The activities in the development, manufacture and application of cellular materials are steadily growing. Meanwhile, R&D of cellular materials constitutes a discrete but well-connected research field of materials science and engineering. In the same manner as other materials, it is expected to be a driver of innovations and novel or better products.

Over the last years, applications have been identified in the fields of energy efficiency, lightweight construction, novel and efficient conversion concepts or biomedical repair functions, just to mention a few.

The CellMAT conference series was initiated in 2010 in order to bring together experts from the polymer, ceramic, glass and metal communities dealing with cellular materials.

The 5th CellMAT conference will cover all aspects of manufacturing, functionalizing, modification, joining, property analysis and modelling of cellular materials. In addition to this, featured side events will focus on specific topics.

International experts will give keynote/invited lectures about applications in the automotive industry and transportation, in mechanical engineering, for chemical and energy systems, for environmental purposes or for micro and medical devices and functions. Thus, the three-day conference comes up as a discussion panel for researchers, manufacturers, and users of cellular materials. During the conference, the best three posters will be honoured.

The 5th CellMAT will be held in the medieval Bad Staffelstein, Germany in the famous Franconian Switzerland.

We cordially invite you to join the CellMAT 2018 conference, to share your experience in cellular materials with your fellow colleagues and to enjoy the very beautiful and special atmosphere during our conference.

Conference Chair
Michael Scheffler
Otto von Guericke University
Magdeburg, Germany

Co-Chairs
Tobias Fey
Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany

Mike Tromm
University of Kassel, Germany

Dirk Enke
Leipzig University, Germany

Peter Quadbeck
Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM, Dresden, Germany
General Information

Conference Venue
Bildungszentrum Kloster Banz
Hanns-Seidel-Stiftung
96231 Bad Staffelstein, Germany
T +49 (0) 9573 337-0
F +49 (0) 9573 337-733
banz@hss.de
www.klosterbanz.de

Date
24 - 26 October 2018

Conference Chair
Michael Scheffler
Otto von Guericke
University Magdeburg
Germany

Conference Office
Deutsche Gesellschaft für Materialkunde e.V.
c/o INVENTUM GmbH
Alexia Ploetz
Marie-Curie-Straße 11-17
53757 Sankt Augustin
Germany
cellmat@dgm.de

Conference Website
https://cellmat2018.dgm.de

Conference Language
The official conference language will be English.

Conference Fees
Young Researchers up to 30 years
DGM members*         230 EUR
Non-members         300 EUR
Expert Researchers 31-40 years
DGM members*         460 EUR
Non-members         530 EUR
Professionals University
DGM members*         560 EUR
Non-members         630 EUR
Industry
DGM members*         700 EUR
Non-members         800 EUR

* DGM - Deutsche Gesellschaft für Materialkunde e.V. (German Materials Society)

Social Evening
On Thursday 25 October 2018, all participants are invited to take part in the conference dinner at the restaurant of the Banz Monastery.

Poster Session
The Oral Postersession will be held on Wednesday 24 October 2018.

The best three posters will be awarded a prize. The prizes will be announced during the conference dinner.

Poster Discussion Evening
Authors will have the opportunity to discuss their subject with delegates and answer questions in front of their poster on Wednesday evening.

Snacks and beverages will be offered.
The conference is dedicated to all classes of materials including material combination/macrostructural and microstructural composite materials of all types and cellular parts.

In a side event commercialized parts and applications or those which are close to commercialization will be in focus.

**General Topics**
- Manufacturing
- Functionalization
- Surface modification
- Structure characterization
- Joining and machining
- Physical, chemical, mechanical, thermal and optical properties
- In situ mechanical characterization
- Plastic deformation
- Recycling
- Standardization

**Application-related Topics**
- Mechanical engineering
- Energy management and saving
- Chemical engineering and conversion
- Bioengineering, biomaterials and life science
- Biotechnology
- Medical engineering
- Microsystems technology
- Automotive, aerospace and transportation
- Architecture and design
## Programme Overview Wednesday

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<td>12:15</td>
<td>Opening Lecture S. Smith</td>
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<td>13:00</td>
<td>Keynote Lecture R. Hingmann</td>
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<td>Keynote Lecture P. Gehre</td>
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<tr>
<td>13:40</td>
<td>Manufacturing</td>
<td>Physical, chemical, mechanical, thermal and optical properties</td>
<td>Special Session SFB CRC 920</td>
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<td>15:40</td>
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<tr>
<td>16:10</td>
<td>Invited Lecture</td>
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<tr>
<td>16:20</td>
<td>Manufacturing</td>
<td>Physical, chemical, mechanical, thermal and optical properties</td>
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## Programme Overview Thursday

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<tr>
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<td>Keynote Lecture A. Gurlo</td>
<td>Physical, chemical, mechanical, thermal and optical properties</td>
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<tr>
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<td>Manufacturing</td>
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<tr>
<td>11:00</td>
<td>Invited Lecture</td>
<td>Structure characterization</td>
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<tr>
<td>11:30</td>
<td>Manufacturing</td>
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<tr>
<td>12:50</td>
<td>Lunch Break</td>
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<tr>
<td>14:00</td>
<td>Invited Lectures</td>
<td>Mechanical engineering</td>
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<td>15:00</td>
<td>Manufacturing</td>
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<tr>
<td>15:20</td>
<td>Invited Lecture</td>
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<td>16:00</td>
<td>Coffee Break</td>
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<td>16:20</td>
<td>Manufacturing</td>
<td>Functionalization</td>
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<tr>
<td>17:40</td>
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<tr>
<td>19:00</td>
<td>Highlight Lecture</td>
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Programme Overview Friday

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<tr>
<td>09:30</td>
<td>Keynote Lecture J. Allain</td>
<td>Keynote Lecture E. Di Maio</td>
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<tr>
<td>10:10</td>
<td>Bioengineering, biomaterials and life science</td>
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<tr>
<td>11:20</td>
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<td>11:40</td>
<td>Closing Remarks</td>
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Programme Wednesday 10:00 - 13:00

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<td>10:00</td>
<td>Registration</td>
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<tr>
<td>12:00</td>
<td>Opening Ceremony</td>
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<tr>
<td>12:15</td>
<td>Thermophysical properties of porous materials: microstructural design parameters for thermal insulation</td>
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<td></td>
<td>Chair M. Scheffler, Otto von Guericke University Magdeburg (Germany)</td>
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Polycrystalline ceramics often contain a pore volume fraction which can vary from < 1% to > 95%. This paper discusses how pores and interfaces modulate the thermal properties of a porous solid with a particular focus on relations between microstructure and the thermal conductivity of ceramics.

First, the effect of grain size on the effective thermal conductivity of the solid phase in a porous polycrystalline ceramic is examined. Two contributions can be identified. Finite grain size at the nanoscale, with interfaces essentially parallel and perpendicular to heat flow, inhibits grain thermal conductivity by removal of low frequency phonons. Then each grain-grain interface crossing the heat flow path acts as a site of Kapitza resistance. These localized thermal resistances, due to grain boundary disorder, are typically in the range of 0.5 x 10^-8 m^2K/W to 1.0 x 10^-8 m^2K/W. Data is presented for porous alumina ceramics showing how, due to these two effects, the thermal conductivity of the polycrystalline alumina solid phase is reduced from 33 W/m·K for an average grain size of 2 µm to 8 W/m·K for an average grain size of 0.25 µm.

Second, at the macroscopic scale, a tool box of analytical relations is proposed to describe the effective thermal conductivity of the porous ceramic as a function of solid phase thermal conductivity, pore thermal conductivity and pore volume fraction (vp). For vp < 0.65, the Maxwell-Eucken relation for closed porosity and Landauer relation for open porosity give good agreement to measurements on tin oxide, alumina and zirconia. For vp > 0.65, Landauer’s effective medium expression becomes of restricted use. In fact a natural limit to achieving low thermal conductivity in a porous solid seems to be approached. This is explained by the condition of continuity in the solid skeleton for maintaining a minimum of mechanical strength. Useful predictions for highly porous cellular materials can then be made with models described by the Hashin-Shtrikman upper bound, Russell’s relation or the Glicksman-Schuetz relation.

Finally, the approach is illustrated with examples of porous materials with low values of thermal conductivity. These include kaolin based foams, ceramic green bodies, sunflower pith aggregates and silica aerogels.
Programme Wednesday 13:00 - 14:00

**Session 1**

**Manufacturing**

Chair: M. Bram, Forschungszentrum Jülich GmbH (Germany) / U. Betke, Otto von Guericke University Magdeburg (Germany)

13:00 Keynote Lecture

Temporary Plastic Foams: Versatile Cellular Materials for Multi-faceted Applications and Markets

R. Hingmann (Sp)¹
1BASF SE, Ludwigshafen (Germany)

13:10 Invited Lecture

Mechanical properties of aluminium foam filled aluminium tubes

M. Vesenjak (Sp)¹
1University of Maribor (Slovenia); 2University of Aveiro (Portugal); 3University of Split (Croatia)

13:40 Porous structures based on hollow copper fibre fabrics

J. Weise (Sp)¹
J. Baumeister; S. Böhmer; J. Toebelmann²
¹Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM, Bremen (Germany); ²Statek Produktions & Vertriebs GmbH, Bremen (Germany)

**Seminarraum 6**

**Physical, chemical, mechanical, thermal and optical properties**

O. Andersen, Fraunhofer-Institute for Manufacturing Technology and Advanced Materials IFAM, Dresden (Germany)

13:10 Keynote Lecture

Functionalisation of cellular filtering materials for steel melt: a contribution to clean steel technologies

P. Gehre (Sp)¹
1Czech Academy of Sciences, Brno (Czech Republic); 2Bruno University of Technology VUT (Czech Republic); 3Slovak Academy of Sciences, Bratislava (Slovakia)

13:40 The measurement of reticulated ceramic foams by mercury intrusion porosimetry

C. Voigt (Sp)¹
1University of Kassel (Germany)

**Seminarraum 9**

SFB CRC 920

T. Fey, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) (Germany)

Programme Wednesday 14:00 - 15:00

**Manufacturing (cont.)**

14:00 Preparation and characterization of novel inexpensive and environmentally friendly Al2O3/SiO2/CaO ceramic foams.

L. Bertolla (Sp)¹
O. Sèvecek²; L. Dlouhý²; P. Roucůvá³; P. Tatárko³; Z. Chlup³
¹Czech Academy of Sciences, Brno (Czech Republic); ²Brno University of Technology VUT (Czech Republic); ³Slovak Academy of Sciences, Bratislava (Slovakia)

14:20 Development of hollow polymeric fibres for biomedical applications by gas dissolution foaming

S. Barroso Solares (Sp)¹
D. Cuadra Rodríguez¹; M.A. Rodríguez Pérez¹; J. Pinto¹
¹University of Valladolid (Spain)

14:40 Grading curve of hollow spheres composites

S. Misch (Sp)¹
L.T. Nguyễn¹; H.-C. Möhring²
¹TU Bergakademie Freiberg (Germany); ²Otto von Guericke University Magdeburg (Germany)

**Physical, chemical, mechanical, thermal and optical properties (cont.)**

14:00 Effects of heat treatment on compression behavior of open-cell AlCu4 foams

P. Kubelka (Sp)¹
A.M. Matz²; N. Jost³
¹Pforzheim University of Applied Sciences (Germany)

14:20 Absorbing Sound - Low Frequency Phononic Band Gap Materials via Electron Beam Melting

M. Wormser (Sp)¹
C. Körner¹
¹Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Fürth (Germany)

14:40 Ductile behavior of Al2O3-C foam filter structures with functionalized coatings at temperatures up to 1500°C

Y. Ranglack-Klemm (Sp)¹
E. Stört¹; C.G. Aneziris¹; H. Biermann¹
¹TU Bergakademie Freiberg (Germany)

14:00 Simulation of Microarchitectured Sheet-Based Lattices

O. Al-Ketan¹; R. Rezgui¹; H. Du³; N.X. Fang³
¹Czech Academy of Sciences, Brno (Czech Republic); ³Slovak Academy of Sciences, Bratislava (Slovakia)

14:20 Analysis of plate-like alumina in 42CrMo4 and resulting mechanical properties after treatment with ceramic foam filters

J. Gleinig (Sp)¹
M. Selezněv; K.Y. Wong¹; S. Henschel¹; A. Weidner¹; E. Störtl¹; H. Biermann¹; L. Krüger¹
¹TU Bergakademie Freiberg (Germany)
Programme Wednesday 15:00 - 16:20

**Session 15:00**

**Chair**

E. Ionescu, Technische Universität Darmstadt (Germany)

**Invited Lecture**

Solidification templating of cellular polymer-derived ceramics employing photo-induced click chemistry

T. Konegger (Sp); R. Obmann; G. Mikl

1TU Wien (Austria)

**Combination of the Schwartzwalder technique and freeze casting for preparation of RPCs with tailored strut porosity**

K. Schelm (Sp); K. Dammler; T. Fey; U. Betke; M. Scheffler

1Otto von Guericke Universität Magdeburg (Germany); 2Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) (Germany)

**Application of Wood-based Panels with foam in the Core of the Depth Filtration System**

K. Sae-Ueng (Sp); J. Martín de Léon; I. Sanchez-Calderon; E. Laguna-Gutierrez; J. Martín de Léon; I. Sanchez-Calderon

1TU Bergakademie Freiberg (Germany)

**Coffee Break**


Programme Wednesday 16:20 - 17:20

**Session 16:20**

**Chair**

E. Ionescu, Technische Universität Darmstadt (Germany)

**Invited Lecture**

Solidification templating of cellular polymer-derived ceramics employing photo-induced click chemistry

T. Konegger (Sp); R. Obmann; G. Mikl

1TU Wien (Austria)

**Cellular structures with tailored thermal conductivity**

U. Betke (Sp); M. Scheffler

1Otto von Guericke Universität Magdeburg (Germany)

**Carbon-bonded alumina filters for a novel melt refining approach in continuous casting of steel**

T. Wetzig (Sp); B. Luchini; S. Dudczig; J. Hubalková; C. G. Aneziris

1TU Bergakademie Freiberg (Germany)

**Interface reactions of differently coated carbon-bonded alumina filters with an AZ91 magnesium alloy melt**

A. Schramm (Sp); B. Bock; A. Schmidt; T. Zienert; T. Wetzig

1TU Bergakademie Freiberg (Germany); 2AGH University of Science and Technology, Krakow (Poland)

**Spinel forming Systems (Fe-/Mg-/Mn-Al-O) as Functional Coating on Interface reactions of differently coated carbon-bonded alumina filters with an AZ91 magnesium alloy melt**

A. Schramm (Sp); B. Bock; A. Schmidt; T. Zienert; T. Wetzig

1TU Bergakademie Freiberg (Germany); 2AGH University of Science and Technology, Krakow (Poland)

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**Application of Wood-based Panels with foam in the Core of the Depth Filtration System**

K. Sae-Ueng (Sp); J. Martín de Léon; I. Sanchez-Calderon; E. Laguna-Gutierrez; J. Martín de Léon; I. Sanchez-Calderon

1TU Bergakademie Freiberg (Germany)

**Coffee Break**


Programme Wednesday 17:00 - 18:00

**Session 17:00**

**Chair**

E. Ionescu, Technische Universität Darmstadt (Germany)

**Invited Lecture**

Solidification templating of cellular polymer-derived ceramics employing photo-induced click chemistry

T. Konegger (Sp); R. Obmann; G. Mikl

1TU Wien (Austria)

**Manufacturing of open-celled aluminum foams by the sponge replication technique**

A. Sutygina (Sp); U. Betke; M. Scheffler

1Otto von Guericke Universität Magdeburg (Germany)

**On the scaling of natural and artificial cellular materials: Do they obey Weibull’s laws?**

K. Nickel (Sp); C. Lauer; G. Buck; K. Klang; T. Speck; S. Schmier

1University of Tübingen (Germany); 2University of Tübingen (Germany)

1Albert-Ludwigs-Universität Freiburg (Germany)

1AGH University of Science and Technology, Krakow (Poland)
Programme Wednesday 17:20 - 19:00

Session Manufacturing (cont.)

17:20 Mechanism and active control of cell formation in foam injection molding
M. Tromm (Sp)¹; H.-P. Heim¹
¹University of Kassel (Germany)

Strain rate effects on mechanical properties of auxetic cellular structures
N. Novak (Sp)¹; M. Vesenjak¹; L. Krstulovic-Opara¹; K. Hokamoto¹; Z. Ren¹
¹University of Maribor (Slovenia); ²University of Split (Croatia); ³Kumamoto University (Japan)

Physical, chemical, mechanical, thermal and optical properties (cont.)

Strain rate effects on mechanical properties of auxetic cellular structures
N. Novak (Sp)¹; M. Vesenjak¹; L. Krstulovic-Opara¹; K. Hokamoto¹; Z. Ren¹
¹University of Maribor (Slovenia); ²University of Split (Croatia); ³Kumamoto University (Japan)

17:40 Manufacturing of foamable semi-finished products for sandwiches with foamed core and cover sheets made of Aluminum produced by extrusion
C. Hannemann (Sp)¹; J. Hohlfeld¹; T. Hipke¹; F. Schneider¹
¹Fraunhofer Institute for Machine Tools and Forming Technology IWU, Chemnitz (Germany)

Metallic Sheet-based Lattices: Role of Geometry on Controlling the Mechanical Properties
Q. Al-Ketan¹ (Sp), R. Rowshan², R.K. Abu Al-Rub¹
¹Khalifa University of Science and Technology, Abu Dhabi (UAE); ²New York University Abu Dhabi (UAE)

18:00 Mechanical properties of expanded polypropylene foam at different temperatures
D. Morton (Sp)¹; A. Reyes¹; A. Clausen¹; O.S. Hopperstad¹
¹Norwegian University of Science and Technology - NTNU, Trondheim (Norway)

18:20 Short Break

Programme Wednesday 19:00 - 22:00

Seminarraum 1

19:00 Oral Poster session
Chair T. Fey, Friedrich-Alexander-Universitét Erlangen-Nürnberg (FAU) (Germany)

P-5 Active meta-materials with adjustable pore size
R. Hedayati (Sp)¹; S. van der Zwaag¹
¹Delft University of Technology (Netherlands)

P-8 Initiation of plateau region during compression test of porous metals with aligned unidirectional pores
T. Tamai (Sp)¹; D. Muto¹; T. Yoshida¹; S. Suzuki¹; M. Vesenjak²; Z. Ren²
¹Waseda University, Tokyo (Japan); ²University of Maribor (Slovenia)

P-11 Battery housings for electric vehicles using CFRP and aluminium foam
J. Baumeister (Sp)¹; J. Weise¹
¹Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM, Bremen (Germany)

P-17 Manufacturing and characterization of open-cell stainless steel foams by investment casting
J. Frörent (Sp)¹; T.G. Lott¹; A.M. Matz²; N. Jost¹
¹Pforzheim University of Applied Sciences (Germany)

P-19 Interface formation of Mg2X (X = Si, Sn) in cellular Si infiltrated by Mg(Sn) alloys
A.M. Matz (Sp)¹; B.S. Matz²; J. Heimann¹; N. Jost¹
¹Pforzheim University of Applied Sciences (Germany)

P-40 Characterisation of NiTi cellular materials fabricated by the powder-metallurgy spaceholder technique
K. Dahm (Sp)¹, K. Gabryska², P. Calloch¹
¹Callaghan Innovation Ltd., Lower Hutt (New Zealand); ²Technische Universität Dresden (Germany)

P-50 Polymeric foams 3D numerical mechanical modelling
S. Tagliaabue (Sp)¹; L. Andena¹; M. Nacucchi²; F. De Pascalis¹
¹Politecnico di Milano (Italy); ²Italian National Agency for New Technologies, Energy and Sustainable Economic Development ENEA, Brindisi (Italy)

P-57 Nanocellular polymers based on PMMA/sepiolite nanocomposites: characterization of the mechanical behaviour
V. Bernardo (Sp)¹; J. Martin de León¹; F. Van Loock²; N. Fleck²; P. Cimavilla-Roman¹; S. Perez-Tamarit¹; M.A. Rodriguez Pérez²
¹University of Valladolid (Spain); ²University of Cambridge (United Kingdom)

P-59 Impact resistant foams based on PP/POE blends
S. Muñoz Pascual (Sp)¹; C. Saiz Arroyo²; M.A. Rodriguez Pérez¹
¹University of Valladolid (Spain); ²CellMat Technologies S.L., Valladolid (Spain)

P-62 Crosslinked open cell ethylene butyl acrylate copolymer (EBA) foams: properties and applications
E. Lopez (Sp)¹; C. Saiz Arroyo²; M.A. Rodriguez Pérez¹
¹University of Valladolid (Spain); ²CellMat Technologies S.L., Valladolid (Spain)
Programme Wednesday Postersession

P-63 Production of microcellular PMMA using the bead foaming technology
M. Mugica (Sp); V. Bernardo; J. Martín de León; C. Saiz Arroyo; M.A. Rodríguez Pérez
1University of Valladolid (Spain); 2CellMat Technologies S.L, Valladolid (Spain)

P-64 Nanocellular PMMA with tunable cellular structure by changing the rheological behaviour of the polymer matrix.
J. Martín de León (Sp); V. Bernardo; M.A. Rodríguez Pérez
1University of Valladolid (Spain)

P-67 Influence of molecular weight in the solubility, diffusivity and the subsequent cellular structure of polystyrene foams
A. Ballesteros (Sp); E. Laguna-Gutierrez; M.A. Rodríguez Pérez
1University of Valladolid (Spain)

P-73 Production of thermoplastic polyurethane foams synthesized with different contents of hard segment and graphene nanoplatelets by the gas dissolution foaming process
M. Santiago-Calvo (Sp); H. Najd; V. Bernardo; J. Martín de León; A. Saiani; F. Villafañe; M.A. Rodríguez Pérez
1University of Valladolid (Spain); 2The University of Manchester (United Kingdom)

P-82 Surface functionalized filters for aluminum melt filtration
C. Voigt (Sp); C. G. Aneziris
1TU Bergakademie Freiberg (Germany)

P-83 Crushing strength measurement at reticulated ceramic foams ex situ and in situ CT analysis
C. Voigt (Sp); J. Hubálková; C. G. Aneziris
1TU Bergakademie Freiberg (Germany)

P-115 Accurate separation of open cell metal foams using remote laser cutting technique
R. Baumann (Sp)
1Fraunhofer Institute for Material and Beam Technology IWS Dresden (Germany)

P-116 Generation of artificial foam structures and evaluation of their thermo-mechanical, flow and filtration characteristics
C. Settgast (Sp); M. Abendoth; E. Werzner; C. Demuth; M. Kuna; S. Ray
1TU Bergakademie Freiberg (Germany)

P-120 Surface modification of magnesium-based foams by Directed Plasma Nanosynthesis
V.M. Posada Pérez (Sp), University of Illinois at Urbana-Champaign

20:00 Posterdiscussion Evening

Programme Thursday 08:50 - 09:50

Thursday

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| **P-63** Production of microcellular PMMA using the bead foaming technology | **Thursday**
M. Mugica (Sp); V. Bernardo; J. Martín de León; C. Saiz Arroyo; M.A. Rodríguez Pérez
1University of Valladolid (Spain); 2CellMat Technologies S.L, Valladolid (Spain) |

| **P-64** Nanocellular PMMA with tunable cellular structure by changing the rheological behaviour of the polymer matrix. | 08:50 **Keynote Lecture**
J. Martín de León (Sp); V. Bernardo; M.A. Rodríguez Pérez
1University of Valladolid (Spain) |

| **P-67** Influence of molecular weight in the solubility, diffusivity and the subsequent cellular structure of polystyrene foams | 09:10 Mechanical performance and deformation characteristics of cellular structures produced by additive manufacturing techniques
A. Gurlo (Sp)
1Technische Universität Berlin (Germany) |

| **P-73** Production of thermoplastic polyurethane foams synthesized with different contents of hard segment and graphene nanoplatelets by the gas dissolution foaming process | 09:30 **Use of polymers for the production of metallic scaffolds via direct ink writing**
L. Biasetto (Sp); H. Elsayed; P. Rebesan
1University of Padova, Vicenza (Italy) |

| **P-82** Surface functionalized filters for aluminum melt filtration | 09:40 **Nanoscale quasi-static and fatigue behaviour of open-cell aluminium foam struts**
C. Voigt (Sp); C. G. Aneziris
1TU Bergakademie Freiberg (Germany) |

| **P-83** Crushing strength measurement at reticulated ceramic foams ex situ and in situ CT analysis | 09:50 **Understanding the behaviour of semi-transparent nanocellular PMMA: study of the transmittance and modelling.**
C. Voigt (Sp); J. Hubálková; C. G. Aneziris
1TU Bergakademie Freiberg (Germany) |

| **P-115** Accurate separation of open cell metal foams using remote laser cutting technique | 09:50 **Use of polymers for the production of metallic scaffolds via direct ink writing**
R. Baumann (Sp)
1Fraunhofer Institute for Material and Beam Technology IWS Dresden (Germany) |

| **P-116** Generation of artificial foam structures and evaluation of their thermo-mechanical, flow and filtration characteristics | 09:50 **Nanoscale quasi-static and fatigue behaviour of open-cell aluminium foam struts**
C. Settgast (Sp); M. Abendoth; E. Werzner; C. Demuth; M. Kuna; S. Ray
1TU Bergakademie Freiberg (Germany) |

| **P-120** Surface modification of magnesium-based foams by Directed Plasma Nanosynthesis | 09:50 **Use of polymers for the production of metallic scaffolds via direct ink writing**
V.M. Posada Pérez (Sp), University of Illinois at Urbana-Champaign |

20:00 Posterdiscussion Evening
Programme Thursday 09:50 - 11:00

09:50 MAX-phase (Ti2AlC) foams by gelcasting
T. Fey (Sp); M. Stumpf;
A. Chmielarz;
P. Colombo;
P. Greil
Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) (Germany);
university of Padova (Italy)

10:10 Casting and mechanical properties of iron-based open cell foams
A. Kaya (Sp); P. Zaslansky;
A. Rack; S.F. Fischer;
C. Fleck
Technische Universität Berlin (Germany);
Charité Universitätsmedizin Berlin (Germany);
European Synchrotron Radiation Facility ESRF, Grenoble (France);
RWTH Aachen University (Germany)

10:30 Coffee Break

Programme Thursday 11:00 - 11:50

11:00 Invited Lecture
Lightweight, tough and surface defect-free nanocellular PP/PTFE nanocomposite foam enabled by in-situ nano-fibrillation and nanocellular injection molding
G. Wang (Sp)
Shandong University - SDU, Jinan (China)

11:30 Analysis of single-phase moment and heat transfer in open-celled structures
K. Dubil (Sp);
S. Meinicke;
B. Dietrich
Karlsruhe Institute of Technology (KIT) (Germany)

Modern Techniques of Atomic Force Microscopy (AFM) in Life Sciences
S. Kostrowski (Sp);
N. Neumann;
D. Stamov; H. Haschke;
T. Jähnke
JPK Instruments AG, Berlin (Germany)

Invited Lecture
Strongly Anisotropic Open Cell Porous Metal Structures for Heat Transfer Applications
M. Fink (Sp);
O. Andersen;
T. Klemm;
A. Schlott;
B. Kieback
Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM, Dresden (Germany)

Investigation of the structure formation of Freeze Foams on the example of biocompatible ceramics
D. Werner (Sp);
A. Ahlhelm;
J. Maier;
T. Behnisch;
T. Moritz;
A. Michaelis;
M. Gude
Fraunhofer Institute for Ceramic Technologies and Systems IKTS, Dresden (Germany); Technische Universität Dresden (Germany)

Session Manufacturing (cont.)

Chair:
A. Gurlo, Technische Universität Berlin (Germany)

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Session Manufacturing (cont.)

Chair:
A. Gurlo, Technische Universität Berlin (Germany)
Programme Thursday 11:50 - 14:00

11:50

Localized in situ synthesis of nanoparticles as a promising route for the development of templated PMMA foams by gas dissolution foaming

J. Pinto (Sp); D. Morselli; V. Bernardo; B. Notario; D. Fragouli; A. Athanassiou; M.A. Rodríguez Pérez

1University of Valladolid (Spain); 2Istituto Italiano di Tecnologia IIT, Genova (Italy)

Stress Simulation for Complex Porous Microstructures

J. Fieres (Sp); K. Nigge; C. Reinhart; P. Schumann

1Volume Graphics GmbH, Heidelberg (Germany); 2Concept Laser GmbH, Lichtenfels (Germany)

Freeze cast alumina foams with hierarchical strut porosity

K. Dammler (Sp); K. Schelm; T. Fey; U. Betke; M. Scheffler

1Otto von Guericke University Magdeburg (Germany); 2Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) (Germany)

A new strategy to control the cellular anisotropy ratio in natural rubber foams

L. Oliveira Salmazo (Sp); A. López-Gil; M.A. Rodríguez Pérez

1University of Valladolid (Spain); 2CellMat Technologies, Valladolid (Spain)

12:10

Freeze cast alumina foams with hierarchical strut porosity

K. Dammler (Sp); K. Schelm; T. Fey; U. Betke; M. Scheffler

1Otto von Guericke University Magdeburg (Germany); 2Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU) (Germany)

12:30

Influence of compaction on foaming behaviour of aluminium precursors

T. Neu (Sp); P.H. Kamm; F. García-Moreno; J. Banhart

1Technische Universität Berlin (Germany); 2Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (Germany)

Structural characterisation and related properties of open-celled ceramic and metal foams

A. Füssel (Sp); G. Standke; D. Haase; J. Adler

1Fraunhofer Institute for Ceramic Technologies and Systems IKTS, Dresden (Germany)

12:50

Lunch Break

Programme Thursday 14:00 - 15:00

14:00

Invited Lecture

Additive Manufacturing with Geopolymers

P. Colombo (Sp); P. Scanferla; G. Franchin

1University of Padova (Italy)

Design, manufacturing and properties of metallic sandwiches using open cellular metallic cores

O. Andersen (Sp); M. Franke; B. Kieback

1Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM, Dresden (Germany); 2Technische Universität Dresden (Germany)

Impact loading on sandwich structures with polymeric foam cores

A. Reyes (Sp); T. Barvik

1Norwegian University of Science and Technology - NTNU, Trondheim (Norway)

14:20

Invited Lecture

Control of larger pore sizes in phase separating sodium borosilicate glasses by heat treatment

H. Roggendorf (Sp); S.A.H. Sanders; D. Enke

1Martin Luther University Halle-Wittenberg (Germany); 2Leipzig University (Germany)

On the creep deformation behaviour and elastic stiffness of carbon-bonded ceramic foams

C. Settgast (Sp); Y. Ranglack-Klemm; M. Abendroth; M. Kuna; H. Biermann

1TU Bergakademie Freiberg (Germany)
### Programme Thursday 15:00 - 16:20

<table>
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</table>
| 15:00 | Keynote Lecture | Nanocellular polymers. Novel approaches to produce these materials using gas dissolution foaming | M.A. Rodríguez Pérez (Sp); J. Pinto; V. Bernardo; J. Martín de Leon  
1University of Valladolid (Spain); 2University of Valladolid / CellMat Laboratory (Spain) |
| 15:20 | Attenuation of vibrations with particle filled hollow sphere structures | U. Jehning (Sp); P. Quadbeck; J. Hohlfeld; O. Andersen; B. Kieback  
1Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM, Dresden (Germany); 2Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM, Branch Lab Dresden (Germany); 3Fraunhofer Institute for Machine Tools and Forming Technology, Chemnitz (Germany) |
| 15:40 | Sintering nanopowder | K. Dammier (Sp)  
1Otto von Guericke University Magdeburg (Germany) |
| 16:00 | Coffee Break | | |

### Programme Thursday 16:20 - 17:10

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| 16:20 | Invited Lecture | Mechanism of Foaming Light-Weight Glass Foams | R.R. Petersen (Sp)  
1Aalborg University (Denmark) |
| 16:40 | Processing and Coating of Bead Foams | | J. Gensel (Sp); J. Schwemmer; P. Schreier; T. Neumeyer; V. Altstädt  
1Neue Materialien Bayreuth GmbH (Germany); 2Neue Materialien Bayreuth GmbH and University of Bayreuth (Germany) |
| 16:50 | Novel AI/Al2O3 composite foams by direct oxidation conversion | X. Chen (Sp); R. Sun; U. Betke; M. Scheffler  
1Otto von Guericke University Magdeburg (Germany) |
| 17:00 | Rigid polyurethane foams from polyol functionalized with graphene oxide: optimization of the physical properties based on a systematic study of the reaction kinetics | M. Santiago-Calvo (Sp); V. Blasco; C. Ruiz; R. Paris; F. Villafañe; M.A. Rodríguez Pérez  
1University of Valladolid (Spain); 2Repsol S.A., Madrid (Spain) |
Programme Thursday 17:10 - 23:00

17:10 Invited Lecture
Porous metal tapes for application in PEM electrolysis cells and solid oxide fuel cells
M. Bram (Sp); F. J. Hackemüller; F. Thaler; D. Udomsilp
1Forschungszentrum Jülich GmbH (Germany)

17:40 Break
Festsaal

19:00 Highlight Lecture
Beer foam and its significance for beer quality
C. Neugrodda (Sp)
1TU München, Lehrstuhl für Brau- und Getränketechnologie (Germany)

Beer foam is one of the most important qualities of beer. It is the first impression of the consumer who linked a stable beer with a high quality beer. In addition, the beer foam has a great influence on the sensory evaluation of beer. In order for the beer foam to be stable, the brewer needs a great deal of knowledge about the foam. The lecture shows the importance of the beer foam and what the brewer does to preserve it.

20:00 Social Evening at the Restaurant of Monastery Banz

Programme Friday 09:30 - 10:30

Friday

Seminarraum 1
Bioengineering, biomaterials and life science

09:30 Keynote Lecture
Surface and interface nano-to-mesoscale patterning of biomimetic architected cellular materials
J. Allain (Sp); A. Civantos; A. R. Shetty; S. Arias; A. Barnwell; J. Pavón; Y. Torres; J. Rodríguez-Ortiz; C. Domínguez; J. F. Ramírez; V. M. Posada
1University of Illinois, Urbana (United States); 2Universidad de Antioquia, Medellin (Colombia); 3Universidad de Sevilla (Spain); 4Universidad Nacional de Colombia, Medellin (Colombia); 5Universidad Pontificia Bolivariana, Medellin (Colombia)

10:10 Structure and Properties of Porous Titanium Coating Deposited by Shock Wave Induced Spraying
L. Lefebvre (Sp); E. Ionescu
1National Research Council Canada, Boucherville (Canada)

Seminarraum 6
Functionalization

09:30 Keynote Lecture
Graded and layered foams by gas foaming
E. Di Maio (Sp)
1University of Naples Federico II, Naples (Italy)

One-pot synthesis of a C/βSiFeN(O)-based ceramic paper with in-situ generated hierarchical micro/nano-morphology
E. Ionescu (Sp); H.-J. Kleebe; R. Riedel
1Technische Universität Darmstadt (Germany)
10:30 Magnesium Sponges as Resorbable Bone Implants Manufactured by Investment Casting
S. Julmi (Sp)
Leibniz Universität Hannover, Garbsen (Germany)
Integration of thermally active materials during the formation of open porous metal structures
J. Baumeister (Sp)
J. Weise, M. Möllers
H. Seifarth, S.-J. Ernst
Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM, Bremen (Germany);
Fraunhofer Institute for Solar Energy Systems ISE, Freiburg (Germany)
Cellular spacer structures from polymeric and metallic threads for medical and composite applications
F. Wieczorek (Sp)
W. Trümper, C. Cherif
Technische Universität Dresden (Germany)

10:50 Invited Lecture
Macroporous scaffolds by laser sintering from PLGA/bioactive glass composite microspheres
F. Schmidt (Sp)
Technische Universität Berlin (Germany)

11:10 Coffee Break

11:20 Invited Lecture
Cellular spacer structures from polymeric and metallic threads for medical and composite applications
F. Wieczorek (Sp)
W. Trümper, C. Cherif
Technische Universität Dresden (Germany)

11:40 Closing Remarks
M. Scheffler, Otto von Guericke University Magdeburg (Germany)
Exhibitors

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ChemPur Feinchemikalien und Forschungsbedarf GmbH was founded in 1988 as a subsidiary of W.C. Heraeus GmbH Hanau under the company name Heraeus Feinchemikalien und Forschungsbedarf GmbH – since 1996 ChemPur has existed as an independent GmbH (German limited company). Today, we are among the most renowned providers of metals and fine chemicals for research and development. Our worldwide network of agents allows us to supply almost all materials.

Our delivery program includes more than 4,000 pure and high pure metals in all available forms, evaporation materials, sputtering targets from metallic and non-metallic materials, inorganic specialty chemicals up to the highest level of purity, precious-metal compounds, catalysts, rare earth compounds and nanopowder as well as laboratory equipment and semi-finished products made from platinum and platinum alloys.

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JPK Instruments AG is a world-leading manufacturer of nanoanalytic instruments - particularly atomic force microscope (AFM) systems and optical tweezers - for a broad range of applications reaching from soft matter physics to nano-optics, from surface chemistry to cell and molecular biology. From its earliest days applying atomic force microscope (AFM) technology, JPK has recognized the opportunities provided by nanotechnology for transforming life sciences and soft matter research. This focus has driven JPK’s success in uniting the worlds of nanotechnology tools and life science applications by offering cutting-edge technology and unique applications expertise.

Headquartered in Berlin and with direct operations in Dresden, Cambridge (UK), Singapore, Tokyo, Shanghai (China), Paris (France) and Carpinteria (USA), JPK maintains a global network of distributors and support centers and provides on the spot applications and service support to an ever-growing community of researchers.

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Volume Graphics develops leading software for the analysis and visualization of industrial computed tomography (CT) data. Companies around the world use Volume Graphics software in research, development, production, quality control, and damage analysis.

Volume Graphics helps companies to find out as much about their products as possible – and non-destructively at that. CT provides the basis for this, as CT scans reveal every aspect of an object.

The high-end software VGSTUDIO MAX offers versatile functions to analyze complex microstructures such as porous metals or ceramics, 3D printed lattice structures or metal-metal laminates. To determine their effective mechanical properties, VGSTUDIO MAX offers micromechanics simulations that overcome the limits of meshing.

Since 1997, Volume Graphics has been developing software for industrial CT at its headquarters in Heidelberg, Germany. Employees in offices in the USA, Japan, China, and Singapore offer sales and support in their respective regions.
### List of Authors & Participants

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About the Banz Monastery

The story of Banz Monastery According to legend, Countess Alberada founded the heavily fortified Banz Castle around 1070, in order to establish a Benedictine monastery after her husband, Count Hermann von Vohburg, was killed in a tournament. In 1505, Banz was burned to the ground, rebuilt and then once again destroyed during the Thirty Years’ War. The altars were demolished and the bells, the organ and the contents of the library were all stolen. It was not until the Counter-Reformation that the Benedictine abbey once again flourished as a spiritual and cultural centre, reaching the height of its powers under Abbot Otto de la Bourde. The monastery was subsequently rebuilt by Leonhard and Johann Dientzenhofer and Balthasar Neumann, and the church was consecrated in 1719. The interior decoration was carried out by the Vogel brothers and the Baroque artist, Sebastian Reinhard.

During the Enlightenment, the monastery became known as a major centre of scholarship in the humanities and natural science. This golden age of monastic life then began to decline with the increasing onset of secularism.

In 1814, Duke Wilhelm in Bavaria acquired the monastery and used it as his summer residence. Banz played host to many prominent guests, such as the Russian Tsarina, the Kings of Bavaria and Prussia and eminent scholars and artists such as Viktor von Scheffel, who penned his well-known song “Wohlauf, die Luft geht frisch und rein” while staying at the castle in 1859. After the First World War, Duke Wilhelm leased the property to a community of Trappists and Banz Castle once again became a monastery. In 1933, the Community of the Holy Angels bought the monastery, and during the Second World War Banz was turned into a military hospital. After the order moved out in 1964, a large part of the building was used to house a Caritas retirement home. In 1979, the Hanns-Seidel-Stiftung bought the former abbey, which was in a state of some disrepair, and carried out extensive renovation works.

On 22nd April 1983, Banz Monastery opened its doors as a centre for adult political education.
Travel Information

Getting to Banz Monastery

By public transport:
Train to Bad Staffelstein or Lichtenfels (ICE stop), and from there by taxi to Banz Monastery

By car:
A73 motorway to Lichtenfels-Nord (Exit 12) or Bad Staffelstein-Kurzentrum (Exit 14), then follow the signs to “Kloster Banz”

GPS coordinates: 50°08’01.6”N 10°59’59.3”E
Location: 96231 Bad Staffelstein, Kloster-Banz-Straße
With the add-on module Structural Mechanics Simulation for VGSTUDIO MAX, you can simulate where a part would break directly on CT data—without time-consuming and lossy mesh generation.

Harmless discontinuity or serious flaw? Find out with a few clicks whether a pore leads to the failure of the part when force is applied.

Join our presentation “Stress Simulation for Complex Porous Microstructures”!