

XV INTERNATIONAL FORUM ON THERMOELECTRICITY

XV International Forum on Thermoelectricity dedicated to outstanding scientist Thomas Johann Seebeck was held in his home city Tallinn (Estonia) on May 21 – 24, 2013. The Forum was organized by the International Thermoelectric Academy (ITA), Thomas Johann Seebeck Department of Electronics of Tallinn University of Technology and Institute of Thermoelectricity NAS and MES of Ukraine.



XV International Forum on Thermoelectricity

The Forum International Organizing Committee was formed by: chairman – L. Anatyshuk (Ukraine), members– S. Ašmontas (Lithuania), H.J. Goldsmid (Australia), Yu. Gurevich (Mexico), T. Kajikawa (Japan), S. Sidorenko (Ukraine), T. Caillat (USA), J. Stockholm (France), T. Tritt (USA), M. Fedorov (Russia) and L. Chen (China). Chairman of local organizing committee was M. Min (Estonia).

The Forum was attended by key specialists from 22 countries of the world.

There were 92 presentations at the Forum, among them – 4 reports on the history of thermoelectricity, 8 invited lectures of leading scientists on the achievements in thermoelectricity in various countries of the world, 35 oral and 45 poster papers.

The Forum was opened by L. Anatyshuk, President of the International Thermo-



ITA President Dr. L. Anatyshuk (Ukraine)

electric Academy, academician of the National Academy of Sciences of Ukraine.

The Forum participants held a moment of silence to honour the memory of ITA members who passed away in 2011-2013.

Particular attention was focused on Thomas Johann Seebeck. A report “Thomas Johann Seebeck – man and scientist” was delivered by Dr. E. Velmre (Estonia), professor of T.J. Seebeck Department of Electronics of Tallinn University of Technology.



E. Velmre (Estonia)



L. Vikhor (Ukraine)

ITA President Dr. Anatyshuk (Ukraine) presented a film about the role of T.J. Seebeck in thermoelectricity.

In her report, ITA corresponding member Dr. L. Vikhor (ITE, Ukraine) dwelt on the history of discovery of the bulk Seebeck effect.

Invited report on recent research and developments in the field of thermoelectric power generation technologies in Japan was presented by ITA academician, Dr. T. Kajikawa (Shonan Institute of Technology, Japan). In his report, he emphasized that fundamentals of research and development in

technology of thermoelectric power generation in Japan have changed considerably after the accident at the Fukushima nuclear power station in March 2011. Dr. Kajikawa also noted that thermoelectric generators based on waste heat recovery that have proved their high efficiency and long service life due to the use of improved *Bi-Te* modules change over to commercial exploitation stage in Japan.



T. Kajikawa (Japan)

Dr. L. Chen (Shanghai Institute of Ceramics, China) reported on the progress of thermoelectricity in China during the recent two years.



L. Chen (China)

ITA academician Dr. L. Bulat (National Research University ITMO, Russia) made a report on the development of thermoelectricity in Russia in 2010 – 2012. He told about the results of basic and applied research performed at the universities, institutes and enterprises of Russian Federation.



L. Bulat (Russia)



V. Jovovich (USA)

A report on thermoelectricity applications in vehicles, their comfort and fuel efficiency was delivered by Dr. V. Jovovich from a group of authors of Gentherm company USA). He emphasized that thermoelectric devices developed by Gentherm company are successfully employed in automobiles assuring additional comfort for passengers.

ITA corresponding member Y. Shinohara (National Institute of Material Science, Japan) presented his report on the development of thermoelectricity in South-East Asia.

The work of the Forum was accompanied by interesting discussions that continued during informal socializing of the participants.



Yu. Gurevich (Mexico)



V. Grabov (Russia)



S. Ašmontas (Lithuania)



J. Gradauskas (Lithuania)

Invited scientific reports on physics of thermoelectricity were delivered by: ITA academician Dr. Yu. Gurevich (Mexico) “The role of nonequilibrium current carriers in thermoelectric cooling”, ITA academician Dr. L. Vikhor (Ukraine) “Optimal functions in thermoelectricity”, ITA academician Dr. J. Snyder (USA) “Thomson cooler obtained with application of compatibility factor to the analysis of thermoelectric devices”, ITA academician Dr. V. Grabov (Russia) “Thermoelectrokinetic effects as a promising direction in thermoelectricity”, ITA academician Dr. S. Ašmontas (Lithuania) “Thermoelectricity of hot carriers”, Dr. J. Tobola (Poland) “Study of electron transport properties from basic calculations to search for efficient thermoelectrics”, ITA corresponding member Dr. J. Gradauskas (Lithuania) “Thermoelectricity of hot carriers caused by infrared laser radiation in semiconductor structures”.



Y. Shinohara (Japan)



J. Snyder (USA)



J. Tobola (Poland)



A. Casian (Moldova)



J.-C. Tedenac (France)



E. Rogacheva (Ukraine)



W. Xie (China)



O. Uryupin (Russia)

Reports on thermoelectric material science were presented by: ITA academician Dr. A. Casian (Moldova “Organic thermoelectric materials: new opportunities”, ITA academician Dr. M. Fedorov (Russia) “Modern thermoelectric materials,” ITA corresponding member Dr. J.-C. Tedenac (France), Dr. A. Cantarero (Spain) “Thermal conductivity of silicon nanowires”, ITA corresponding member Dr. E. Rogacheva (Ukraine) “Concentration anomalies of thermoelectric properties in solid solutions”, Dr. Y. Nishino (Japan) “Development of thermoelectric Heusler compounds for use in energy accumulation field”, Dr. W. Xie (China) “On the achievements in the Laboratory of Advanced Technology for Materials Synthesis and Processing (Wuhan University of Technology), Dr. Yu. Grin (Germany) “What do chemists think about thermoelectricity. Thermoelectric investigations at Max Planck Institute for Chemical Physics of Solids”, Dr. O. Uryupin (Russia) “Thermoelectric properties of nanowires in asbestos channels and porous glasses”, ITA corresponding member Dr. V. Schennikov (Russia) “Effect of physical and geometric factors on the properties of thermoelectric materials”, Dr. F. Gaskoin (France) “Thermoelectric properties of intermetallic hollandite”, Dr. A. Udal (Estonia) “Can SiC and phonon drag effect change thermoEMF paradigm at low temperatures?”.



M. Fedorov (Russia)



A. Cantarero (Spain)



Y. Nishino (Japan)



Yu. Grin (Germany)



F. Gascoin (France)



S. Yatsyshin (Ukraine)



G. Arakelov (Russia)



G. Min (United Kingdom)



J. Takai (Japan)

Thermoelectric applications were covered in the reports presented by: Dr. S. Yatsyshin (Ukraine) “Thermoelectric temperature sensors under extreme operation conditions”, ITA academician Dr. S. Filin (Poland) “Application of thermoelectricity in domestic appliances: yesterday, today, tomorrow”, ITA corresponding member Dr. G. Arakelov “Photoelectric sensors with thermoelectric cooling. State of the art, problems and prospects”, ITA corresponding member Dr. A. Terekov (Russia) “Industrial-purpose thermoelectric generators on renewable fuel”, Dr. G. Min (United Kingdom) “Theory of thermoelectric devices for operation at given thermal power”, Dr. K. Wojciechowski (Poland) “Characterization of high-performance segmented $Bi_2Te_3/CoSb_3$ thermocouples for vehicular applications”, Dr. A. Nazarenko “Reliability enhancement of thermoelectric coolers using polymer vacuum coatings”, A. Ivanov (Russia) “On the activity of “RIF” company”, J. Takai (Japan) “Presentation of Z-max company”. In his report “Global projects in thermoelectricity and the ways of their implementation”, ITA President Dr. L. Anatyshuk (Ukraine) dwelt on some new lines of thermoelectricity applications based on the use of the Seebeck effect.



V. Schennikov (Russia)



A. Udal (Estonia)



S. Filin (Poland)



A. Terekov (Russia)



K. Wojciechowski (Poland)



ITA President Dr. L. Anatyshuk



Awarding the ITA Golden Prize to Yu. Gurevich

On May 24, 2013 during the operational period of the Forum the General Meeting of the International Thermoelectric Academy took place where as a result of competitive selection, by secret voting, the following ITA academicians were elected: Dr. Mikhail Fedorov, A.F. Ioffe Physical-Technical Institute, Russia; Dr. Yoshi Nishino, Nagoya Institute of Technology, Japan; Dr. Xinfeng Tang, China. ITA corresponding members were elected: Dr. Yuri Grin, Max Planck Institute, Germany; Dr. Krzysztof Wojciechowski, AGH University of Science and Technology, Poland; Dr. Svyatolsav Yatsyshin, National University “Lvivska Politechnika”, Ukraine;

Dr. Oleg Uryupin, A. F. Ioffe Physical-Technical Institute, Russia; Dr. Vladimir Jovovich, Gentherm company, USA.

ITA Golden Prize in the nomination "For the fundamental contribution to development of thermoelectricity" was awarded to ITA academician Dr. Gurevich; in the nomination "For technology and quality of thermoelectric products" – to Open JSC "Corporation NPO "RIF" and “ERA-SFTI” LTD.

However, the main event during the Forum was unveiling a monument to Seebeck.



Awarding the ITA Golden Prize to A. Ivanov, Director of Open JSC "Corporation NPO "RIF".



Monument to T.J. Seebeck



Unveiling the monument to T.J. Seebeck



Outside view of the monument to T.J. Seebeck



Working model of Seebeck's experiment

The monument has been created with the support of 42 members of the International Thermoelectric Academy from 15 countries of the world. Their names have been engraved on the monument. 16 thermoelectric companies from various countries have also become the monument sponsors.

The idea of the monument belongs to Dr. Anatychuk, the sculptress is Mrs. Kuulbusch. The monument symbolizes the short-circuited Seebeck's thermocouple. Laser technologies create a 3-D image of Seebeck.

Installed on the monument is a working model of Seebeck's experiment. The monument was unveiled in solemn atmosphere on May, 2013. In this way the grateful supporters of thermoelectricity have honoured the memory of outstanding scientist Thomas Johann Seebeck.

