



On behalf of the Organizing Committee, we would like to warmly welcome you to the beautiful and historical city of Budapest for the **15th Conference & Exhibition of the European Ceramic Society** (ECerS2017), between 9th and 13th of July, 2017.

For the first time, the Conference will be organised jointly by the two member societies namely Turkish Ceramic Society and Hungarian Scientific Society of the Silicate Industry.

Since the first ECerS conference in 1989, the tremendous growth in interest and participation from ceramic communities has made the ECerS Conference a globally very popular venue for scientists, artists, students and industrialists willing to have a direct access to one of the largest community of international experts of ceramic art, science and technology.

We would like to promote in the next ECerS2017 a multi-disciplinary atmosphere, mixing ceramics, materials science, chemistry, physics, art, design, archeology, dentistry, electronic, energy departments and industry and universities as well as young scientist with the experienced to discuss the developments in the ceramic art, science and technology under 12 different topics from the latest energy applications to traditional ceramics, from the latest additive manufacturing technologies to cultural heritage and art, from high temperature production to geopolymers.

All in all, our goal is to organize a truly unforgettable event for all attending as students, scientists, artists, craftsmans, industrialists and so on.

Servet Turan and Csaba Balázs

On behalf of the ECerS 2017 Organizing Committee

www.ecers2017.eu

Conference Topics

T1. New Developments in Processing and Synthesis with a Special Focus on Additive Manufacturing

This symposium will review the current state of advanced processing methods for ceramics, including advanced, technical ceramics, silicate ceramics and refractories. Focuses will be placed on new developments in concepts and technologies for powder synthesis, forming, sintering and additive manufacturing.

T2. High Temperature Processes and Advanced Sintering

High-Tech ceramics offer a variety of outstanding physical and mechanical properties but their behaviour critically depend on the microstructure which should be carefully tailored to develop specific sets of properties. Conventional sintering of highly refractory ceramics is usually carried out at very high-temperature to obtain density close to the theoretical one, often at the expenses of microstructural control. The consolidation of nano-crystalline powders to fully dense nanostructured specimens is still a challenge, due to the difficulties of retaining the starting grain size during sintering. In composites, degradation of reinforcing phases such as carbon fibers, whiskers, graphene is an issue when the temperature required for the starting matrix densification is significantly higher than the stability of the reinforcing phase. Nowadays, novel high temperature processes and sintering techniques are available allowing effective densification of highly refractory materials as well as control of interface reactions and microstructure. Very often, scale up of components thermally treated by these nonconventional techniques is an issue. Additional aspects to be considered are “green technologies” able to reduce the energy consumption and the process time as compared to conventional techniques. Joining of ceramics is another critical area of research where advanced temperature processes may lead to significant improvement of performance.

This topic will thus cover recent progress, challenges and emerging approaches of non-conventional high temperature processes or novel sintering techniques, capable of retaining the microstructure to a fine scale and of limiting unwanted interface reactions as much as possible; bulk scale-up issues; high temperature processing for joining. Expected contributions mainly concern materials (including joining) whose process and/or properties are enabled or improved by advanced sintering techniques such as: Spark plasma and flash sintering, High-frequency induction heating, laser sintering, Reactive metal infiltration, Microwave sintering, Laser Sintering, Reactive sintering. The emphasis is on process/microstructure/properties relationship, microstructural evolution control approaches, mechanisms and kinetics of processes, possibility to scale-up the advanced sintering techniques, future directions.

T3. Advanced Structural Ceramics

Advanced structural ceramics are key materials in a multitude of applications in the automotive, aerospace, electrical, military and medical sectors for example. New areas such as energy generation and environmental technology combined with more ambitious specifications have increased the demand for novel ceramics featuring improved properties and functionality whilst making manufacturing processes more efficient. The central requirement is for strong, reliable components operating without degradation under mechanical load, in abrasive or corrosive environments and/or under high temperatures.

T4. Electroceramics and Optical Materials

Functional ceramic materials with tunable electrical and optical properties are of high technological importance in view of their promising applications in a wide range of fields. This symposium will focus on the processing, characterization and device applications of novel electroceramics, glass-ceramic and optical ceramic materials. A particular emphasis will be placed on the fundamental issues to advance our understanding and utilization of glass-ceramics and optical ceramics and integrated related devices. Besides new fundamental insights, novel and emerging processing techniques to fabricate transparent glasses and electroceramics, novel application areas together with advances in phenomenological modeling will form the focus of this topic.

T5. Ceramics for Novel Energy Conversion, Storage and Use

This topic will cover the ceramic and glass solutions for energy harvesting and storage expects contributions from a wide range of subjects related to batteries, thermoelectrics, fuel cells, photovoltaics and solar devices, steam electrolyzers, membranes, electrochemical systems and technologies. The scope of this topic includes the performance-synthesis and processing-properties-crystal structure and characterization relationship for these materials and devices. Specific components include electrodes, electrolytes, electrochemical membranes, catalysts, substrates, seals, interconnects or interfacial layers and semiconductors. Testing of single components, stacks, alternative system concepts, harvesting and recycling technologies are also considered within the scope of this topic.

T6. Ceramics and Glasses for Healthcare

Ceramics and glasses have long been considered as materials for healthcare. They are commonly used in orthopaedic surgery and dentistry but they are potentially suitable for a wide range of important applications within the medical device industry. In orthopaedics, ceramics play a pivotal role as they are increasingly used for the manufacturing of femoral heads and cups for total hip replacement. In addition, they have been used as materials for artificial heart valves, bone fillers and - more recently, for dental restorations. Moreover, a number of compositions in the frame of bioactive ceramics are currently used as coatings for metallic devices, promoting the formation of natural bone tissue and thus favouring their integration into hard tissues. Ceramic particles, microspheres, and nanostructures play a role in the cancer treatment. Besides such applications, the trend today is to widespread their use as scaffolds for tissue engineering, as carriers for drug release as dental implants and, finally, as nanostructures for cancer diagnostic and therapy. Most of such applications are the results of the important advances which have been made along the past few years both on bio-inert and bio-active ceramics, glasses and glass ceramics, and on the ceramic products themselves. New bioceramics with improved mechanical and biological performances (as it is the case of zirconia-based composites or more recently non-oxide ceramics) have been developed. At the same time, ceramics and composites (including organic-inorganic composites) for bone substitute or scaffold applications are currently developed, improving the interaction of the ceramics with both cells and living tissues. Furthermore, the latest technological advances allow their manufacturing by innovative 3D techniques, to create multi-scale, hierarchical materials. The latest achievements are also dedicated to low temperature syntheses, bio-mineralization, surface modifications of implants, or to the grafting of inorganic micro- and nano-spheres with biomolecules to promote biological interactions. In this frame, long-lasting and bioresorbable/osteo-inductive scaffolds are the ultimate goals.

T7. Challenges and Opportunities in Industrial Ceramics

This topic is focused on various challenges and opportunities in design, fabrication, and testing of industrial ceramics, silicates and composites. Main aim is a to demonstrate the ceramic component manufacturing and integration technology for developing of creative, ceramics-oriented solutions for industrial applications to meet the needs and the expectations of the industries from the ceramic, glass and refractory sectors in the broader sense (producers, users and integrators).

T8. The Ceramics Genome: Modelling, Simulation and In-situ Experimentation

Key societal concerns, such as sustainable consumption, and the low carbon economy, motivate the need for new, innovative ceramic materials. To answer this challenge, we can accelerate the development of new ceramic materials with unique properties through the predictive power of simulations (e.g. DFT calculations, phase field simulation) combined with experimental studies, which are able to determine the microstructure as well its evolution during processing as well as operation. For this topical symposium, we invite contributions to a discussion on developing the ceramics genome via in-situ experimentation and computational modeling and simulation.

T9. Boron Based Ceramics

Boron based ceramics show a unique combination of properties based on special crystal structures, atomic bonding as well as the microstructure formed during sintering. These result in lightweight materials of high hardness, high elastic modulus but low density and usually with high melting temperatures. Beside these special electric properties were observed for different borides. These unique properties result in a wide range of applications from armour materials, nuclear applications up to thermoelectrics, refractories and many others. The topic will cover both fundamental and applied aspects of preparation microstructure formation, properties and application of boron containing ceramics materials.

T10. Cultural Heritage

One of the oldest materials used in the world is ceramic pottery. Potteries or ceramics became unique daily used materials since the establishment of civilizations. They have been produced in wide varieties of bodies, with glazes in different colors and decorations. ECERS 2017 focuses on the topics of technology, provenance, dating, restoration and conservation of archaeological ceramics and other related materials.

T11. Refractories

Refractories are commonly used in several industries like Iron and Steel, Cement, Glass, None-Ferrous Metals, Petrochemical, Power, Environmental, Aerospace and so on. Refractory materials are required being heat, thermal stress, abrasion, chemical agents and other physical phenomena induced by heat resistant. Additionally, they should possess good insulating properties that improve the energy savings in the industry.

T12. Art and Ceramics

The aim of the topic is the interconnection of materials, transformation of ceramic process to art. The topic will bring together international ceramic artists and specialists from the universities, crafts and institutions share their view and present their thoughts of future developments in ceramics art.

SATELLITE EVENTS

SE1 Advanced Ceramics for Dentistry

The works on developing and customized manufacturing of novel advanced ceramics with improved properties for dental prosthesis, implants and guided bone regeneration, are particularly encouraged. Fundamental understanding of the interactions between ceramics on micro-to-nanoscale level and hard-to-soft tissues on protein and cell level, of the reliability of ceramic parts in relation to their hierarchical microstructures and of the feasibility of fitting the ceramic processes into a full digital clinic approach, all became of important general interest. Technologies enabling the establishment of an ecosystem based on model-free digital workflows are welcome. This satellite event aims to provide a forum for multidisciplinary discussion amongst ceramists, that is, ceramic researchers and manufacturers, dental clinicians and technicians, and biologists with the focus on challenges presented to the current and the emerging technologies, as well as to the future concepts going beyond the state of the art.

SE2 Smart Manufacturing Systems for Industry

Smart manufacturing systems are realizing the promise and potential of Industry 4.0 that enables any product to be made at the smallest possible cost, the highest quality, and the lowest environmental impact for industrial ceramics.

This event focuses on performing R&D&I and technology consulting tasks relating to the following: Design and construction of industrial machines and laboratory equipment for ceramic materials. Measurement of variables under industrial conditions, and automation of process stages. Determination of powder flowability, and robotics applications to the ceramic process. Fast integration and flexible configuration: commissioning, integration and (re) configuration, as well as preventive maintenance of all components, modules and machines.

SE3 Ceramics and Composites in Harsh Nuclear Environment

The aim of this event is to visit the Budapest Research Reactor, which has been utilized as a neutron source for research and various industrial and medical applications. The mission of the Centre for Energy Research is to perform research and development in the field of nuclear science and technology for facilitating the adoption and the safe use of nuclear technology in Hungary, to participate in international research efforts aiming at the establishing a new generation of nuclear power plants and closing the fuel cycle.

The aim of this event is a visit of Budapest Research Reactor which has been utilized as a neutron source for research and various industrial and medical applications. Irradiations are performed in vertical channels (the reactor has now more than 40 channels that can be used

for isotope production and material testing) whereas physical experiments are carried out at the horizontal neutron beam ports.

In the frame of satellite event „Ceramics and composites design, processing and properties to their performance in harsh nuclear environments „, scientists can get access to the BRR experimental facilities with some interesting presentations not only of novel ceramic based materials.

SE4 New Frontiers on Ceramic Characterisation Techniques

The aim of event is to visit the Centre for Energy Research, Institute for Technical Physics and Materials Science, which has been utilized as a microscopic laboratory for research and various industrial and medical applications of ceramics.

Characterization techniques have become widely used in the definition of ceramics due to their structure, simplicity, cost effectiveness, rapidness, and maybe most importantly, the indenter itself can be used as a mechanical microprobe in ceramic thin films, interfaces, grain boundaries, and nanocomposites.

Satellite event „New Frontiers on the Ceramic Characterization Techniques,, cover measurement techniques, reliability, and problems associated with this testing method of ceramic materials with respect to microscopic techniques.

The event will cover some invited lectures and practical testing of different characterization techniques as TEM, HREM, electron diffractions, etc.

SE5 Young Ceramists Network (YCN)

The Young ceramic Researchers Network (YCN) is an initiative of the European Ceramic Society (ECerS) sponsored by the JECS Trust. This nonprofit network aims at bringing young students and professionals currently doing research on Ceramics.

Following the ECerS` traditional special care for young ceramists the “student evening” will be held again during the 15th ECerS conference taking place in beautiful city of Budapest. Young ceramist researchers, that is, Master and PhD students including early stage PhD`s are all invited and will have an opportunity to socialize, interact and discuss their work in a warm and festive atmosphere, where short talks about scientist careers are planned for the evening as well. A great opportunity to start professional and/or friendly relationships, to initiate collaborative networks and plan lab visits. This time the students evening will be organized by newly established Young Ceramists Network (YCN), who will present itself and its activities, the Ceramic Social Club, JECS Trust fund and much more.

A network for Young people conducting research on the field of Ceramics (under 40 years old) For young researchers (professional, PhD but also post-doctoral or master students), belonging to European/International research institutions (universities, laboratories...)

SE6 Student Speech Contest

The student speech contest at the biannual ECerS conference is an event where young research students, representing each of the ECerS member countries, are able to give an oral presentation that is evaluated by a jury.

The presentation duration will be 15 minutes, followed by questions from the jury and the audience. Each member country of ECerS can send one (PhD, MSc, BSc) research student as the candidate of their country for the ECerS student speech contest. The oral presentation at the contest should be based on research work that the candidate has performed himself/herself at a research institution in the country he/she is representing.

Graduate representatives must be within their first five years of full time research at the time of the speech. If the representative is a PhD student, the candidate can participate in the competition if he/she defends (or will defend) his/her thesis after September 1, 2016.

The candidate obtains free registration to ECerS XV

The national ceramic societies are requested to pay the costs for travelling and lodging of their candidate student. The conference organizers have submitted a proposal to the JECS Trust for (partially) reimbursing these costs. Decision on this proposal will be taken by the JECS Trust board at the beginning of February 2017.

The national society will inform the ECerS educational working group as well as the conference organisers not later than April 30, 2017 who will be the representative of their country.

The candidates should not register for the conference through the web page. Once the national societies inform about their candidates, the conference organizers will contact the candidate to give instructions about abstract submission, registration, travelling and lodging.

Important Dates

Extended deadline for abstract submission: February 24, 2017

Confirmation for abstract acceptance: March 10, 2017

Early bird registration deadline: March 17, 2017

Payment deadline for Authors with accepted Abstract: March 31, 2017

Conference dates: July 9-13, 2017

