable properties
- 11B.8 (Invited) **Huijun Liu**, Jinghua Liang, Long Cheng, Jie Zhang, Zhenyu Zhang  
**09:36-10:00** Enhancing the thermoelectric performance and bridging the p- and n-type carrier asymmetry of  $\text{Bi}_2\text{Te}_3$  thin films via topological surface states
- 10:00-10:30** Coffee Break



8:00-10:00 Hong Kong Room

Subsection 11C: Strategies for high performance thermoelectric material

Chair: Lasse Rosendahl

11C.1 (Invited) **G. Jeffrey Snyder**

08:00-08:24 **The Use of Zintl Chemistry for Understanding Defects and Tuning Thermoelectrics**

11C.2 (Oral) **Lili Xi**, Jiong Yang, Wenqing Zhang

08:24-08:36 **Conductive Network in Complex Chalcogen-based Compounds**

11C.3 (Oral) **Hong-Yu Zhou**, Xin-Mu, Ping Wei, Wan-Ting Zhu, Wen-Yu Zhao, Qing-Jie Zhang

08:36-08:48 **Low contact resistance and improved stability in Ni/Cu/Al multilayer electrodes for Bi<sub>2</sub>Te<sub>3</sub> thermoelectric modules**

11C.4 (Oral) **Maria Ibáñez**, R. Hasler, O. Drobozhan, O. Nazarenko, A. Cabot, M. Kovalenko

08:48-09:00 **Nanocrystal Surface Design to Control Carrier Density in Bottom-Up Produced Thermoelectric Nanocomposites**

11C.5 (Oral) **Chao-Feng Wu**, Heng Wang, Tian-Ran Wei, Jing-Feng Li

09:00-09:12 **Nano-SiC induced doping effects in PbSe nanocomposites**

11C.6 (Oral) **Bin Zhu**, Fangqiu Zu

09:12-09:24 **Strikingly promote thermoelectric properties of free solidified Bi<sub>2</sub>Te<sub>2.7</sub>Se<sub>0.3</sub> n-type semiconductor by manipulating its parent liquid state and KI doping**

11C.7 (Oral) **Jae Sung Son**, Sung Hoon Park, Seungki Jo

09:24-09:36 **Nano- and molecular-solder introduced thermoelectric materials**

11C.8 (Invited) **Qiang Li**

09:36-10:00 **Transport Properties of Thermoelectric Materials near Quantum Critical Point (Dirac Semimetals)**

10:00-10:30 **Coffee Break**



10:30-12:30 Ballroom 2  
 Subsection 12A: Chalcogenide  
 Chair: Svilen Bobev

- 12A.1 (Invited) **Yanzhong Pei**  
 10:30-10:54 Electron and Phonon Engineering in PbTe and SnTe
- 12A.2 (Oral) **Radoslaw Chmielowski**, S. Bhattacharya, W. Xie, D. Péré, S. Jacob, R. Stern, K. Moriya, A. Weidenkaff, G. K. H. Madsen, G. Denner  
 10:54-11:06 High thermoelectric performance in Tellurium doped Paracostibite
- 12A.3 (Oral) **RAMESH CHANDRA MALLIK**, Prem Kumar D. S, R. Chetty, O.E. Femi, K. Chattopadhyay, P. Malar  
 11:06-11:18 Thermoelectric Properties of Bi-Doped Tetrahedrite
- 12A.4 (Invited) **Li-Dong Zhao**  
 11:18-11:42 Synergistically optimized electrical and thermal transport properties in SnTe
- 12A.5 (Oral) **Fu-Hua Sun**, Jing-Feng Li, Zhi-Liang Li, Asfandiyar, Jin-Feng Dong, Yu Pan, Chao-Feng Wu  
 11:42-11:54 Synthesis of tetrahedrite  $\text{Cu}_{12}\text{Sb}_4\text{S}_{13-x}$  thermoelectric materials: effect of repeated milling and sintering
- 12A.6 (Oral) **Peng Jiang**, Zhiwei Huang, Shuang Kong, Tianmin Wu, Wei Zhuang, Xinhe Ba  
 11:54-12:06 Enhancement of Thermoelectric Performance of Transition Metal Dichalcogenide Semiconductors by Doping
- 12A.7 (Invited) **Koichiro Suekuni**, Toshiro Takabatake, Michihiro Ohta  
 12:06-12:30 Cu-S based synthetic minerals: environmentally benign thermoelectric materials
- 12:30-13:30 Lunch



10:30-12:30 Ballroom 3

Subsection 12B: Material development strategies

Chair: Kunihiro Koumoto

- 12B.1 (Invited) **Junyou Yang**  
10:30-10:54 Progressive regulation of electrical and thermal transport properties to high performance  $\text{CuInTe}_2$  thermoelectric materials
- 12B.2 (Oral) **Hongxia Liu**, Shukang Deng  
10:54-11:06 Preparation and electrical transport properties of Ge doped single crystalline  $\beta\text{-Zn}_4\text{Sb}_3$  by the Sn-flux method
- 12B.3 (Oral) **Isao Ohkubo**, Takao Mori  
11:06-11:18 Anomalous anisotropic thermoelectric transport properties and electronic structures in layered complex nitrides  $\text{AMN}_2$  (A = Na, Cu; M = Ta, Nb)
- 12B.4 (Oral) **Liangliang Li**, Funing Tseng  
11:18-11:30 Thermoelectric Properties and Fracture Toughness of  $\text{ZnSb/SiC}$  and  $\text{ZnSb/SiC/Ag}$  nanocomposites
- 12B.5 (Oral) **Hiroaki Anno**, Takahiro Ueda, Kazuya Okamoto  
11:30-11:42 Effect of Codoping with Ga and P on Thermoelectric Properties of  $\text{Ba}_8\text{Al}_6\text{Si}_{30}$  Clathrate System
- 12B.6 (Oral) **Pengyan Mao**, K. P. Tai, H. Lei, X. Jiang  
11:42-11:54 Thin film Thermoelectric Micro-Cooler
- 12B.7 (Oral) **Siqi Lin**, Yanzhong Pei  
11:54-12:06 Band nestification for high thermoelectric performance in elemental tellurium
- 12B.8 (Invited) **Huaizhou Zhao**, Dandan Li, Shanming Li  
12:06-12:30 New thermoelectric materials with intrinsically low lattice thermal conductivity: MgAgSb based material and Cu-doped  $\text{Mn}_{1-x}\text{Cu}_x\text{Sb}_2\text{Se}_4$   
12:30-13:30 Lunch



**10:30-12:30**      **Hong Kong Room**  
**Subsection 12C:**    **Thermoelectric generators**  
**Chair:**              Matt Scullin

- 12C.1 (Invited)    **Yadong Deng** , Yiping Wang, Chuqi Su  
**10:30-10:54**      **Intelligent Air Conditioning System of Commercial Vehicle Based on Thermoelectric Technology**
- 12C.2 (Oral)        **Daryoosh Vashaee**, Koushik Devarajan, Amin Nozariasbmarz, Michael Hall, Abhishek Malhotra, Mehmet C Öztürk  
**10:54-11:06**      **Thermoelectric Generators for Body Heat Harvesting**
- 12C.3 (Oral)        **Yuan Deng**  
**11:06-11:18**      **Design and fabrication of bismuth telluride based films and devices as generator**
- 12C.4 (Oral)        **Tongjun Liu**, Tongcai Wang, Weiling Luan, Qimin Cao  
**11:18-11:30**      **A study of heat pipe assisted thermoelectric generator for waste heat recovery**
- 12C.5 (Oral)        **Jinwoo Kwak**, I. W. Lyo, B. W. Kim, H. S. Lee, J. K. Lee  
**11:30-11:42**      **Thermoelectric generation system for vehicular applications (Applicable to engine part)**
- 12C.6 (Oral)        **Alaa Attar**, HoSung Lee  
**11:42-11:54**      **Studying the Optimum Load Resistance of Thermoelectric Generator System**
- 12C.7 (Oral)        **Chien-Chang Wang**, Bo-Yi Sung, Yi-Ray Chen, Yu-Li Lin  
**11:54-12:06**      **Design and Experimental Study of the 1kW Thermoelectric Generation System Applied for Waste Heat Recovery**
- 12C.8 (Invited)    **Ya Yang**  
**12:06-12:30**      **Hybridized nanogenerators for harvesting thermal and mechanical energies**
- 12:30-13:30**      **Lunch**



13:30-15:30 Grand Ballroom

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Subsection 13: Close and Plenary

Chair: Lidong Chen

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13K.1 (Keynote) **Claudia Felser**, Max Planck Institute for Chemical Physics of Solids, Germany

13:30-14:10 **Topology and thermoelectric properties in Heusler compounds**

13K.2 (Keynote) **Wooyoung Lee**, Yonsei University, Korea

14:10-14:50 **How to Make That Breakthrough in Nano-thermoelectricity: Structure-engineered Single-crystalline Bi nanowires**

**Xinfeng Tang**, Conference Chair

14:50-15:30 Close Remarks



15:30-16:30 Tuesday, May 31, 2016 Grand Ballroom of Wanda Realm Hotel  
 16:00-18:30 Wednesday, June 1, 2016 Grand Ballroom of Wanda Realm Hotel

- P001** Yifen Zhao,  
 Phase transitions, electronic and mechanical properties for wurtzite-derived and zinblende-derived stannite  $\text{Cu}_2\text{ZnSnS}_4$  under pressure
- P002** Weifang Yang, Xiaoqing Liu, Yuanyuan Li, Han Xu, Wei Wang,  
 Effect of different electrode materials on the electropolymerization process of aniline in nitric acid media
- P003** Bulat L. P., Pshenay-Severin D. A., Ivanov A. A., Osvenskii V. B., Parkhomenko Yu. N.,  
 On heat capacity of  $\text{Cu}_2\text{Se}$
- P004** Kunpeng Zhao, Pengfei Qiu, Tiansong Zhang, Dudi Ren, Xun Shi, Lidong Chen,  
 Enhanced thermoelectric performance in  $\text{Cu}_2\text{Se}_{1-x}\text{S}_x$  solid solutions
- P005** Yaju Zhu, Yao Li, Pengcheng Zhai, Jialiang Li,  
 Thermoelectric Properties of Se-doped  $\text{Mg}_2\text{Si}$  via HTHP
- P006** Yao Yao, Bo-Ping Zhang, Shun Li, Yao-Chun Liu, Chao Gao,  
 Fabrication and thermoelectric performance of  $\text{Cu}_{1.8-x}\text{Ag}_x\text{S}$  polycrystals
- P007** Yang Zeng, Guang-Xing Liang, Ping Fan, Ju-Guang Hu, Jun Zhao, Xiang-Hua Zhang, Hong-Li Ma, Jing-Ting Luo, Yi-Zhu Xie, Dong-Ping Zhang,  
 The structural, optical and thermoelectric properties of single target sputtered  $\text{Cu}_2\text{ZnSn}(\text{S},\text{Se})_4$  thin film
- P008** Peng Qin, Zhen-Hua Ge, Jing Feng,  
 Enhanced thermoelectric performance of polycrystalline  $\text{Cu}_9\text{S}_5$  bulk materials via Sn doping
- P009** Parisa Jafarzadeh, Holger Kleinke,  
 New Thermoelectric Copper Chalcogenides
- P010** Dawei Liu, A. J. Jin, Wenbo Peng, Qiming Li, Hu Gao, Lianjun Zhu,  
 Micro thermoelectric generators fabricated with low cost mechanical machining processes
- P011** Jang-Yeul Tak, Sang Tae Lee, Won-Seon Seo, Il-Ho Kim, Hyung Koun Cho, Young Soo Lim,  
 Thermoelectric properties of  $\text{Cu}_{1.98}\text{Se}$  compound prepared by melt-spinning
- P012** Wujie Qiu, Xuezhi Ke, Wenqing Zhang,  
 Part-crystalline Part-amorphous State and Structure Family in Room-Temperature  $\text{Cu}_2\text{Se}$  with "Soft" Sublattice
- P013** Y. Bouyrie, C. Candolfi, V. Ohorodniichuk, J.-B. Vaney, Ph. Masschelein, A. Dauscher, B. Lenoir,  
 Thermoelectric properties of colusite  $\text{Cu}_{26}\text{V}_2\text{Ge}_6\text{S}_{32}$

- P014** Meijie Yin, Di Wu, Jiaqing He,  
**Statistic and theoretical analysis on nanoscale precipitates in Na-doped PbTe-PbS system with low lattice thermal conductivity**
- P015** C. H. Cheng, Y. S. Ke, C. P. Cheng, M. J. Dai, C. K. Liu, L. L. Liao,  
**Thermal Vacuum Bonding of Thermoelectric Lead Telluride Materials with Cu Electrode Using Ag-based Filler**
- P016** Feng Gao, Huadou Chai, Hongzhang Song,  
**Electrical transport properties of hot-pressed Cu<sub>2</sub>Se nanocrystalline bulk alloys**
- P017** Dou-Dou Liang, Bo-Ping Zhang, Sheng-Liang Liu,  
**Enhanced thermoelectric properties in Cu<sub>2-x</sub>Ti<sub>x</sub>Se superionic conductor prepared by mechanical alloying and spark plasma sintering**
- P018** Yi Niu, Chao Wang,  
**The Preparation and Thermoelectric Properties of Cu<sub>2-x</sub>S/SnS<sub>2</sub> Composite**
- P019** R. Nunna, X. Shi, L. D. Chen,  
**Enhancement in Thermoelectric properties of Copper Sulphide Cu<sub>2-x</sub>S Compounds Prepared by Ball Milling and Spark Plasma Sintering**
- P020** Luona Chen,  
**Explored the thermoelectric properties of Cu-Sb-Se relevant materials**
- P021** Lili Zhang, Yong Yan, Jinjuan Guo, Baoguo Ren,  
**Influences of Heat Treatment and Doping Ag on the properties of PbSnTe-based thermoelectric Materials**
- P022** Hongyao Xie, Xianli Su, Yonggao Yan, Xinfeng Tang,  
**The Role of Zn in Chalcopyrite CuFeS<sub>2</sub>: Enhanced thermoelectric properties of chalcopyrite Cu<sub>1-x</sub>Zn<sub>x</sub>FeS<sub>2</sub> with in-situnanoprecipitates**
- P023** Teng Fang, Tian Zhou, Hong Chen, Shuqi Zheng, Peng Zhang,  
**Electronic structures and thermoelectric properties of Ce-doped NbFeSb from first principles calculations**
- P024** Matthias Schrade, Cristina Echevarria-Bonet, Simen Eliassen, Kristian Berland, Raluca Tofan, Ole Martin Løvvik, Anette E. Gunnæs, Terje G. Finstad,  
**Thermal Properties of XNiSn (X=Ti, Zr, Hf) Half Heusler Alloys**
- P025** Q. Y. Xue, H. J. Liu, D. D. Fan, L. Cheng, B. Y. Zhao, J. Shi,  
**LaPtSb: a half-Heusler compound with high thermoelectric performance**
- P026** Xiwen Zhang, Yuanxu Wang,  
**Origin of high thermoelectric performance of FeNb<sub>1-x</sub>Zr/Hf<sub>x</sub>Sb alloys: a first principles study**
- P027** Bo Yuan, Lihong Huang, Xiaobo Lei, Qinyong Zhang,  
**Effect of Sb substitution by Sn on the thermoelectric properties of ZrCoSb**





- P028** **Nguyen Van Du**, Jamil Ur Rahman, Won-Seon Seo, Myong Ho Kim, Soonil Lee, **Thermoelectric Properties of N-Type Half-Heusler Compounds Synthesized by the Induction Melting Method**
- P029** **Ki Sung Kim**, Hyeona Mun, Kyu Hyoung Lee, Sung Wng Kim, **Reduced thermal conductivity by enhanced boundary scattering of nano grained TiNiSn-based half-Heusler compounds**
- P030** **K. H. Su**, C. C. Chang, T. W. Lan, C. H. Huang, Y. Ting, Y. R. Wu, M. H. Chiu, M. J. Wang, Y. Y. Chen, M. K. Wu, **Thermoelectric material characteristics of MgAgSb with adding Aerogel**
- P031** **K. H. Su**, C. C. Chang, T. W. Lan, C. H. Huang, Y. Ting, Y. R. Wu, M. H. Chiu, M. J. Wang, Y. Y. Chen, M. K. Wu, **Characteristics of MgAgSb-Platinum Hybrid Thermoelectric material**
- P032** **Tiezheng Hu**, Dongwang Yang, Xianli Su, Yonggao Yan, Xinfeng Tang, **Thermoelectric properties of ZrNiSn prepared by self-propagating high-temperature synthesis**
- P033** **Rizwan Akram**, Evarsite NSHIMIYE, Yonggao Yan, Xiaoyu She, Xianli Su, Xinfeng Tang, **Influence of Pt substitution on (Ti, Zr, Hf)NiSn based half-Heusler thermoelectric materials**
- P034** **R. Pothin**, R. M. Ayrat, A. Berche, D. Granier, F. Rouessac, P. Jund, **Role of mecnosynthesis in the improvement of the figure of merit of ZnSb**
- P035** **Anders B. Blichfeld**, Kirsten M. Ø. Jensen, Ann-Christin Dippel, Hazel Reardon, Simon J. L. Billinge, Bo B. Iversen, **In-situ pair distribution function analysis of thermoelectric zintl thin films**
- P036** **Yuanxu Wang**, Qingxiu Yu, **Influence of forming As-As bond on the electronic structure and thermoelectric properties of Zintl compounds  $\text{Ca}_3\text{GaAs}_3$  and  $\text{Ca}_5\text{Ga}_2\text{As}_6$**
- P037** **Gnu Nam**, Woongjin Choi, Tae-Soo You, **Cation and Anion Doping Effect for the Thermoelectric Property of the  $\text{Ca}_{11-x}\text{Yb}_x\text{Sb}_{10-y}\text{Ge}_y$  ( $2 \leq x \leq 9$ ,  $0 \leq y \leq 3$ ) Series**
- P038** **Ruijuan Yan**, Xin-Xin Yang, Kai Guo, Jing-Tai Zhao, **Enhanced thermoelectric properties of  $\text{BaZn}_2\text{Sb}_2$  via synergistic optimization strategy of co-doped Na and Sr**
- P039** **Hiromasa Tamaki**, Hiroki K. Sato, Tsutomu Kanno, **Origin of the carrier-type transition induced by Mg interstitials in Te-doped  $\text{Mg}_{3+\delta}(\text{Sb},\text{Bi})_2$**
- P040** **Yulong Li**, Pengfei Qiu, Xun Shi, Lidong Chen, **Non-equilibrium synthesis for high performance thermoelectric filled-skutterudites**

- P041** **Zi Liu**, Xuqiu Yang, Pengcheng Zhai,  
**Molecular Dynamics Study of Influence of Sb-vacancy Defects on Lattice Thermal Conductivity of Crystalline CoSb<sub>3</sub>**
- P042** **Afsandiyar**, Tian-Ran Wei, Qing Tan, Chao-Feng Wu, Fu-Hua Sun, Yu Pan, Zhi-Liang Li, Jin-Feng Dong, Jing-Feng Li,  
**Thermoelectric performance of SnS and SnS-SnSe solid solutions prepared by mechanical alloying and spark plasma sintering**
- P043** **Yuhao Fu**, David J. Singh, Wu Li, Lijun Zhang,  
**Intrinsic ultralow lattice thermal conductivity of the unfilled skutterudite FeSb<sub>3</sub>**
- P044** **Dong-Kil Shin**, Il-Ho Kim,  
**Thermoelectric Properties of p-Type Partially-double-filled (Pr<sub>1-z</sub>Nd<sub>z</sub>)<sub>y</sub>Fe<sub>4-x</sub>Co<sub>x</sub>Sb<sub>12</sub> Skutterudites**
- P045** **Kwon-Min Song**, Dong-Kil Shin, Kyung-Wook Jang, Soon-Mok Choi, Soonil Lee, Won-Seon Seo, Il-Ho Kim,  
**Synthesis and Thermoelectric Properties of Ce<sub>1-z</sub>Pr<sub>z</sub>Fe<sub>4-x</sub>Co<sub>x</sub>Sb<sub>12</sub> Skutterudites**
- P046** **Chen Chen**, Jianghua Li, Qian Zhang, Long Zhang, Dongli Yu, Bo Xu,  
**Thermoelectric properties of high pressure synthesized n-type La-filled CoSb<sub>3</sub> skutterudite**
- P047** **Yulong Kang**, Hao Sun, Bo Xu,  
**Thermoelectric properties of high pressure synthesized dual-filled CoSb<sub>3</sub>**
- P048** **Xianfu Meng**,  
**Enhanced thermoelectric performance of p-type filled skutterudites via the coherency strain fields from spinodal decomposition**
- P049** **Xiaohui Li**, Yulong Kang, Yongjun Tian, Bo Xu,  
**High pressure synthesized double filled Ce<sub>x</sub>Ca<sub>0.3</sub>Co<sub>4</sub>Sb<sub>12</sub> skutterudites with enhanced thermoelectric properties**
- P050** **P. Heinrich**, E. Bauer, A. Grytsiv, P. Rogl, J. Landaeta, I. Bonalde,  
**Superconductivity and Thermoelectricity in (Ba,Sr)Pt<sub>4</sub>Ge<sub>12-x</sub>Sb<sub>x</sub>**
- P051** **Taketoshi TOMIDA**,  
**200 mm diameter sintering bodies fabrication of skutterudite thermoelectric materials by spark plasma sintering method**
- P052** **Geon-Sik Son**, Soon-Mok Choi, Kyu Hyoung Lee,  
**Effects of annealing process on thermoelectric transport properties of Yb-filled Fe<sub>3</sub>CoSb<sub>12</sub>**
- P053** **Dong-Ik Cheong**, Jae-Seong Yeo, Kisu Lee, Il-Sung Seo, Jung-Hun Lee, Il-Ho Kim, Won-Seon Seo,  
**Mechanical behavior of melt-quenched p-type La<sub>0.9</sub>Fe<sub>3</sub>CoSb<sub>12</sub> Skutterudite**



- P054** **Pengfei Wen**, Yao Li, Shijie Ding, Bo Duan, Pengcheng Zhai, Qingjie Zhang,  
**The bending strength and thermoelectric properties of nano-TiN/  
Co<sub>4</sub>Sb<sub>11.3</sub>Te<sub>0.58</sub>Se<sub>0.12</sub> composites after annealing treatment**
- P055** **Xu Lu**, Xiaoyuan Zhou,  
**High temperature thermoelectric properties of Nd filled and Ge substituted  
p-type skutterudites**
- P056** **Eun-Ji Meang**, Won-Seon Seo, Soonil Lee,  
**Synthesis and Thermoelectric Properties of (In, Tl) Double-Filled  
Skutterudites**
- P057** **Hongliang Dong**, Zhiqiang Chen, Yunshan Tang, Jincheng Liao, Gaoshan Huang,  
Shengqiang Bai, Shunyan Tao, Yongfeng Mei, Lidong Chen,  
**Protection strategies for skutterudite thermoelectric materials and devices**
- P058** **Yuhao Fu**, David J. Singh, Wu Li, Lijun Zhang,  
**New insights into the role of fillers in reducing thermal conductivity of  
skutterudites**
- P059** **Jiangying Peng**, Jin Zheng, Fanhao Shen, Kuo Zhang, Jian He, Jinsong Zeng,  
Wanli Xiao, Bing An,  
**Tailoring Skutterudite-Bi<sub>2</sub>Te<sub>3</sub> Thermoelectric Nanocomposites via Synergistic  
Diffusion and Grain Boundary Effects**
- P060** **Ying Liang**,  
**Synthesis, Crystal Structure and Physical Properties of the Skutterudite-  
related phase CoGe<sub>1.5</sub>Se<sub>1.5</sub>**
- P061** **Hiroharu Sugawara**, Ayumi Inaba  
**Theoretical investigation of electronic structures of magnesium silicide  
(Mg<sub>2</sub>Si) lightly doped by p-type impurity atoms**
- P062** **Deniz P. Wong**, Tian-Wey Lan, Yang-Yuan Chen, Li-Chyong Chen, Kuei-Hsien  
Chen,  
**Thermoelectric Properties of Concentric Shell Mg<sub>2</sub>Si/MgO Composite**
- P063** **Sora-at Tanusilp**, Ken Kurosaki, Aikebaier Yusufu, Yuji Ohishi, Hiroaki Muta,  
Shinsuke Yamanaka,  
**Enhancement of Thermoelectric Properties of Bulk Si by Dispersing Size-  
Controlled VSi<sub>2</sub>**
- P064** **Jialiang Li**, Gang Chen, Bo Duan, Yaju Zhu, Xiaojun Hu, Pengcheng Zhai, Peng  
Li,  
**Thermoelectric properties of Mg<sub>2</sub>Si<sub>0.995</sub>Sb<sub>0.005</sub> prepared by high pressure high  
temperature method**
- P065** **Guanting Yu**, Xiaohua Liu, Tiejun Zhu, Xinbing Zhao,  
**Enhancing the Figure of Merit of Mg<sub>2</sub>(Si, Sn) Thermoelectric Materials  
through Sb and Zn co-doping**

- P066** **Gwansik Kim**, Jeongmin Kim, Hwijong Lee, In Woong Lyo, Byung-Wook Kim, Sung Wng Kim, Kyu Hyoung Lee, Wooyoung Lee,  
**Co-doping of Al and Bi for the Enhancement of Thermoelectric Performance in Magnesium Silicide**
- P067** **Akio Yamamoto**, Swapnil Ghodke, Masaharu Matsunami, Tsunehiro Takeuchi,  
**Thermoelectric performance of higher manganese silicide containing a small amount of 5d transition metal elements**
- P068** **A. Shukla**, Gagan K. Goyal, T. Dasgupta,  
**Flux Synthesis of Mg<sub>2</sub>(Si, Sn) solid solution by the B<sub>2</sub>O<sub>3</sub> encapsulation method**
- P069** **Kang Yin**, Xianli Su, Yonggao Yan, Ctirad Uher, Xinfeng Tang,  
**In-situ nanostructure design leading to high figure of merit in eco-friendly stable Mg<sub>2</sub>Si<sub>0.3</sub>Sn<sub>0.7</sub> solid solution**
- P070** **Afiqa Mohamad**, Yuji Ohishi, Yoshinobu Miyazaki, Hiroaki Muta, Ken Kurosaki, Shinsuke Yamanaka,  
**Enhancement of Thermoelectric Properties of CrSi<sub>2</sub> by Congener Elemental Substitution**
- P071** **Daisuke Kato**, Kouta Iwasaki, Masahito Yoshino, Tomoaki Yamada, Takanori Nagasaki,  
**Preparation and Thermal Stability Evaluation of Sb-doped Mg<sub>2</sub>Si with High Carrier Concentration**
- P072** **Jianghua Li**, Chen Chen, Bo Xu,  
**High pressure synthesis of Sb-doped Mg<sub>2</sub>Si with enhanced thermoelectric performance**
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# Leading Physical Property Analysis of Thin-Film Materials

## Leading Technology



## Products

- Phase Change Temperature Analyzer
- Thermal Expansion Coefficient Analyzer
- Optical Power Thermal Analyzer
- Thermoelectric Parameter Test System
- Thin-Film Thermoelectric Parameter Test System
- Thin-Film Thermal Conductivity Test System
- Hall Effect Test System
- Thin-Film Thermal Resistance Tester
- Thin-Film Magnetism Test System
- Thin-Film Thermal Stress Test System
- Spectroscopic Ellipsometer
- .....

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