

Report on the XVIII International UIE-Congress 2017

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The Association for Microwave Power in Europe for Research and Education (AMPERE Europe)

The wonder of Hannover Maschsee welcomed the XVIII International UIE-Congress 2017 on Electrotechnologies for Material Processing at the lake side Courtyard Marriott Hotel (Fig. 1).



Figure 1: Courtyard Marriott Hotel, the conference venue.

Following the long tradition of International UIE-Congresses, the first taking place 80 years ago in the Netherlands and more recently in Durban (South Africa 2004), Krakow (Poland 2008) and St. Petersburg (Russia 2012), the Institute of Electrotechnology of the Leibniz Universität Hannover (Germany) hosted the XVIII Edition from June 6 to 9, 2017.

The two conference Chairmen, Prof. Egbert Baake and Prof. Bernard Nacke, offered a wide view covering many aspects of Electrotechnologies for Material Processing: Material processing by heating and melting; Magneto-hydrodynamics in industrial processes; Solidification in metallurgical and semi-conductor processes; Microwave and RF material processing; Production processes for innovative materials and products; Process control and optimization; Industry 4.0 in electromagnetic processing; Energy efficiency, and sustainability of industrial thermal processes.

The Scientific Committee, composed of experts from 12 countries, aided by the Chairmen, put together a program comprising two plenary

sessions with invited well known experts from industry and academe, followed by 16 parallel sessions covering the two and a half days of the conference.

An extremely efficient and friendly Organizing Committee supported the two Chairmen in staging the Welcome Reception on Tuesday, June 6, at the Courtyard Marriott Hotel, and the Congress Dinner (Fig. 2) on Thursday at the Historical Town Hall of Hannover.



Figure 2: Guests arriving at the conference dinner.

The technical presentations were opened by two sessions of Keynote lectures. The first covered the following topics: “UIE – Past and Future”, by K. Van Reusel (Katholieke University Leuven Belgium); “An insight into steelmaking processes by computational fluid dynamics”, by H.-J. Odenthal (SMS Group, Germany), “Induction heating: The day after tomorrow”, by V. Rudnev (Inductoheat Inc., USA). A second Keynote Session on the first day the conference covered two themes: “Internet of things – The brave new world of thermo-processing?” by A. Seitzer (Himmelwerk GmbH, Germany); “Magnetic stirring and sonication of metal melts” by G. Gerbeth (Helmholtz-Zentrum, Dresden-Rossendorf, Germany). Both keynote sessions provided inspiring thoughts on the future trend of electroheat technologies.

All the conference sessions were well attended by around 110 participants from 17 countries. The novelties from the parallel sessions hinted to an undeniable future oriented towards increasing fields of applications for the use of electro-technologies for material processing.

Increasing interest is observed in melting processes for metals and non-metallic materials, in the combination of melting and casting, in electromagnetic processing of melts before solidification or segregation of metals and special alloys, in crystal growth of semiconductors, but also in induction heating and heat treatment of materials, e.g. induction surface hardening of complex geometries. In all these applications, physical and mathematical modelling plays an important and necessary role for the analysis and optimisation of such processes. An increasing important field of research is the mathematical optimisation for the design and control of the processes and devices.



Figure 3: Chairman Prof. Egbert Baake with a Local Organizing Committee member at the conference terrace.

Our German colleagues were also successful in organizing the UIE Intensive Course for PhD Students on Design Optimization in Induction Heating, Electromagnetic Stirring and Optimal Control of Induction Heating Processes, during the week prior to the conference, May 31 - June 6. The 6-days programme of the course brought together 19 PhD students from 6 European Universities, including the host institution, to be instructed in the above topics, and to work together in theoretical and experimental work as well, as in mathematical modelling and numerical simulation. The students

did participate in lectures, discussed their own scientific topics and existing problems under the guidance of supervisors from the Institute of Electrotechnology (ETP), Leibniz Universität Hannover, and from the Department of Control and System Analysis, State Technical University of Samara, Russia.

The Congress committee received support from the following companies: ALD Vacuum Technologies, SMS Elotherm, Inductoheat Europe, Himmelwerk, Fluxtrol, as well as the Heat Processing online - The Platform for Thermo-processing Technologies, Leibniz Universität Hannover, Vereinigung zur Förderung des Instituts für Elektrowärme der Universität Hannover e.V., the Int'l Union for Electricity Applications (UIE), and the Association for Microwave Power in Europe for Research and Education (AMPERE).

About the Authors



Koen Van Reusel received the degree of Master of Electrical Engineering from the KU Leuven (Belgium) in 1985, and the degree of Doctor of Engineering from the KU Leuven in 2010. Since 1992 he is at LABORELEC (Belgium), a technical competence center in energy processes and energy use. As senior expert, he is member of the Power Networks Department. He is currently involved in industrial projects on shielding of high voltage cables and substations, health effects of the exposure to electromagnetic fields, the aggregation of harmonics produced by wind turbines and photovoltaics, and the mitigation of lightning incidents on wind turbines. He is visiting professor at the KU Leuven, where he teaches "Electromagnetic Processing of Materials" and "Power Quality". Koen Van Reusel is Member of the Management Committee of AMPERE, the Association for Microwave Power in Europe for Research and Education; General Secretary to UIE, the International Union for Electricity applications; Member of the Board of Directors of FISUEL, the International Federation for the Safety of the Electricity Users; and Member of the International Electrotechnical Committee n° 27 "Industrial Electroheating and Electromagnetic Processing of Materials".

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