Developing the Powder Metallurgy Future

european powder
metallurgy association

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Technical Programme

5 – 7 October 2020

Virtual Congress

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Representing the Powder Metallurgy Industry

european powder
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10 Reasons to join the EPMA

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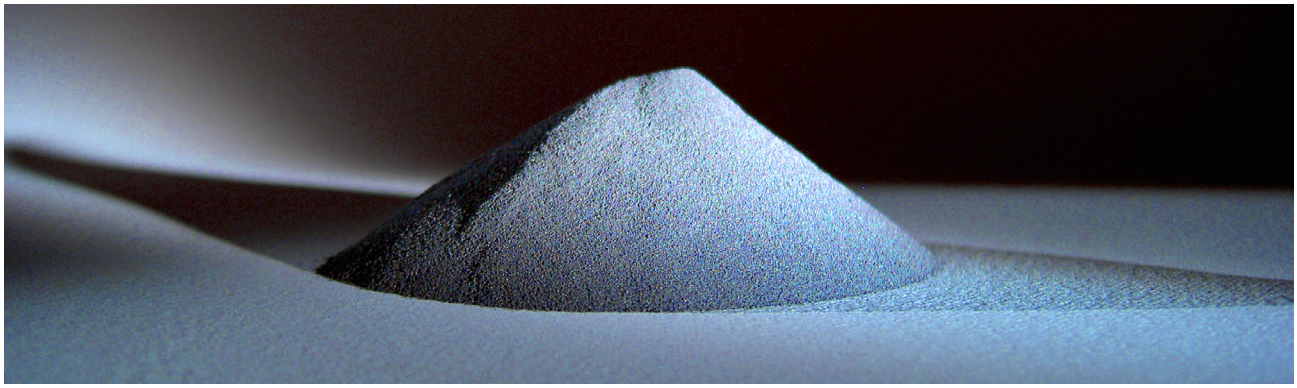

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*Student members do not receive the journal Powder Metallurgy as part of their membership

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This version was last updated on 01/10/20

About Euro PM2020 Virtual Congress

The Euro PM2020 Congress is the foremost event for the international powder metallurgy community, and provides the focal point for industry personnel, researchers, and suppliers to meet, network and develop their business.

The Euro PM2020 Congress programme will include over 180 technical papers presented in oral and poster sessions, including EPMA Keynote Paper Award presentations, as well as **thirteen** in-depth Special Interest Seminars. Details of the full programme can be found on the following pages, and on our website www.europm2020.com.

For the first time the event will be held entirely online in 2020, allowing delegates to remotely access technical sessions either live, or on demand. Live Q & A sessions with authors will provide opportunity for in-depth PM discussions.

Congress Organiser

Euro PM2020 is sponsored and organised by the European Powder Metallurgy Association (EPMA), in co-operation with key members of the PM community and across Europe.

Founded in 1989, EPMA is the leading PM trade association representing the interests of the entire European PM community, and promoting PM technology throughout the world.

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For further information on Euro PM2020 Congress please contact:

European Powder Metallurgy Association

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Shocklogic
E: registration-epma@shocklogic.com

The EPMA reserves the right to make changes to the final programme. All programme timings, content and fees correct at time of creation. E&OE.

An electronic version will be updated on **www.europm2020.com** as necessary.

Euro PM2020 Congress and all associated meetings, sessions and events are ruled according to EPMA Antitrust Guidelines. Details of which can be found here: **www.epma.com/antitrust**.

Event Sponsors

Gas atomised metal powders, superalloy PM billets, HIPped and HIP clad components. Types of Product: PM semi-products, net shape and near net shape, structural parts, prealloyed powders, bi-metallic part. Range of Materials: Nickel, cobalt.

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Congress Schedule

Interested in a particular topic?

The following seminars, technical sessions and meetings have been colour-coded to aid faster navigation throughout the Technical Programme and other EPMA booklets. Please see the guide below

- Additive Manufacturing
- Functional Materials
- Hard Materials and Diamond Tools
- Hot Isostatic Pressing
- Metal Injection Moulding
- New Materials Processes and Applications
- Press and Sinter
- Sustainability and Environment
- App Applications
- **KNP** Keynote Paper Award Presentation
- **SIS** Special Interest Seminar
- Industry Speakers

Please note schedules are listed in CET time (Brussels, Copenhagen, Madrid, Paris)

Monday 5 October 2020	
08.30 – 10.30	Plenary Session
10.40 - 12.10	Session 1: Material Deposition Technologies
10.40 - 11.40	Session 2: WC- Co Materials
10.50 - 11.50	App Session 3: Applications for Mobility
10.50 - 12.20	Session 4: **SIS** PIM of Functional Materials
11.50 - 13.30	Session 5: High temperature properties of HM **KNP**
12.00 - 13.30	App Session 6: General Applications
12.30 - 14.00	Session 7: Printing Technologies
12.30 - 14.00	Session 8: **SIS** Enabling technologies for MIM
13.40 - 14.40	Industry Speakers
13.50 - 15.20	Session 9: **SIS** Microstructural design of cemented carbides Part 1
14.10 - 15.40	Session 10: Beam Based Technologies
14.20 - 15.50	Session 11: Ferrous Powder
15.30 - 17.00	Session 12: **SIS** Microstructural design of cemented carbides Part 2
15.50 - 17.20	Session 13: Metal Binder Jetting
16.00 - 17.00	Session 14: Compaction

Tuesday 6 October 2020	
08.30 - 10.00	Session 15: Spreadability of powders for AM
08.30 - 10.10	Session 16: HIP & AM **KNP**
08.40 - 10.40	Session 17: Alternative HM System part 1
08.40 - 10.10	Session 18: **SIS** Functional Materials for High Temperature Application
10.10 - 11.40	Session 19: Powders for AM
10.20 - 11.20	Session 20: Hot Isostatic Pressing
10.20 - 11.50	Session 21: **SIS** Electrical Functional Materials
10.50 - 12.20	Session 22: Alternative HM System part 2

11.30 – 12.30	Industry Speakers
11.50 - 13.20	Session 23: Impurities in AM Powders
12.00 - 13.40	Session 24: AM - Special Materials
12.30 - 14.00	Session 25: Sintering of PM Steel
12.40 - 14.10	Session 26: **SIS** The opportunities of HIP in Additive Manufacturing
13.40 - 15.20	Session 27: AM Post Processing Part 1 **KNP**
13.50 - 15.20	Session 28: Powder, Recycling, and Environment
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16.00 – 17.00	Industry Speakers

Wednesday 7 October 2020

08.30 - 10.30	Session 33: AM Properties Lightweight Materials
08.30 - 10.00	Session 34: **SIS** Modelling of materials for Press & Sinter and their properties part 1
08.40 - 10.50	Session 35: FM Energy Management **KNP**
08.40 - 10.10	Session 36: Corrosion and Wear
10.10 - 11.40	Session 37: **SIS** Modelling of materials for Press & Sinter and their properties part 2
10.20 - 11.50	Session 38: Processing and applications
10.40 - 11.40	Session 39: AM Properties - Fatigue
11.00 - 12.00	Session 40: FM PM Magnetic Materials
11.50 - 12.50	Session 41: AM Properties Materials Development
11.50 - 12.50	Industry Speakers
12.00 - 13.30	Session 42: AM of HM
12.20 - 13.50	Session 43: Metals Ceramics Composites
13.00 - 14.30	Session 44: **SIS** Sustainability of Powder Metallurgy
13.10 - 14.40	Session 45: **SIS** AM connecting to Industry 4.0 and other digitalisation approaches
13.50 - 15.20	Session 46: MIM Advanced Processes
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14.40 - 16.40	Session 48: AM Properties Stainless Steel
14.50 - 16.20	Session 49: **SIS** Metal based multi-material AM - more degrees of freedom
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15.30 - 17.00	Session 50: MIM Properties and Materials

Congress Schedule By Strand

Additive Manufacturing

Monday 5 October

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12.30 - 14.00	Session 7: Printing Technologies
14.10 - 15.40	Session 10: Beam Based Technologies
15.50 - 17.20	Session 13: Metal Binder Jetting

Tuesday 6 October

08.30 - 10.00	Session 15: Spreadability of powders for AM
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12.00 - 13.40	Session 24: AM - Special Materials
13.40 - 15.20	Session 27: AM Post Processing Part 1
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10.40 - 11.40	Session 39: AM Properties - Fatigue
11.50 - 12.50	Session 41: AM Properties Materials Development
14.40 - 16.40	Session 48: AM Properties Stainless Steel

Hot Isostatic Pressing

Tuesday 6 October

08.30 - 10.10	Session 16: HIP & AM
10.20 - 11.20	Session 20: Hot Isostatic Pressing

Metal Injection Moulding

Wednesday 7 October

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15.30 - 17.00	Session 50: MIM Properties and Materials

Applications

Monday 5 October

10.50 - 11.50	Session 3: Applications for Mobility
12.00 - 13.30	Session 6: General Applications

Functional Materials

Wednesday 7 October

08.40 - 10.50	Session 35: FM Energy Management
11.00 - 12.00	Session 40: FM PM Magnetic Materials

Hard Materials and Diamond Tools

Monday 5 October

10.40 - 11.40	Session 2: WC- Co Materials
11.50 - 13.30	Session 5: High temperature properties of HM

Tuesday 6 October

08.40 - 10.40	Session 17: Alternative HM System part 1
10.50 - 12.20	Session 22: Alternative HM System part 2

Wednesday 7 October

08.40 - 10.10	Session 36: Corrosion and Wear
10.20 - 11.50	Session 38: Processing and applications
12.00 - 13.30	Session 42: AM of HM

New Materials Processes and Applications

Wednesday

12.20 - 13.50	Session 43: Metals Ceramics Composites
14.00 - 15.00	Session 47: High Temperature Materials

Industry Speakers

Monday 5 October

13.40 - 14.40	Industry Speaker

Tuesday 6 October

11.30 - 12.30	Industry Speaker
16.00 - 17.00	Industry Speaker

Wednesday 7 October

11.50 - 12.50	Industry Speaker
15.10 - 16.10	Industry Speaker

Press and Sinter

Monday 5 October

14.20 - 15.50	Session 11: Ferrous Powder
16.00 - 17.00	Session 14: Compaction

Tuesday 6 October

12.30 - 14.00	Session 25: Sintering of PM Steel
14.20 - 15.50	Session 30: Field Assisted Sintering and Hot Pressing
16.00 - 17.00	Session 32: Sintered Steels

Special Interest Seminars

Monday 5 October

10.50 - 12.20	Session 4: SIS PIM of Functional Materials
12.30 - 14.00	Session 8: SIS Enabling technologies for MIM
13.50 - 15.20	Session 9: SIS Microstructural design of cemented carbides Part 1
15.30 - 17.00	Session 12: SIS Microstructural design of cemented carbides Part 2

Tuesday 6 October

08.40 - 10.10	Session 18: SIS Functional Materials for High Temperature Application
10.20 - 11.50	Session 21: SIS Electrical Functional Materials
12.40 - 14.10	Session 26: SIS The opportunities of HIP in Additive Manufacturing
14.20 - 15.50	Session 29: SIS The opportunities of HIP in Powder Metallurgy

Wednesday 7 October

08.30 - 11.40	Session 34: SIS Modelling of materials for Press & Sinter and their properties part 1
10.10 - 11.40	Session 37: SIS Modelling of materials for Press & Sinter and their properties part 2
13.00 - 14.30	Session 44: SIS Sustainability of Powder Metallurgy
13.10 - 14.40	Session 45: SIS AM connecting to Industry 4.0 and other digitalisation approaches
14.50 - 16.20	Session 49: SIS Metal based multi-material AM - more degrees of freedom

Opening Plenary Session

Monday 5 October

Opening Plenary Session 08.30 – 10.30

Welcome from the EPMA Executive Director
Dr Lionel Aboussouan

Welcome from the EPMA President:
The European PM Industry – Current Status
Mr Ralf Carlström (EPMA President)

Presentation of the 2020 EPMA Awards

PM Thesis Competition Sponsored by Taylor & Francis

Keynote Paper Award Sponsored by Taylor & Francis

Distinguished Service Award 2020

Fellowship Award 2020

Current and new opportunities for PM components in New Mobility
Mr Jean Marie Réveillé
(A2Mac1)

EPMA Keynote Paper Award 2020

Keynote papers receive an extended oral presentation slot in the programme and will go on to be published in the journal Powder Metallurgy who sponsor the Award.

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The EPMA Keynote Papers for Euro PM2020 are:

Monday 5 October

Dr. MINGARD Ken
NPL - National Physical Laboratory, United Kingdom

Microstructural Observations Of High Temperature Creep Processes In Hardmetals

High temperature properties of HM – 11:50-12:30

Abstract: High temperature properties of hardmetals are critical to their use in many applications but a challenge to measure accurately. Creep behaviour is not well understood so this work has studied uniaxial tensile testing of small simple geometry samples to look at how modifications to the microstructure can affect creep behaviour at temperatures between 800 and 900°C. In particular, a carbon-ladder series with high, medium and low carbon contents in the 10wt%Co binder has been investigated. Significant differences between the stress-strain curves of the different carbon contents have been observed, but the underlying microstructural mechanisms appear to be similar in detailed large area examination of samples after failure. Penetration of Co along WC-WC boundaries with 'precipitation' of discrete islands is seen as well as formation of continuous thin lamellae while void formation tends to occur at WC-Co boundaries. EBSD mapping suggests Co penetration varies as a function of WC-WC misorientation.

Tuesday 6 October

Dr STRANDH Emil
Swerim, Sweden

Artificial Porosity Introduced During L-PBF Of IN718, And Its Effect On Fatigue Performance Before And After HIP

HIP & AM – 09:00-09:40

Abstract: During laser powder bed fusion (L-PBF) the protective atmosphere, normally Argon, can become trapped in cavities formed during the process. We have demonstrated this by introducing ø0.5 mm pores in the CAD file (totalling 0.5% by volume) and measuring a threefold increase in Argon content, versus an identical IN718 build-job without pores.

For critical applications where the material is subjected to cyclic loading, any defects can act as stress raisers and initiate cracks. The pores that were introduced drastically reduced the fatigue performance of said material. However, after Hot Isostatic Pressing (HIP), the material regained its properties as if the pores were never introduced. Still, the Argon remains after HIP according to measurements as it lacks solubility and thus cannot leave the IN718. Also, worth noting is that a small quantity of Argon originates from gas-atomization of the powder and thus does not leave entirely during the remelting in L-PBF.

Mr KOSONEN Topi
EOS Finland Oy, Finland

Evaluation Of Pore Re-opening After HIP In LPBF Ti-6Al-4V

AM Post Processing Part 1 – 14:40-15:20

Abstract: Higher build rates in Laser Powder Bed Fusion (LPBF) process in combination with Hot Isostatic Pressing (HIP) have been proposed to reduce the cost-per-part of Additive Manufacturing (AM). However, inert gas trapped in the pores could cause healed pores to re-grow after elevated temperature exposure. Therefore, understanding the possible effects of this pore re-opening phenomenon is crucial in maintaining quality of parts subjected to elevated temperatures during service. The aim of the present study was to investigate pore re-opening after HIP in Ti-6Al-4V parts by exposing samples to different elevated temperatures for varying times. The changes in the pore content were studied using microscopy and micro X-ray computed tomography (μ-CT) in combination with gas content analysis. Based on the results, it was concluded that for typical service temperatures of Ti-6Al-4V, pore re-opening was minimal.

Wednesday 7 October

Mr. OTT Jonas
Robert Bosch GmbH, Germany

Influence Of Porosity And Impurities On The Thermal Conductivity Of Pressure-less Sintered Cu Powder Green Bodies

FM Energy Management – 09:10-09:50

Abstract: Copper as a material with a high electrical and thermal conductivity awakes large interest for many applications in industry, e.g. thermal management of electronic components. Powder-based manufacturing techniques (e.g. Selective Laser Melting, Binder Jetting, Fused Filament Fabrication and Metal Injection Molding) enable the complex shaping of metals. Especially the methods without melting processes like Binder Jetting, Fused Filament Fabrication and Metal Injection Molding have a great potential for complex Cu structures. These techniques built up a powder based green body and require a subsequent sintering step to reach a high density with maximum properties. This work reports the development of the heat conductivity during pressure-less sintering of Cu powder green bodies. The experimental results are compared to analytical models and a numerical simulation and show the limits of the reachable heat conductivity depending on the remaining porosity and the impurity concentration.

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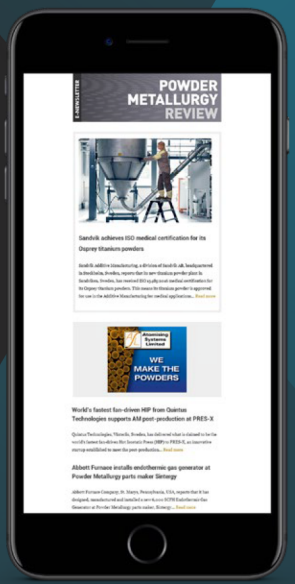

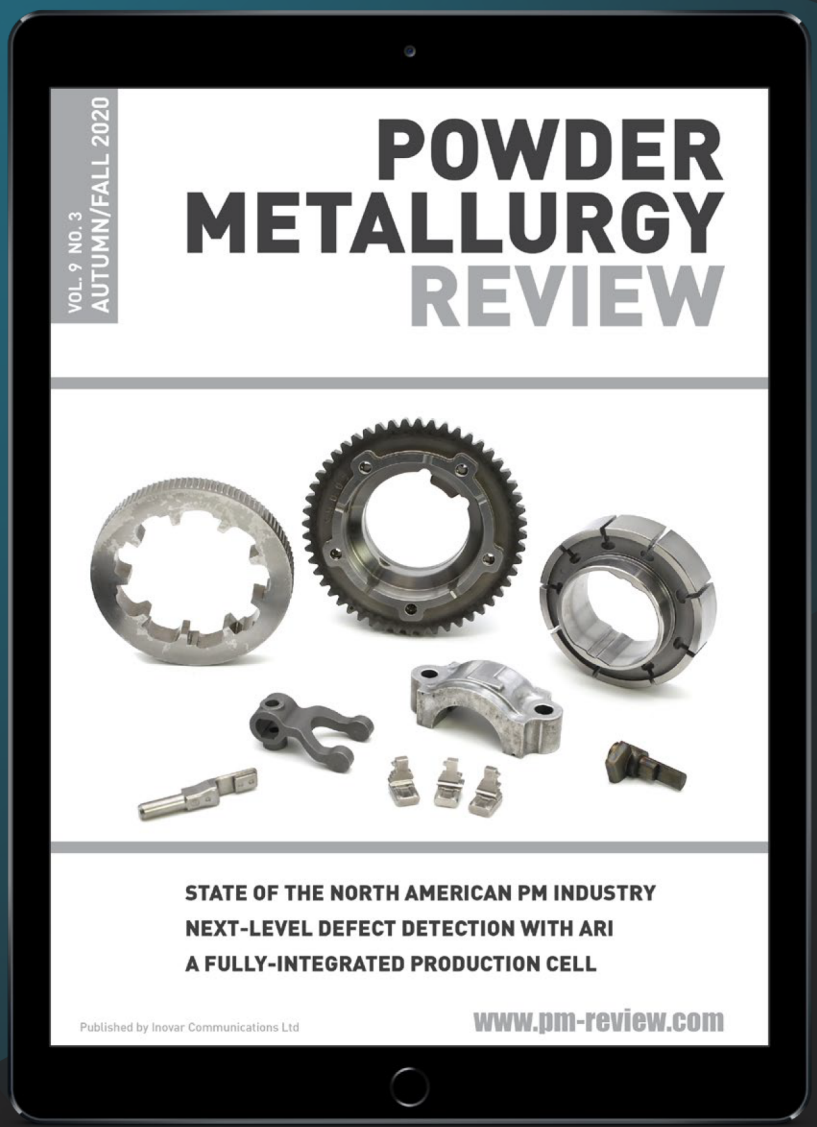

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- Plenary Session
- Keynote Presentations
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- Industry Speakers
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Developing the Powder Metallurgy Future

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*For some years CD versions of the proceedings are not available, only USB versions

Technical Sessions

Keynote and Oral Presentations, together with Special Interest Seminars, are integrated into a three-day programme of presentations. Poster papers will be displayed in a specially designated area in the website for the duration of the event. The full programme of papers accepted by the Technical Programme Committee can be found on the following pages.

Monday

Session 1
Material Deposition Technologies

SESSION CHAIRS
Dr Christian Gierl-Mayer (Vienna Technical University, Austria)

ORAL PRESENTATIONS

Development Of Stainless Steel Feedstocks For Filament-based Fused Deposition And Characterization Of Final Materials Properties
Wagner, M (Laboratory for Nanometallurgy, ETH Zürich, Switzerland); Sebastian, T; Clemens, F (High performance ceramics, Empa, Switzerland); Wheeler, J; Spolenak, R; Rusch, A; Ganz, R (Laboratory for Nanometallurgy, ETH Zürich, Switzerland)

Manufacturing Of A Metallic-Composite Optical Bench From Electron Beam Melting And Cold Spray For Nano Satellite Applications
Meyer, L (University of New South Wales Canberra, Australia); Griffin, D; Lambert, A; Boyce, R (University of New South Wales Canberra, Australia); Fraser, D; Urban, A (CSIRO Manufacturing, Australia)

Production And Characterization Of PIM-like M2 High Speed Steel Parts
Naranjo, J-A (UCLM, Spain); Berges, C (UCLM, Spain); Herranz, G (Castilla La Mancha Univ, Spain)

POSTER PRESENTATIONS

Potentials Of Multi-Material Additive Manufacturing With Cold Spray
Kindermann, P (Fraunhofer Research Institution for Casting, Composite and Processing Technology, Germany); Wunderer, M; Dietrich, S (Fraunhofer Research Institution for Casting, Composite and Processing Technology, Germany); Seidel, C (Munich University of Applied Sciences, Germany)

Additive Multi-material Depositions Process (AMD®) Optimization Parameters For Stainless Steel Filament 316L
Ramirez Ortiz, N (TRIDITIVE, Spain); Diaz, M; Gomez, R (TRIDITIVE, Spain)

Session 2
WC- Co Materials

SESSION CHAIRS
Dr Ken Mingard (NPL - National Physical Laboratory, United Kingdom)

ORAL PRESENTATIONS

Microstructure And Thermo-mechanical Properties Of WC-ZrC-Co-Cr3C2 Cemented Carbides Obtained By HIP After Sintering
Sanchez Moreno, J-M (CEIT, Spain); Lopez-Soria, B; Alveen, P; Moseley, S (HILTI CORPORATION, Liechtenstein); Soria Biurrun, T; Lozada Cabezas, L (CEIT, Spain); Magin, M; Useldinger, R (CERATIZIT, Luxembourg)

The Role Of Molybdenum As An Additive In Hardmetal Metallic Binder Alloys
De Gaudenzi, G-P (F.I.L.M.S. S.p.A. - OMCD Group, Italy); Garabelli, M; Tedeschi, S (F.I.L.M.S. S.p.A. - OMCD Group, Italy); Mele, C; Rossi, F (Università del Salento, Italy); Bozzini, B (Politecnico di Milano, Italy)

POSTER PRESENTATIONS

The Effect Of Carbon Content On The Properties Gradient Of Hardmetal Parts Attained With Recycled Powders
Fernandes, C (Palbit S.A., Portugal); Henriques, L; Figueiredo, D (Palbit S.A., Portugal); Carreira, F; Senos, A (University of Aveiro, Portugal)

Session 3
Applications for mobility

SESSION CHAIRS
Dr Inigo Agote (TECNALIA, Spain)

ORAL PRESENTATIONS

Analysis Of The Dynamic Noise Behavior Of PM Gears
Scholzen, P (WZL RWTH Aachen, Germany); Brecher, C; Brimmers, J (WZL RWTH Aachen, Germany)

Concept For Mass Production Of Automotive Parts Using Plasma Metal Deposition
Meuthen, J (RHP-Technology GmbH, Austria); Bielik, M; Ariza, E; Kitzmantel, M; Neubauer, E (RHP-Technology GmbH, Austria); Plano, S; Morgano, E (Centro Ricerche Fiat S.C.p.A., Italy)

Session 4
SIS PIM of Functional Materials

SESSION CHAIRS:
Prof Frank Petzoldt (Fraunhofer IFAM, Germany)
Mr Georg Breitenmoser (Parmaco Metal Injection Molding AG, Switzerland)

ORAL PRESENTATIONS

)Resource-efficient Production Of Modern Hard Magnets Via Metal Injection Molding

Weck, C (Fraunhofer IFAM, Germany); Hartwig, T; Petzoldt, F (Fraunhofer IFAM, Germany)

CIM Processing Of Engineered Glass-ceramics For Enhancing The Photoluminescence Properties
Herranz, G (UCLM, Spain); Gallego, A; Berges, C; Naranjo, J-A (UCLM, Spain); Enriquez, E; Fuertes, V; Fernandez, J-F (ICV-CSIC, Spain)

Session 5
High temperature properties of HM

SESSION CHAIRS:
Dr Steven Moseley (Hilti Corporation, Liechtenstein)

KEYNOTE PAPER

Microstructural Observations Of High Temperature Creep Processes In Hardmetals
Mingard, K (National Physical Laboratory, United Kingdom); Zakaria, H; Jones, D (University of Sheffield, United Kingdom); Roebuck, B (National Physical Laboratory, United Kingdom); Moseley, S (Hilti AG, Liechtenstein); Norgren, S (Sandvik & Coromant R&D, Sweden)

The Effect Of Surface Texturing On The Temperature Distribution On WC-Co Cutting Tools
Guimarães, B (CMEMS - University of Minho, Portugal); Fernandes, C; Figueiredo, D (Palbit S.A., Portugal); Silva, F-S; Miranda, G (CMEMS - University of Minho, Portugal)

High Temperature Nanomechanical Behaviour Of WC Grains In WC-Co Hardmetals
Mingard, K (National Physical Laboratory, United Kingdom); Zhang, H; Tong, V; De Luca, F (National Physical Laboratory, United Kingdom)

POSTER PRESENTATIONS DIAMOND TOOLS

Chemical Pretreatment Optimization For Improved Diamond Adhesion On Hard Metal Substrates
Pratas, S (Universidade de Aveiro, Portugal); Silva, E; Girão, V; Oliveira, F; Silva, R (Universidade de Aveiro, Portugal); Fernandes, C; Figueiredo, D (Palbit, Portugal)

Influence Of Diamond-lonsdaleite Abrasive Additives On The Structure And Properties Of Reactional SIC Ceramics
Ilyushchanka, A (O.V.Roman Powder Metallurgy Institute, Belarus); Dyachkova, L; Osipov, V (O.V.Roman Powder Metallurgy Institute, Belarus)

Session 6
General Applications

SESSION CHAIRS
Prof Marco Actis Grande (Politecnico di Torino, Italy)

ORAL PRESENTATIONS

Raw Material Development For Powder Bed Additive Manufacturing Of Space Hardware: Supply Chain, Quality Control And Performance Studies From The European Space Agency Perspective
Meisnar, M (European Space Agency, United Kingdom); Prante, N (European Space Agency, United Kingdom); Fowler, C (UKRI, Science and Technology Facilities Council, United Kingdom); Pambaguian, L (European Space Agency, Netherland)

Creep Stability Of The Microstructure Of Different Sintered Ferritics ODS Steels
Meza, A (University Carlos III of Madrid, Spain); Macía, E; Rabanal, M-E; Campos, M (University Carlos III of Madrid, Spain); García-Junceda, A (IMDEA Materials Institute, Spain); Altstadt, E (Helmholtz-Zentrum Dresden-Rossendorf, Germany)

Strategies For Improving Wear Behaviour Of Powder Metallurgy B-Ti Alloys
Gordo, E (Universidad Carlos III de Madrid, Spain); Chirico, C; Tsipas, S; Vaz-Romero, A (Universidad Carlos III de Madrid, Spain)

POSTER PRESENTATIONS

Investigation Of Liquid State Sintering And Properties Of Ti6Al4V/xAg Composites For Biomedical Applications
Olmos, L (Universidad Michoacana de San Nicolas de Hidalgo, Mexico); Solorio, V (TecNM|Instituto Tecnológico de Morelia, Mexico); Bouvard, D (Univ. Grenoble Alpes, CNRS, France); Chavez, J (Universidad Michoacana de San Nicolás de Hidalgo, Mexico); Jimenez, O (Universidad de Guadalajara, DIP, Mexico)

Influence of the second pressing and atmospheres of sintering of presses from magnesium powder on the speed of their biodegradation in vitro
Savich, V (Powder Metallurgy Institute, Belarus); Tolstik, V; Tarusov, I (Powder Metallurgy Institute, Belarus); Vorobiev, S (Chief Clinical Medical Center Of The Armed Forces Of The Republic Of Belarus, Belarus); Bordakov, V (Republican Scientific And Practical Center For Transfusiology And Medical Biotechnology, Belarus)

Session 7
Printing Technologies

SESSION CHAIRS
Prof Alberto Molinari (Trento University, Italy)

ORAL PRESENTATIONS

Factors Affecting The Properties Of POM-based Feedstocks For Fused Filament Fabrication/FFF
Kukla, C (Montanuniversitaet Leoben, Austria); Hentschel, L; Cano, S; Holzer, C; Gonzalez-Gutierrez, J (Montanuniversitaet Leoben, Austria); Kitzmantel, M (RHP-Technology GmbH, Austria)

Effect Of Printing Parameters On The Mechanical Strength Of Green Body From Binder Jetting Additive Manufacturing
Mariani, M (Politecnico di Milano, Italy); Beltrami, R; Meneghetti, F; Azzollini, D; Lecis, N (Politecnico di Milano, Italy)

Study On Processing Nickel Alloy Hastelloy C-22 By Additive Manufacturing Technique Plasma Metal Deposition
Ariza Galván, E (RHP-Technology GmbH, Austria); Bielik, M; Meuthen, J; Neubauer, E; Kitzmantel, M (RHP-Technology GmbH, Austria); Montealegre-Meléndez, I; Pérez-Soriano, E; Arévalo-Mora, C (University of Seville, Spain)

Session 8
SIS Enabling technologies for MIM

SESSION CHAIRS
Prof Frank Petzoldt (Fraunhofer IFAM, Germany)
Mr Georg Breitenmoser (Parmaco Metal Injection Molding AG, Switzerland)

ORAL PRESENTATIONS

Virtual Assessment And Optimization Of The MIM Process Chain - Simulation Enables Risk Management And Leverage Of Potential
Hartmann, G (MAGMA GmbH, Germany); Gebauer, T (Sigma GmbH, Germany)

Digitizing MIM Parts Production
Petzoldt, F (Fraunhofer IFAM, Germany)

3D printing of MIM sinter supports via ceramic AM - An efficient AM process for MIM sinter supports
Wilberforce, S (Emery Oleochemicals GmbH, Germany); Grimmer, P (CMG Technologies Ltd, United Kingdom)

Session 9
SIS Microstructural design of cemented carbides Part I

SESSION CHAIRS
Prof Dr Ana Senos (Aveiro University, Portugal)
Prof Elena Gordo (University Carlos III of Madrid, Spain)

ORAL PRESENTATION

Computer-aided design of novel binders for cemented carbides
De Oro Calderon, R (TU Wien, Austria) Schubert, W-D (TU Wien, Austria); Norgren, S (Sandvik & Coromant R&D, Sweden)

Microstructure design of NbC matrix cermet, bridge the gap between cemented carbide and cermet
Huang, S (KU Leuven, Belgium)

Session 10
Beam Based Technologies

SESSION CHAIRS
Dr. Ing Thomas Weißgärber (Fraunhofer IFAM, Germany)

ORAL PRESENTATIONS

Influence Of Different Process Gas Types And Oxygen Levels On AlSi10Mg Parts Processed By LPBF - Microstructure, Mechanical And Chemical Properties
Bähr, S (Linde AG, Germany); Ammann, T; Forêt, P (Linde AG, Germany); Bachmann, A; Zäh, M (Institute for machine tools and industrial management (TUM), Germany)

(World Paper) On The Role Of Process Pressure In Laser Powder Bed Fusion: Mechanisms, Powder Denudation And Effects On The Powder Bed
Kaserer, L (University of Innsbruck, Austria); Bergmueller, S; Braun, J; Leichtfried, G (University of Innsbruck, Austria)

Impact Of Powders Reuse In L-PBF Processes On The Powder Characteristics And Samples Mechanical Properties
Gaillard, G (CEA Tech, France); Suarez Rios, L; Sanchez Parrondo, G (IDONIAL, Spain); Courtois, K (WEARE ADDITIVE, France); Baffie, T (CEA Tech, France)

Session 11
Ferrous Powder

SESSION CHAIRS

Dr Mark Dougan (AMES SA, Spain)

ORAL PRESENTATIONS

High Green Strength Facilitating Green Part Handling And Green Machining, Reducing Green Scrap
Hansen, A (Höganäs AB, Sweden); Knutsson, P; Ahlin, Å (Höganäs AB, Sweden)

The influence of lubricant type and amount on warm die compaction mechanics relationships
Cristofolini, I (University Of Trento, Italy); Zago, M; Molinari, A (University Of Trento, Italy); Foschi, D; Rambelli, A (Sacmi Imola S.C., Italy); Crosa, R; Della Ricca, F (Höganäs Italia S.r.l, Italy)

Ancorbond Materials Providing Good Flow And High Apparent Density
Wimbert, L (Hoeganaes Corporation Europe GmbH, Germany); Lindsley, B; Wartenberg, A (Hoeganaes Corporation, USA); Osman, A; Lindenau, N (Hoeganaes Corporation Europe GmbH, Germany); Lindenau, R (GKN Sinter Metals Engineering GmbH, Germany)

Session 12
SIS Microstructural design of cemented carbides Part 2

SESSION CHAIRS

Prof Dr Ana Senos (Aveiro University, Portugal)
Prof Elena Gordo (University Carlos III of Madrid, Spain)

ORAL PRESENTATIONS

Sintering of WC-CoNiCrTiAl cemented carbides: precipitation of gamma prime
Sanchez, J-M (CEIT-BRTA, Spain)

Microstructure and Properties of Ti(C,N)-based Cermets
Lengauer, W (Vienna University of Technology, Austria)

Session 13
Metal Binder Jetting

SESSION CHAIRS

Dipl.-Ing Claus Aumund-Kopp (Fraunhofer IFAM, Germany)

ORAL PRESENTATIONS

A step towards a robust binder jetting technology: process parameter optimization for 17-4ph steel to increase powder bed homogeneity
Lores, A (TECNALIA, Spain); Azurmendi, N; Agote, I (TECNALIA, Spain); Andrés, U (MIM-TECH ALFA, Spain)

Analysis Of The Influences On Densification Of Metal Binder Jetted Parts
Gabriel, P (GKN Sinter Metals Engineering GmbH, Germany); Schade, C; Horvay, K (GKN Hoeganaes Corporation, USA); Höges, S (GKN Sinter Metals Engineering GmbH, USA)

The Master Sintering Curve And Its Application On 316L Steel Produced By Binder Jetting
Schneider, M (GKN Sinter Metals Engineering GmbH, Germany); Gabriel, P; Hoeges, S; Schaak, C (GKN Sinter Metals Engineering GmbH, Germany)

Session 14
Compaction

SESSION CHAIRS

Dr Yoko Pittini-Yamada (Meyer Sintermetall AG, Switzerland)

ORAL PRESENTATIONS

Producing Multi-metal Parts In A Die Via Selective Powder Deposition
Neirinck, B (Aerosint, Belgium); Moens, E (Aerosint, Belgium); Boilet, L; Kozak, K; Erauw, J-P (Belgian Ceramic Research Center, Belgium)

Room Temperature Compaction For Higher Density PM Parts
Narasimhna, K (P2PTechnologies, USA); Schade, C; Mcquaig, K (Hoeganaes Corporation, USA); Steibick, B (Phoenix Sinterd Metals, USA)

POSTER PRESENTATIONS : NON-FERROUS POWDERS

A Yield Surface Approach To The Green Behavior Of Composite Ceramic Powders Through Discrete And Finite Element Method Simulations
Bonaldo, J-C (Vesuvius | Grenoble INP, France); Mazerat, S; Romero Baivier, S (Vesuvius | Grenoble INP, France); L. Martin, C (Grenoble-INP, Lab SIMAP|GPM2, France)

Evaluation Of Spray-dried Powder Deagglomeration Behaviour Based On Dry Laser Diffraction Analysis
Marie, A (French Alternative Energies and Atomic Energy Commission, France); Tourbin, M; Frances, C (Chemical Engineering Laboratory, France); Robisson, A-C; Ablitzer, C (French Alternative Energies and Atomic Energy Commission, France)

Tuesday

Session 15
Spreadability of powders for AM

SESSION CHAIRS

Dr Helio Jorge (Ctcv - Technological Centre For Ceramics And Glass, Portugal)

ORAL PRESENTATIONS

Spreading Behavior And Packing Density Of The Powder Bed In L-PBF As A Function Of Spreading Strategy And Velocity
Mitterlehner, M (TU Wien, Austria); Fürst, M; Gierl-Mayer, C; Danninger, H (TU Wien, Austria); Gschiel, H (voestalpine BÖHLER Edelstahl GmbH & Co KG, Austria);

Benchtop Spreadability Measurement Of Powders
Hulme-Smith, C (KTH Royal Institute of Technology, Sweden)

Effects Of Humidity On The Flowability Of Steel Powders
Marchetti, L (KTH Royal Institute of Technology, Sweden); Mellin, P (Swerim AB, Sweden); Hulme-Smith, C (KTH Royal Institute of Technology, Sweden)

POSTER PRESENTATIONS

Experimental Investigation Of Spreadability Of Metal Powders In The Recoating Process
Tripathi, N (GranuTools, Belgium); Neveu, A; Francqui, F (GranuTools, Belgium); Reigo, O (Sirris, Belgium); Lumay, G (University of Liege, Belgium)

Session 16
HIP & AM

SESSION CHAIRS

To be announced

ORAL PRESENTATIONS

Fully Dense CM247LC Alloy Obtained By Binder Jetting. Characterization Of The Processing Route.
Sainz, S (CEIT, Spain); Agote, I; Azurmendi, N; Lores, A (Tecnalia, Spain); Iturriza, I (CEIT, Spain)

KEYNOTE PAPER

Artificial Porosity Introduced During L-PBF Of IN718, And Its Effect On Fatigue Performance Before And After HIP
Strandh, E (Swerim AB, Sweden); Gårdstam, J (Quintus Technologies AB, Sweden); Dubiez-Le Goff, S (Linde AG, Germany); Mellin, P (Swerim AB, Sweden)

Session 17
Alternative HM System part 1

SESSION CHAIRS

Dr Raquel De Oro Calderon (TU Wien, Austria)

ORAL PRESENTATIONS

Influence Of Secondary Carbides On TiCN Based Cermets Compositions
Fernandes, C (Palbit S.A., Portugal); Cardoso, J; Durão, A; Senos, A (University of Aveiro, Portugal); Figueiredo, D (Palbit S.A., Portugal)

Analysis Of Dissolution Resistance Of (M,W)Cx Ternary Carbides [M=Ti, Zr, Hf, V, Nb, Ta, Cr, Mo] In Ni-, Co- And Fe-based Matrices
Larouche, B (Oerlikon Metco WOKA GmbH, Germany); Reisel, G (Oerlikon Metco WOKA GmbH, Germany)

Co-free Alternative Binders For Hard Materials. Comparison Of Ti(C,N) And WC Hard Phases
De Nicolás, M (Universidad Carlos III de Madrid, Spain); Pereira, L; Müller-Grunz, A; Bertalan, C; Useldinger, R (CERATIZIT Group, Luxembourg); Llanes, L (Universitat Politècnica de Catalunya - BarcelonaTech, Spain); Gordo, E (Universidad Carlos III de Madrid, Spain)

Influence Of The Hard-phase Alloy Status On The Microstructure Evolution And Properties Of Ti(C,N)-based Cermets
Lengauer, W (Vienna University of Technology, Austria); Waldner, C; Fürst, M (Vienna University of Technology, Austria)

POSTER PRESENTATIONS

Effect Of Nano-WC On The Microstructure Parameters Of TiC-VC-NiCr Hard Alloys
Rusyn, B (Karpenko Physico-Mechanical Institute of the National Academy of Sciences of Ukraine, Ukraine); Koval, I; Bodrova, L; Kramar, H; Bukhta, V (Ternopil Ivan Puluj National Technical University, Ukraine); Obuh, Y (Karpenko Physico-Mechanical Institute of the National Academy of Sciences of Ukraine, Ukraine)

Session 18
SIS Functional Materials for High Temperature Application

SESSION CHAIRS

Dr Sebastian Boris Hein (Fraunhofer IFAM, Germany)
Mr Peter Kjeldsteen (Sintex a/s, Denmark)

ORAL PRESENTATIONS

High-Entropy Alloys and high temperature applications: an opportunity for PM
Torralba, J-M (University Carlos III, Spain)

Review of High Temperature Performance Gas-Atomised Alloy Powders for Metal Injection Moulding & Additive Manufacturing
Davies, P (Sandvik, United Kingdom)

Powder bed based additive manufacturing of refractory metals
Juechter, V (Heraeus Additive Manufacturing GmbH, Germany)

Session 19
Powders for AM

SESSION CHAIRS

Mr Peter Vikner (Aubert&Duval, France)

ORAL PRESENTATIONS

Influence Of Particle Size Distribution And Morphology On Bulk Material Behavior, Maximum Possible Laser Scanning Speed And Properties Of AlSi10Mg Parts Produced By Laser Powder Bed Fusion (LPBF)
Riener, K (University of Innsbruck, Austria); Leichtfried, G (University of Innsbruck, Austria); Ziegelmeier, S; Ramakrishnan, R; Burkert, T (BMW AG, Germany); Haferkamp, L; Spierings, A (Inspire AG, Switzerland)

Powder Production Using Arc Spraying Process For Additive Manufacturing
Chen, D (Neue Materialien Bayreuth GmbH, Germany); Daoud, H (Neue Materialien Bayreuth GmbH, Germany)

Influence Of Melt Viscosity On Particle Size Of Gas-Atomized Metal Powders
Dopler, M (metalpine GmbH, Austria); Weiß, C (University of Leoben, Austria)

POSTER PRESENTATIONS

Production Of Aluminium-silicon Alloy Powders By Centrifugal Atomization
Pijuan Cases, J (Technological Centre EURECAT, Spain); Cegarra Salges, S (Technological Centre EURECAT, Spain)

Simulation Of Modes And Selection Of New Particles With Dimensions Not Exceeding 250 Nm After Laser Ablation Of Vertically Falling Titanium Particles With The Fraction Of 50-63 Mm
Ilyushchanka, A (O.V. Roman Powder Metallurgy Institute, Belarus); Chivel, Y (Additive Technology Laboratory Ltd, Belarus)

Production And Microstructure Of Al-Ni-Y And Al-Ni-Y-La Powder By Centrifugal Atomization
Cegarra Salges, S (Technological Centre EURECAT, Spain); Pijuan Cases, J (Technological Centre EURECAT, Spain); Riera, M-D (Department of Mining, Industrial and ICT Engineering, Technical University of Catalonia-(UPC), Spain)

POSTER PRESENTATIONS : SIMULATION IN AM

Basic Assumptions To Mathematical Modeling Of Processes Of Metal Powders Selective Laser Sintering
Ilyushchanka, A (O.V. Roman Powder Metallurgy Institute, Belarus); Letsko, A (O.V. Roman Powder Metallurgy Institute, Belarus)

Session 20
Hot Isostatic Pressing

SESSION CHAIRS

To be announced

ORAL PRESENTATIONS

Hot Isostatic Pressing Of Inconel 625: Effect Of Powder Production Type On Microstructure And Mechanical Properties
Khan, R (TWI Ltd, United Kingdom); Sergi, A (National Structural Integrity Research Centre (NSIRC), United Kingdom); Attallah, M (University of Birmingham, United Kingdom)

Carburising And Nitriding During Hot Isostatic Pressing Of Capsule Free Materials
Magnusson, H (Swerim AB, Sweden); Vattur Sundaram, M; Chasoglou, D (Höganäs AB, Sweden); Rydgren, E (Swerim AB, Sweden); Gårdstam, J (Quintus Technologies AB, Sweden); Kaplan, B (Aga Gas AB, Sweden); Nyborg, L (Chalmers Tekniska Högskola, Sweden); Oikonomou, C (Uddeholm AB, Sweden)

POSTER PRESENTATIONS

The Effect Of Molybdenum Microadditives On The Structure And Properties Of Hot-Deformed Powder Steels
Dorofeyev,V (Platov South-Russian State Polytechnic University (NPI), Russia); Sviridova, A; Berezhnoi, Y; Bessarabov, E (Platov South-Russian State Polytechnic University (NPI), Russia); Sviridova, S (Derzhavin Tambov State University, Russia); Vodolazhenko, R (MIREA - Russian Technological University, Russia); Kochkarova, K (North Caucasian State Academy, Russia)

Anomalous Particles (granules) In PREP-powders. A Multiscale Study Of The PREP- Powders And PM HIP Compacts Of The Ni-based Superalloys And Stainless Steels
Shulga, A (National Research Nuclear University MEPhI (Moscow Engineering Physics Institute), Russia)

An Investigation Of The Microstructure And Mechanical Properties Of The PM HIP Compacts Of The High Temperature Ti-based Alloy Fabricated Using The Rapidly Quenched Powder Produced By PREP-technique
Shulga, A (National Research Nuclear University MEPhI (Moscow Engineering Physics Institute), Russia)

Session 21
SIS Electrical Functional Materials

SESSION CHAIRS

Dr Sebastian Boris Hein (Fraunhofer IFAM, Germany)
Mr Peter Kjeldsteen (Sintex a/s, Denmark)

ORAL PRESENTATIONS

Sintering Behaviour Of Silver Paste For Packaging Of Power Electronics Components
Botter, N (SAFRAN, France); Bouvard, D (Université Grenoble Alpes, France); Khazaka, R (SAFRAN, France); Missiaen, J-M (Université Grenoble Alpes, France)

Processing of high performance MgB2 superconducting wires through Powder-In-Tube method
Grasso, G (ASG Superconductors SpA, Italy)

Session 22
Alternative HM System part 2

SESSION CHAIRS

Dr Cristina Fernandes (Palbit S.A., Portugal)

ORAL PRESENTATIONS

Thermodynamic And Sintering Studies In Hardmetals With Alternative Binders Of Co And Ni Based Alloys
Pereira, P (DURIT - Metalurgia Portuguesa do Tungsténio, Lda, Portugal); Oliveira, F-J; Senos, A-M (DEMaC - Department of Materials and Ceramic Engineering, CICECO, University of Aveiro, Portugal); Sacramento, J; Valente, M-A (DURIT - Metalurgia Portuguesa do Tungsténio, Lda, Portugal); Malheiros, L-F (Department of Metallurgical and Materials Engineering, University of Porto, Portugal)

Study On Strengthening Intermetallic Phases In Carbon-free PM High Speed Steels
Danninger, H (Technische Universität Wien, Austria); Eitenberger, E; Hradil, K (Technische Universität Wien, Austria); Dlapka, M (MIBA AG, Austria)

Green WC-FeMn Cemented Carbides For Industrial Wear Parts
Tarraste, M (Tallinn University of Technology, Estonia); Kolnes, M; Kübarsepp, J; Juhani, K; Viljus, M (Tallinn University of Technology, Estonia); Külaviir, J (Desintegraator Tootmise OÜ, Estonia)

Session 23
Impurities in AM Powders

SESSION CHAIRS

Dr Diego Manfredi (Politecnico di Torino, Italy)

ORAL PRESENTATIONS

Comparison Of Methods To Detect Powder Contamination And To Evaluate Particle Size Distribution
Bonfanti, F (MIMETE, Italy); Malaspina, C; Gelain, E (MIMETE, Italy); Girelli, R; Vattasso, G (LABORMET 2, Italy)

Influence From Non-metallic Inclusions On Electron Beam Printing
Vikner,P (Aubert & Duval, France); Sundin, S (Erasteel, Sweden); Beste, U (VBN Components, Sweden)

Influence Of The Oxygen Content Of Ti6Al4V Powder On Mechanical Properties Of Additively Manufactured Components Using Laser-based Powder Bed Fusion
Schafnitzel, M (Fraunhofer IGCV, Germany); Walter, S; Schmitt, M; Schlick, G (Fraunhofer IGCV, Germany)

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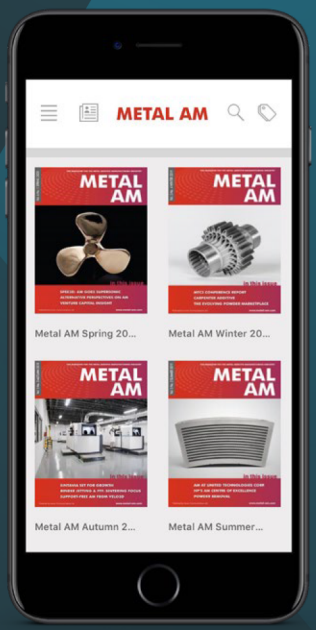

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Session 24
AM - Special Materials

SESSION CHAIRS

Prof Jie Zhou (Delft Technical University, Netherlands)

ORAL PRESENTATIONS

Chemical Composition And Mechanical Properties Of Wires Obtained By Powder Extrusion For Additive Manufacturing
Rodríguez González, P (Universidad Carlos III de Madrid, Spain); Gordo Oderiz, E; Ruiz Navas, E-M; Vaz-Romero Santero, Á (Universidad Carlos III de Madrid, Spain)

Magnesium Powder Characteristics And Its Implications For Powder Bed Fusion
Nilsson Åhman, H (Swerim AB, Sweden); Hulme-Smith, C (KTH, Sweden); Mellin, P (Swerim AB, Sweden)

Nano Silicon Carbide Reinforced Aluminum-based Metal Matrix Composite Processed By Selective Laser Melting
Senol, S (KU Leuven, Belgium); Montero Sistiaga, M; Vanmeensel, K (KU Leuven, Belgium); Soulier, M (CEA-LITEN University, France)

Session 25
Sintering of PM Steel

SESSION CHAIRS

Prof Ilaria Cristofolini (Trento University, Italy)

ORAL PRESENTATIONS

Powder Metallurgy Manufacturing Of Hadfield-type Mn Steels With TRIP Behaviour
Gierl-Mayer, C (TU Wien, Austria); Prokofyev, M; Huemer, M-C; Danninger, H (TU Wien, Austria); Hellein, R; Bolitschek, J; Müller, A (Miba SInter Austria GmbH, Austria)

Sintering In The Presence Of Mn-Cr-Si Containing Master Alloys
Calero, J-A (AMES, Spain); Bernardo, E; Fernández, I-A; Capdevila, M (AMES, Spain)

Electrical Conductivity And Physical Properties Of Sintered Steels Prepared From Different Base Powders
Momeni, M (European Patent Office, Netherlands); Danninger, H; Gierl-Mayer, C (Vienna University of Technology, Austria)

POSTER PRESENTATIONS

Mechanical Behavior Prediction By Discrete Element Method Simulations Of Fired Composite Refractories
Bonaldo, J-C (Vesuvius | Grenoble INP, France); Mazerat, S; Romero Baivier, S (Vesuvius, Belgium); L. Martin, C (Grenoble-INP, Lab SIMAP|GPM2, France)

The Effect Of Titanium Boride Additives On The Structure, Phase Composition, Mechanical And Tribological Properties Of The Fe-Cr-C System Powder Composite Materials
Kyryliuk, Y (Frantsevich Institute for Problems in Materials Science, Ukraine); Maslyuk, V; Mamonova, A; Varchenko, V (Frantsevich Institute for Problems in Materials Science, Ukraine); Gripachevsky, A (G. V. Kurdyumov Institute for Metal Physics of the N.A.S. of Ukraine, Ukraine

Session 26
SIS The opportunities of HIP in Additive Manufacturing

SESSION CHAIRS

Mr James Shipley (Quintus Technologies AB, Sweden)
Dr Susan Davies (Bodycote, United Kingdom)

ORAL PRESENTATIONS

Improvement of material properties of AM Ti-6Al-4V from SLM, EBM and BJT by adapted HIP cycles
Wycisk, E (AMPOWER GmbH & Co, Germany)

PM HIP- probably the best additive manufacturing process in the world
Berglund, T (MTC Powder Solutions, Sweden)

(World Paper) HIP Replacement: An Alternative To Forging
Jones, G (Rolls-Royce, United Kingdom); Warner, T (Rolls-Royce, United Kingdom)

Session 27
AM Post Processing Part I

SESSION CHAIRS

To be announced

ORAL PRESENTATIONS

Effect Of Heat Treatments On The Microstructure Of Inconel 939 Alloy Processed By Laser Powder Bed Fusion
Marchese, G (Politecnico di Torino, Italy); Parizia, S; Saboori, A; Bassini, E; Manfredi, D; Lombardi, M; Ugues, D; Biamino, S (Politecnico di Torino, Italy)

Heat Treatment Behavior Of A Hot Work Tool Steel Produced Through Direct Laser Metal Deposition
Amirabdollahian, S (University of Trento, Italy); Pellizari, M; Bosetti, P; Molinari, A (University of Trento, Italy); Deirmina, F (Sandvik additive manufacturing, Sweden)

KEYNOTE PAPER
Evaluation Of Pore Re-opening After HIP In LPBF Ti-6Al-4V
Kosonen, T (EOS Finland Oy, Finland); Kakko, K; Raitanen, N (EOS Finland Oy, Finland)

Session 28
Powder, Recycling, and Environment

SESSION CHAIRS

Dr Gemma Herranz (Castilla La Mancha Univ, Spain)

ORAL PRESENTATIONS

Powder Rejuvenation Process Investigation For The Improved Utilisation Of Powder In Additive Manufacturing
Quinn, P (SEAM Research Centre, Ireland); O'Halloran, S; Raghavendra, R (SEAM Research Centre, Ireland); Lawlor, J (Department of Engineering Technology, Ireland)

Role Of Laser Exposure, Rotation And Scan Pattern On The Densification Process Of LPBF Samples
Virgillito, E (Politecnico di Torino, Italy); Aversa, A; Manfredi, D; Lombardi, M; Bondioli, F; Fino, P (Politecnico di Torino, Italy)

Environmental Analysis Of The Powder Metallurgy Value Chain: A Comparison With Conventional Manufacturing
Cor, E (French Alternative Energies and Atomic Energy Commission (CEA), France); Baffie, T; Monnier, E (French Alternative Energies and Atomic Energy Commission CEA, France)

POSTER PRESENTATIONS

Application Of Disk Milling To Produce Metal Powder From Industrial Chips
Emadinia, O (Department of Metallurgical and Materials Engineering at FEUP, Portugal); Vieira, M-T (CEMMPRE, Portugal)

Session 30
Field Assisted Sintering and Hot Pressing

SESSION CHAIRS

Prof Jose Torralba (IMDEA, Spain)

ORAL PRESENTATIONS

Processing And Characterization Of SPS Consolidated CrCoFeNiAlxCuy High Entropy Alloy
Reverte, E (Universidad Carlos III de Madrid, Spain); Gordo, E; Campos, M; Cornide, J (Universidad Carlos III de Madrid, Spain)

Hot Pressing Of Iron Based Friction Materials
Echeberria, J (CEIT, Spain); Perez, B (CEIT, Spain)

(World Paper) High Entropy Alloys, A New Opportunity For The Powder Metallurgy Route
Torralba, J-M (Universidad Carlos III de Madrid, Spain); Alvaredo, P (Universidad Carlos III de Madrid, Spain); García-Junceda, A (IMDEA, Spain)

Session 31
AM Post Processing Part 2

SESSION CHAIRS

Dr Riccardo Casati (Politecnico di Milano, Italy)

ORAL PRESENTATIONS

(World Paper) On The Additive Manufacturing Of Inconel 939 -- Analysis Of Microstructure And Re-development Of Heat Treatment
Shaikh, A-S (Chalmers University of Technology, Finland); Hryha, E (Chalmers University of Technology, Finland); Minet-Lallemand, K (EOS Finland Oy, Finland)

(World Paper) Heat Treatment And Properties Of An Ultra-high Strength Maraging Steel Fabricated By Additive Manufacturing
Deirmina, F (Sandvik Machining Solutions AB, Sweden); Kearns, M; Davies, P; Harris, L; Pekka Matilainen, V; Lovquist, S (Sandvik Machining Solutions AB, Sweden)

Influence Of Post Heat Treatment On Microstructure And Residual Stresses Of AISI M50 Produced By Laser Powder-Bed Fusion
Qin, S (IWM Institute; RWTH Aachen University, Germany); Herzog, S; Kaletsch, A; Broeckmann, C (IWM Institute; RWTH Aachen University, Germany)

Session 32
Sintered Steels

SESSION CHAIRS

Dr Christian Gierl-Mayer (Vienna Technical University, Austria)

ORAL PRESENTATIONS

Properties And Microstructures Of Sintered Steels Alloyed With Cr, Mn And Si By The Masteralloy Route
Geroldinger, S (TU WIEN, Austria); De Oro Calderon, R; Gierl-Mayer, C; Danninger, H (TU WIEN, Austria)

Fatigue Assessment Of Hardened PM Steel Components
Baumgartner, J (Fraunhofer LBF, Germany); Haberlick, E; Lipp, K (Fraunhofer LBF, Germany)

Wednesday

Session 33
AM Properties – Special Materials

SESSION CHAIRS

Dr Pierre Blanchard (Welding Alloys Group, France)

ORAL PRESENTATIONS

Computational And Experimental Microstructural Characterization Of A Magnesium WE43 Alloy Processed On A Commercially Available PBF-LB Machine
Nilsson Åhman, H (Swerim AB, Sweden); Rohimsyah, F; Lindwall, G (KTH, Sweden); Thorsson, L (Exmet AB, Sweden); Mellin, P (Swerim AB, Sweden); Persson, C (Uppsala University, Sweden)

Strategies To Design High-strength Al Alloys With Improved L-PBF Processability
Casati, R (Politecnico di Milano, Italy); Belelli, F; Vedani, M (Politecnico di Milano, Italy); Riccio, M; Rizzi, A (Beam-IT SpA, Italy)

Laser Powder Bed Fusion Of A Novel Cu Modified AlSi10Mg Alloy: Processing, Microstructure, And Properties
Li, G (KU LEUVEN, Belgium); Huang, X; Vanmeensel, K (KU LEUVEN, Belgium)

Residual Stress Reduction In AlSi12CuNiMg Aluminum Alloy Fabricated By Laser Powder Bed Fusion
Inoue, Y (Tokyo University of Science, Japan); Sasaki, S (Tokyo University of Science, Japan)

POSTER PRESENTATIONS

Microstructure and mechanical properties of high silicon Duralumin fabricated by Laser Powder Bed Fusion
Sasaki, S (Tokyo University of Science, Japan); Sakai, T (Tokyo University of Science, Japan, Japan)

Session 34
SIS Modelling of materials for Press & Sinter and their properties part I

SESSION CHAIRS

Dr Cesar Molins (AMES SA, Spain)
Mrs Caroline Larsson (Höganäs AB, Sweden)

ORAL PRESENTATIONS

The Rastagaev Compression Test And The Derivation Of The Compressive Yield Strength
Schneider, M (GKN Sinter Metals Engineering GmbH, Germany); Schenk, O (GKN Sinter Metals Engineering GmbH, Germany)

Virtual Assessment And Optimization Of Continuous Sinter Processes And Furnaces
Hartmann, G (MAGMA GmbH, Germany); Kjeldsteen, P; Søgaard, P-V (SINTEX, Denmark); Schäfer, W (MAGMA GmbH, Germany)

Transfer Of A Cylindrical Rolling Force Model For Cylindrical Discs To Rolling Of PM Manufactured Spur Gears
Klee, L (WZL RWTH Aachen University, Germany); Bergs, T; Brimmers, J (WZL RWTH Aachen University, Germany); Frech, T (Humbel Gear Technology, Switzerland)

Session 35
FM Energy Management

SESSION CHAIRS

Dr José Manuel Martin (CEIT, Spain)

ORAL PRESENTATIONS

Porous Transport Layers Made Of Niobium/steel Composites For Water Electrolysis
Bram, M (Forschungszentrum Jülich GmbH, Germany); De Freitas Daudt, N (Universidade Federal de Santa Maria, Brazil); Hackemüller, F-J (Forschungszentrum Jülich GmbH, Germany)

KEYNOTE PAPER
Influence Of Porosity And Impurities On The Thermal Conductivity Of Pressure-less Sintered Cu Powder Green Bodies
Ott, J (Robert Bosch GmbH, Germany); Burghardt, A (Robert Bosch GmbH, Germany); Britz, D (Material Engineering Center Saarland (MECS), Germany); Mücklich, F (Saarland University, Germany)

Magnetocaloric Heat Exchangers By Laser Powder Bed Fusion
Wieland, S (Fraunhofer IFAM, Germany); Breitzke, C; Navickaite, K (Fraunhofer IFAM, Germany)

Resin Bonded Magnetocaloric Plates With A Thickness Of 0.3 Mm Produced From Gas Atomized Powder
Burgos, N (CEIT, Spain); Checa, B-L, Martín, J-M (CEIT, Spain); Ipatov, M

Session 36
Corrosion and Wear

SESSION CHAIRS

Prof Luis Miguel Llanes (Catalunya Univ Polytecnica, Spain)

ORAL PRESENTATIONS

The Influence Of Temperature On The Corrosion Resistance Of Hardmetals
Ferro Rocha, A (University of Aveiro, Portugal); Silva, P; Senos, A; Bastos, A (University of Aveiro, Portugal)

Corrosion Effects On Contact Damage Of A WC-Ni Cemented Carbide
Zheng, Y (Universitat Politècnica de Catalunya, Spain); Fargas, G; Llanes, L (Universitat Politècnica de Catalunya, Spain); Lavigne, O (Hyperion Materials and Technologies, Spain)

(World Paper) The Chemical Transport Mechanism Of Emitter Micro-particles In Tungsten Electrode - A Metallurgical Study
Singh, G (Technical University Dresden, Germany); Schuster, H; Füssel, U (Technical University Dresden, Germany)

POSTER PRESENTATIONS

Comparison Of Wear Performance Between Cemented Carbide, Ceramics And Wear Resistant Steels
Ther, O (Hyperion Materials & Technologies, Spain); Lavigne, O; Carrasco, O (Hyperion Materials & Technologies, Spain)

Mechanical And Tribological Characterization Of Tungsten Carbide Based Composites Produced With Ni Or Co Rich Binders.
Pereira, P (DURIT - Metalurgia Portuguesa do Tungsténio, Lda, Portugal); Vilhena, L-M; Ramalho, A (CEMMPRE - Centre for Mechanical Engineering, Materials and Processes, University of Coimbra, Portugal); Sacramento, J (DURIT - Metalurgia Portuguesa do Tungsténio, Lda, Portugal); Senos, A-M (DEMaC - Department of Materials and Ceramic Engineering, Portugal)

Session 37
SIS Modelling of materials for Press & Sinter and their properties part 2

SESSION CHAIRS

Dr Cesar Molins (AMES SA, Spain)
Mrs Caroline Larsson (Höganäs AB, Sweden)

ORAL PRESENTATIONS

Simulation and testing of two different concepts of anti-satellite systems for the gas atomisation process
Alejo, A (CEIT, Spain); Urionabarrenetxea, E; Martin, J-M (Ceit, Spain)

An Investigation Of The Mechanical Behavior Of Sintered Astaloy® 85 Mo
Gaisina, V (KTH Royal Institute of Technology, Sweden); Bonvalet-Rolland, M; Larsson, P-L; Odkvist, J; Gudmundson, P (KTH Royal Institute of Technology, Sweden) Andersson, M (Höganäs AB, Sweden)

Modelling the influence of porosity on fatigue strength of sintered steels
Andersson, M (Höganäs AB, Sweden)

Session 38
Processing and applications

SESSION CHAIRS

Dr Ing Johannes Pötschke (Fraunhofer IKTS, Germany)

ORAL PRESENTATIONS

Influence Of Hardmetal Properties And Cutting Edge Microgeometry On Tool Wear
Vornberger, A (Fraunhofer IKTS, Germany); Pötschke, J; Herrmann, M; Michaelis, A (Fraunhofer IKTS, Germany); Picker, T (Leibniz Universität Hannover, Germany)

(World Paper) A Metallurgical Analysis On The Condition Of Ex-service Pusher Furnace Tube Made Of Centrifugally Cast Heat Resistant Alloy Used For Tungsten Powder Production.
Venkataraman, S (Schmidt + Clemens GmbH + Co, Germany)

Investigations Of Microcracks On Arranged Diamonds With X-ray Microscopy
Pinho Ferreira, M (Institute of Materials Engineering - TU Dortmund, Germany); Tillmann, W; Biermann, D; Dreier, J; Kansteiner, M (Institute of Machining Technology, TU Dortmund, Germany); Müller, C; Malevich, N (Statistics with Application in Engineering Sciences, TU Dortmund, Germany)

POSTER PRESENTATIONS

Tungsten Monocarbide Nanopowder Synthesis Under 24 GHz Microwave Heating Of The W-C Nanopowder Produced In DC Thermal Plasma
Samokhin, A (Institute of Metallurgy and Materials Science, Russia); Vodopyanov, A; Sorokin, A; Sintsov, S (Institute of Applied Physics, Russia); Alexeev, N; Sinaiskiy, M (Institute of Metallurgy and Materials Science, Russia)

CARBIDE2500 - An Innovative Furnace Technology Development Which Opens Up New Possibilities For R&D To Produce Tailor-made Tungsten Carbide Powders
Gruber, J (CREMER Thermoprozessanlagen GmbH, Germany); Genilke, S; Broeckmann, C; Fries, S (IWM, RWTH Aachen, Germany); Cremer, I (CREMER Thermoprozessanlagen GmbH, Germany)

Session 39
AM Properties - Fatigue

SESSION CHAIRS

Dr Anke Kaletsch (RWTH Aachen University, Germany)

ORAL PRESENTATIONS

Microstructure And Tensile Properties Of Alloy 600 Parts Obtained By Laser Powder Bed Fusion (L-PBF) Process
Baffie, T (CEA-LITEN, France); Salvador, V; Lassègue, P; Cayre, S; Chomette, S; Soulas, R; Viola, C (CEA-LITEN, France)

Fatigue Crack Initiation Of Inconel 718 Fabricated By Laser Powder Bed Fusion
Ogawahara, M (Tokyo University of Science, Japan); Sasaki, S (Tokyo University of Science, Japan)

Session 40
FM PM Magnetic Materials

SESSION CHAIRS

Dr Robert Hellein (R&D Miba Sinter Group, Austria)

ORAL PRESENTATIONS

PEEK/NdFeB 3D PRINTED MAGNETIC MATERIALS
Meisnar, M (European Space Agency, United Kingdom); Pigliaru, L; Rohr, T; Ghidini, T (European Space Agency, Netherland); Rinaldi, M; Nanni, F (University of Rome Tor Vergata, Italy)

Influence Of The Iron Powder Space Factor On The Hysteresis Loss Of Pure Iron Powder Core
Takashita, T (JFE steel corporation, Japan); Ozaki, Y (Kyushu university, Japan)

POSTER PRESENTATIONS

Magnetic properties of iron-nickel-based powder materials alloyed with ti, cr, mo additives
Sytnyk, I (Frantsevich Institute for Problems of Materials Science NAS of Ukraine, Ukraine); Maslyuk, V (Frantsevich Institute for Problems of Materials Science NAS of Ukraine, Ukraine)

POSTER PRESENTATIONS : FUNCTIONAL MATERIALS

The Influence Of Manufacturing Parameters On Tribological Properties Of Contact Materials
Kołacz, D (Łukasiewicz Research Network - Institute of Non-Ferrous Metals, Poland); Księżarek, S; Wiśniewski, T; Kamińska, M; Juszczyk, B; Kulasa, J; Bilewska, K (Łukasiewicz Research Network - Institute of Non-Ferrous Metals, Poland); Karwan-Baczewska, J (AGH University of Science and Technology, Faculty of Non-Ferrous Metals, Poland),

The Effect Of Titanium Powder On The Tribological Properties Of A Copper-based Friction Material To Operate Under Friction With Lubricant
Ilyushchenko, A (O.V. Roman Powder Metallurgy Institute, Belarus); Rogovoy, A; Leshok, A; Dyachkova, L; Pinchuk, T (O.V. Roman Powder Metallurgy Institute, Belarus)

Manufacturing Metallic Hollow Spheres By Electrolytic Nickel Deposition And Applying Metal Powders: The Compare Of Two Methods
Aliaksandr, I (O.V. Roman Powder Metallurgy Institute, Belarus); Mikutski, V; Smorygo, O; Hancharou, V (O.V. Roman Powder Metallurgy Institute, Belarus)

Session 41
AM Properties Materials Development

SESSION CHAIRS

Prof Alberto Molinari (Trento University, Italy)

ORAL PRESENTATIONS

Cobalt-Free Tool Steel Alternatives To Maraging Steels For Parts Made By Laser Powder Bed Fusion
Saby, Q (Université de Lyon, INSA-Lyon, MATEIS UMR CNRS 5510, France); Buffière, J-Y; Maire, E; Boulnat, X (Université de Lyon, INSA-Lyon, MATEIS UMR CNRS 5510, France); Joffre, T; Bajolet, J (IPC - Centre Technique Industriel de la Plasturgie et des Composites, France); Vikner, P (Aubert & Duval, France)

In-situ Fe-TiB2 High Modulus Steel Fabricated By Laser Powder Bed Fusion
Mostaghimi, F (Leibniz-Institute for Materials Engineering, Germany); Springer, H; Baron, C (Max-Planck-Institut für Eisenforschung GmbH, Germany); Mädler, L; Uhlenwinkel, V (University of Bremen, Germany)

POSTER PRESENTATIONS: PROCESS CHAIN VARIATION

The Influence Of Machine Type On Microstructure And Mechanical Properties Of A 3D Printed Commercial Co-Cr Dental Alloy
Viderscak, D (Faculty of Mechanical Engineering and Naval Architecture University of Zagreb, Croatia); Črtomir, D; Paulin, I (Institute of Metals and Technology, Slovenia); Schauperl, Z (Faculty of Mechanical Engineering and Naval Architecture University of Zagreb, Croatia); Catic, A (School of Dental Medicine University of Zagreb, Croatia); Solic, S (Univ

Testing and inspection of additive manufactured pm parts using thermo-optical measuring technique.
Diegeler, A (Fraunhofer ISC, Germany); Staab, T-E (Universität Wuerzburg, Germany)

Novel Micro-textured Surfaces Fabricated By Additive Manufacturing To Improve Frictional Performance.
Iakovakis, E (University of Manchester, United Kingdom); Roy, M; Matthews, A (University of Manchester, United Kingdom); Gee, M (National Physical Laboratory, United Kingdom)

Session 42
High Temperature Alloys

SESSION CHAIRS

Dr Christian Kukla (Montanuniversitaet Leoben, Austria)

ORAL PRESENTATIONS

Development Of Formulations Of WC-Co Filament For Fused Filament Fabrication
Jorge, H (CTCV-Technological Centre for Ceramics and Glass, Portugal); Coelho, S. (CTCV-Technological Centre for Ceramics and Glass, Portugal); Magro, A; Teixeira, P (BEEVC-Electronic Systems, Portugal); Rodrigues, F; Sacramento, J; Ferreira, N; Pereira, P (DURIT, Portugal)

Slurry Development For Lithography-based Additive Manufacturing Of Tungsten Carbide-Cobalt Components
Rieger, T (Karlsruhe Institute of Technology, Germany); Schubert, T; Schurr, J; Schwenkel, M; Bernthaler, T; Schneider, G (Aalen University, Germany)

(World Paper) The Effect Of Oxygen And Carbon On Molybdenum In Laser Powder Bed Fusion (LPBF)
Braun, J (Universität Innsbruck, Austria); Kaserer, L; Leichtfried G (Universität Innsbruck, Austria); Leitz, K-H; Kestler, H (Plansee SE, Austria)

Session 43
Metals Ceramics Composites

SESSION CHAIRS

Dr Tassilo Moritz (Frauhofer Institut - IKTS, Germany)

ORAL PRESENTATIONS

Powder Technological Manufacturing Methods To Combine Stainless Steel With Zirconia
Günther, A (Fraunhofer IKTS, Germany); Moritz, T (Fraunhofer IKTS, Germany)

Mechanism Of Synthesis And Phase Evolution During Preparation Of ODS-doped Tungsten Powders Through Novel Liquid--liquid Doping Technique
Xiao, F (FEMTO-ST Institute, France); Barriere, T (FEMTO-ST Institute, France); Cheng, G (Universite de Tours, France); Miao, Q (Nanjing University of Aeronautics and Astronautics, China); Xu, L (Henan Key Laboratory of High Temperature Structural and Functional Materials, China); Wei, S (Henan University of Science and Technology, China)

Selective Laser Melting Of Aluminium Based Metal Matrix Composites Using Powder Blends
Pejchal, V (CSEM SA, Switzerland); Sereda, O; Mohammad M (CSEM SA, Switzerland)

POSTER PRESENTATIONS

UO2 Powder Characteristics And Flowability: Impact Of Powder Metallurgy Process
Beaunac, E (CEA|UTC, France); Robisson, A-C; Ablitzer, C (CEA, France); Saleh, K; Leturia, M (UTC, France)

The Evolution Of Microstructure And Mechanical Strength Of Ball-milled And Spark Plasma Sintered WN43 Magnesium Alloy
Zemkova, M (Charles University, Czech Republic); Kozlik, J; Kral, R; Minarik, P (Charles University, Czech Republic

Session 44
SIS Sustainability of Powder Metallurgy

SESSION CHAIRS

Dr Cesar Molins (AMES SA, Spain)
Mrs Caroline Larsson (Höganäs AB, Sweden)

ORAL PRESENTATIONS

Life Cycle Assessment of PM Parts Production - Why and How
Gediga, J (Sphera Solutions GmbH, Germany); Arnhold, V (Powder Metallurgy Solutions, Germany)

High temperature sintering of low alloy steels
Wimbert, L (Hoeganaes Corporation Europe GmbH, Germany), Molinari, A (University of Trento, Italy)

Sustainability Aspects of Additive Manufacturing with Metals
Pastowski, A (Wuppertal Institute, Germany)

Session 45
SIS AM connecting to Industry 4.0 and other digitalisation approaches

SESSION CHAIRS

Dipl.-Ing Claus Aumund-Kopp (Fraunhofer IFAM, Germany)
Mrs Adeline Riou (Erasteel, France)

ORAL PRESENTATIONS

Utilization Of Digital Twin In Quality Assurance Of Metal Additive Manufacturing
Kotila, J (EOS Finland, Finland); Ylander, P; Raitanen, N; Syvänen, T; Välikangas, J; Suomala, S (EOS Finland, Finland)

State of the art cost and productivity considerations of Binder Jetting technology
Schmidt-Lehr, M (AMPOWER GmbH & Co, Germany)

A Systematic Approach to Building a Highly Valuable AM Digital Warehouse
Thiébault, M (3YOURMIND, France)

Session 46
MIM Advanced Processes

SESSION CHAIRS

Mr Marko Maetzig (ARBURG GmbH + Co KG, Germany)

ORAL PRESENTATIONS

Injection Mold Concepts For Prototypes, Small Series And Lost Molds
Müller-Köhn, A (Fraunhofer IKTS, Germany); Abel, J; Moritz, T (Fraunhofer IKTS, Germany)

Advanced Shaping Possibilities For Feedstock-based Processes
Hein, S (Fraunhofer IFAM, Germany); Haack, J; Petzoldt, F (Fraunhofer IFAM, Germany)

(World Paper) Development of powder injection moulding process of cobalt free diamond composite for cutting tool applications
Agote, I (TECNALIA Research & Innovation, Spain); Guraya, C (TECNALIA Research & Innovation, Spain); Dai Prè, M; Nicolis, E (DELLAS Diamond Tools, Italy); Colella, A (MBN Nanomateriala, Italy)

Session 47
High Temperature Materials

SESSION CHAIRS

Dr Monica Campos (Carlos III Madrid, Spain)

ORAL PRESENTATIONS

W-Ni-Co Ternary System Thermodynamic Description At Intermediate Temperatures
Bouliez, N (Plansee Tungsten Alloys, France); Andrieux, J; Dezellus, O; Gardiola, B (LMI, Université Lyon 1, France); Cury, R (Plansee Tungsten Alloys, France)

Lattice Distortion Study In Γ-γ Co-based Superalloys Produced By PM Route With Low W Content
Torralba, J-M (Universidad Carlos III de Madrid, Spain); Sanz-Nicolas, H; Campos, M (Universidad Carlos III de Madrid, Spain); Cartón-Cordero, M (CENIM-CSIC, Spain); Hong, S-J (Division of Advanced Materials Engineering, Kongju National University, South Korea)

POSTER PRESENTATIONS : PM TITANIUM

Electric discharge synthesis of intermetallic phases in composite permeable materials from spontaneous titanium with additives of aluminum and niobium
Savich, V (Powder Metallurgy Institute, Belarus); Golodok, R; Poberezhny, S; Kuznechik, O; Taraikovich, A (Powder Metallurgy Institute, Belarus)

Session 48
AM Properties Stainless Steel

SESSION CHAIRS

Mr Christoph Laumen (Linde AG, Germany)

ORAL PRESENTATIONS

Generation Of A Duplex Steel Microstructure In The LPBF Process
Koehler, M-L (RWTH Aachen University, Germany); Kunz, J; Herzog, S; Kaletsch, A; Broeckmann, C (RWTH Aachen University, Germany)

Sintering Response And Porosity Dependence Of Mechanical Properties Of Binder Jet Printed MIM-grade 316L
Bostrom, M (Sandvik Additive Manufacturing, Sweden); Bostrom, M; Amnebrink, M (Sandvik Additive Manufacturing, Sweden)

Microstructure And Mechanical Properties Of Additively Manufactured Superduplex Stainless Steels
Dixit, N (Sandvik Machining Solutions, Sweden); Larsson, A; Söderberg, H; Wallin, J; Kissel, H (Sandvik Machining Solutions, Sweden)

Properties Of Stainless Steel Manufactured By Direct Energy Deposition
Jakobsson, K (Erasteel Kloster AB, Sweden); Toufine, A; Lhabitant, S (OPT'ALM, France)

POSTER PRESENTATIONS

Characterization Of AISI 316L With Different Oxygen Content Processed By Additive Manufacturing
Lionetti, S (RINA Consulting - Centro Sviluppo Materiali, Italy); Cea, A; Sorci, R (RINA Consulting - Centro Sviluppo Materiali, Italy); Franci, R; Gelsomini, C (Il Sentiero International Campus S.r.l., italy); Bemporad, E (Università Roma 3, Italy)

Session 49
SIS Metal based multi-material AM - more degrees of freedom

SESSION CHAIRS

Dipl.-Ing Claus Aumund-Kopp (Fraunhofer IFAM, Germany)
Mrs Adeline Riou (Erasteel, France)

ORAL PRESENTATIONS

Multi-material Cellular Structures Produced By Selective Laser Melting: A Suitable Transition Between NiTi And Ti6Al4V Alloys
Bartolomeu, F (CMEMS - University of Minho, Portugal); Costa, M-M; Miranda, G; Silva, F-S (CMEMS - University of Minho, Portugal); Alves, N (CDRSP - IPL, Portugal)

Metal Powder Cross-contamination Removal In Multi-material Additive Manufacturing Via Sedimentation
Horn, M (Fraunhofer IGCV, Germany); Betteraaÿ, Van, J; Lederer, F; Schafnitzel, M; Dietrich, S; Schlick, G; Seidel, C; Reinhart, G (Fraunhofer IGCV, Germany)

Multi-material metal 3 D printing applications with coldspray cold welding technology
Ritt, S (SPEE3D GmbH, Germany)

Session 50
MIM Properties and Materials

SESSION CHAIRS

Dr Cristina Berges Serrano (UCLM, Spain)

ORAL PRESENTATIONS

MIM 8620 Case-hardened Vs. MIM 100Cr6 Hardened - A Comparison
Schneider, M (GKN Sinter Metals Engineering GmbH, Germany); Schwarz, J; Simon, C (GKN Sinter Metals GmbH, Germany)

POSTER PRESENTATIONS

Recyclability Of MIM Feedstock Using 17-4PH Powders Produced By Gas Or Water Atomization
Vincent, D (CEA Grenoble, France); Laucournet, R; Baffie, T (CEA Grenoble, France)

Special Interest Seminar Metal Injection Moulding

Session 4 **Monday 05 October** Time: 10.50 - 12.20

SIS PIM of Functional Materials

SESSION CHAIRS


Mr Georg Breitenmoser (Parmaco Metal Injection Molding AG, Switzerland)
Prof. Dr.-Ing. Frank Petzoldt (Fraunhofer Institut – IFAM, Germany)

As a Net Shape technology, Powder Injection Moulding lends itself not only to the production of the conventional alloys, like stainless steels or low alloyed steels, or to the fabrication of ceramic parts, but, provided that the relevant raw material is available or anyway obtainable, also to the fabrication of special materials with functional properties, that can be grouped under the label "Functional Materials". In this seminar, some interesting applications of PIM to Functional Materials will be shown, covering mechanical, magnetic, and even photon emission properties.

PRESENTATIONS

Resource-efficient Production Of Modern Hard Magnets Via Metal Injection Molding Time: 11.20 - 11.50
Weck, C (Fraunhofer IFAM, Germany)


CIM Processing Of Engineered Glass-ceramics For Enhancing The Photoluminescence Properties Time: 11.50 - 12.20
Herranz, G; Berges, C (UCLM, Spain)

Special Interest Seminar: Metal Injection Moulding

Session 8 **Monday 05 October** Time: 12.30 - 14.00

SIS Enabling technologies for MIM

SESSION CHAIRS


Mr Georg Breitenmoser (Parmaco Metal Injection Molding AG, Switzerland)
Prof. Dr.-Ing. Frank Petzoldt (Fraunhofer Institut – IFAM, Germany)

The improvement of a production process proceeds both by optimisation of the process parameters with the given equipment, and by a great extent through the adoption of novel technologies that become available and can greatly aid enlarging the feasibility window. These novel ideas sometimes come from quantum leaps forward in supporting hardware, like in the case of computing capabilities or live remote control systems, and sometimes from other approaches and industrial sectors, like the application of new techniques for the fabrication of critical ancillary tools. In this seminar, digital technologies, both virtual and applied to fabrication, like Additive Manufacturing, will show their potential in improving quality, reliability and economic viability of Powder Injection Moulding.

PRESENTATIONS

Virtual Assessment And Optimization Of The MIM Process Chain - Simulation Enables Risk Management And Leverage Of Potential Time: 12.30 - 13.00
Hartmann, G (MAGMA GmbH, Germany)

Digitizing MIM Parts Production Time: 13.00 - 13.30
Petzoldt, F (Fraunhofer IFAM, Germany)


3D printing of MIM sinter supports via ceramic AM - An efficient AM process for MIM sinter supports Time: 13.30 - 14.00
Wilberforce, S (Emery Oleochemicals GmbH, Germany); Grimmer, P (CMG Technologies Ltd, United Kingdom)

Special Interest Seminar: Hard Materials

Session 09 **Monday 05 October** Time: 13.50 - 15.20

Microstructural design of cemented carbides Part 1

SESSION CHAIRS


Prof Dr Ana Senos (Aveiro University, Portugal)
Prof Elena Gordo (University Carlos III of Madrid, Spain)

Cemented carbides are one of the most widespread powder metallurgy products worldwide. The reason for this is their outstanding combination of hardness and toughness compared to other cutting materials, such as diamond or high speed steels. By selecting the appropriate combination of hard phases, metallic binder phase and processing parameters, a wide combination of microstructures with a variety of mechanical properties can be achieved. This seminar focuses on the importance of microstructural design of cemented carbides that has drawn scientific attention due to new potential applications.

PRESENTATIONS

Computer-aided design of novel binders for cemented carbides Time: 13.50 - 14.20
De Oro Calderon, R (TU Wien, Austria)

Microstructure design of NbC matrix cermet, bridge the gap between cemented carbide and cermet Time: 14.20 - 14.50
Huang, S (KU Leuven, Belgium)

Special Interest Seminar: Hard Materials

Session 12 **Monday 05 October** Time: 15.30 - 17.00

Microstructural design of cemented carbides Part 2

SESSION CHAIRS


Prof Dr Ana Senos (Aveiro University, Portugal)
Prof Elena Gordo (University Carlos III of Madrid, Spain)

Cemented carbides are one of the most widespread powder metallurgy products worldwide. The reason for this is their outstanding combination of hardness and toughness compared to other cutting materials, such as diamond or high speed steels. By selecting the appropriate combination of hard phases, metallic binder phase and processing parameters, a wide combination of microstructures with a variety of mechanical properties can be achieved. This seminar focuses on the importance of microstructural design of cemented carbides that has drawn scientific attention due to new potential applications.

PRESENTATIONS

Sintering of WC-CoNiCrTiAl cemented carbides: precipitation of gamma prime Time: 15.30 - 16.00
Sanchez, J-M (CEIT-BRTA, Spain)

Microstructure and Properties of Ti(C,N)-based Cermets Time: 16.00 - 16.30
Lengauer, W (Vienna University of Technology, Austria)

Understanding Quality Control of Hard Metals -A Quantum Mechanics Approach Time: 16.30 - 17.00
Holmström, E (AB Sandvik Coromant, Sweden)

Special Interest Seminar: Functional Materials

Session 18 **Tuesday 06 October** Time: 08.40 - 10.10

Functional Materials for High Temperature Application

SESSION CHAIRS


Dr Sebastian Hein (Fraunhofer IFAM, Germany)
Mr Peter Kjeldsteen (Sintex a/s, Denmark)

In several fields of modern industry, especially in the energy, aerospace and automotive sectors, the requirements for better efficiency, reduction of consumption of resources and emissions, call for the continuous increase of the regime temperature range, imposing severe requirements for structural resistance of the materials in the new designs. This is the driving force for the development of better high temperature resistant materials, by improvement of currently used compositions, even by introducing completely new families of materials, and of the technologies for their fabrication. The seminar will give some insight of what is the state of the art for this class of Functional Materials.

PRESENTATIONS

High-Entropy Alloys and high temperature applications: an opportunity for PM Time: 08.40 - 09.10
Torralba, J-M (University Carlos III, Spain)

Review of High Temperature Performance Gas-Atomised Alloy Powders for Metal Injection Moulding & Additive Manufacturing Time: 09.10 - 09.40
Davies, P (Sandvik, United Kingdom)

Powder bed based additive manufacturing of refractory metals Time: 09.40 - 10.10
Juechter,V (Heraeus Additive Manufacturing GmbH, Germany)

Special Interest Seminar: Functional Materials

Session 21 **Tuesday 06 October** Time: 10.20 - 11.20

Electrical Functional Materials

SESSION CHAIRS


Dr Sebastian Hein (Fraunhofer IFAM, Germany)
Mr Peter Kjeldsteen (Sintex a/s, Denmark)

In the general trend of optimisation of energy production and use, and of efficiency of electrical and electronic appliances, the role of Powder Metallurgy in the fabrication of better materials for electrical applications could be a key factor. Using powders a tailoring of the properties can be achieved, and difficult-to-process materials can be given the desired shape and properties. These Functional Materials can help transport electrical currents with lower losses, or dissipate the heat produced by the electrical appliances, and achieve a better performance of the devices where they are used, from tiny microcircuits to large offshore wind turbines.

PRESENTATIONS

Sintering Behaviour Of Silver Paste For Packaging Of Power Electronics Components Time: 10.20 - 10.50
Botter, N (SAFRAN, France)

Processing of high performance MgB2 superconducting wires through Powder-In-Tube method Time: 10.50 - 11.20
Grasso, G (ASG Superconductors SpA, Italy)

Special Interest Seminar: Hot Isostatic Pressing

Session 26 **Tuesday 06 October** Time: 12.40 - 14.10

The opportunities of HIP in Additive Manufacturing

SESSION CHAIRS

Dr Susan Davies (Bodycote Hot Isostatic Pressing AB, Sweden)
Mr Jim Shipley (Quintus Technologies AB, Sweden)


Hot isostatic pressing (HIP) of additively manufactured metals is a widely adopted and effective method to improve the density and microstructure homogeneity within geometrically-complex metal structures fabricated with laser powder bed fusion (LPBF). HIP can be used as a production technique (net shape HIPing) as well as post-treatment (densification). In this session opportunities of HIP in Additive manufacturing and Powder metallurgy will be under focus.

PRESENTATIONS


Improvement of material properties of AM Ti-6Al-4V from SLM, EBM and BJT by adapted HIP cycles Time: 12.40 - 13.10
Wycisk, E (AMPOWER GmbH & Co, Germany)


PM HIP- probably the best additive manufacturing process in the world Time: 13.10 - 13.40
Berglund, T (MTC Powder Solutions, Sweden)


(World Paper) HIP Replacement: An Alternative To Forging Time: 13.40 - 14.10
Jones, G (Rolls-Royce, United Kingdom)

Special Interest Seminar: Press and Sinter

Session 34 **Wednesday 7 October** Time: 08.30 - 10.00

Modelling of materials for Press & Sinter and their properties part 1

SESSION CHAIRS

Mrs Caroline Larsson (Höganäs AB, Sweden)
Dr Cèsar Molins (AMES SA, Spain)


Even the rather well-established Press&Sinter process is always evolving, with improvements happening all along the process, from powder production and characteristics, through the pressing and the consolidation, and down to the post processing. The simulation of the different process steps, and the use of models to understand the various property-parameter relationships, is key in optimising the whole process chain. The seminar, that is run in two sessions named Part 1 and Part 2, really covers the whole spectrum, from atomisation to surface densification of sintered parts.

PRESENTATIONS


The Rastagaev Compression Test And The Derivation Of The Compressive Yield Strength Time: 08.30 - 09.00
Schneider, M (GKN Sinter Metals Engineering GmbH, Germany)


Virtual Assessment And Optimization Of Continuous Sinter Processes And Furnaces Time: 09.00 - 09.30
Hartmann, G (MAGMA GmbH, Germany)


Transfer Of A Cylindrical Rolling Force Model For Cylindrical Discs To Rolling Of PM Manufactured Spur Gears Time: 09.30 - 10.00
Klee, L (WZL RWTH Aachen University, Germany)

Special Interest Seminar: Press and Sinter

Session 37 **Wednesday 7 October** Time: 10.10 - 11.40

Modelling of materials for Press & Sinter and their properties part 2

SESSION CHAIRS

Mrs Caroline Larsson (Höganäs AB, Sweden)
Dr Cèsar Molins (AMES SA, Spain)


PRESENTATIONS


Simulation and testing of two different concepts of anti-satellite systems for the gas atomisation process Time: 10.10 - 10.40
Alejo, A (CEIT, Spain)


An Investigation Of The Mechanical Behavior Of Sintered Astaloy® 85 Mo Time: 10.40 - 11.10
Gaisina, V (KTH Royal Institute of Technology, Sweden)


Modelling the influence of porosity on fatigue strength of sintered steels Time: 11.10 - 11.40
Andersson, M (Höganäs AB, Sweden)

Special Interest Seminar: Press and Sinter

Session 44 **Wednesday 7 October** Time: 13.00 - 14.30

Sustainability of Powder Metallurgy

SESSION CHAIRS

Mrs Caroline Larsson (Höganäs AB, Sweden)
Dr Cèsar Molins (AMES SA, Spain)


Powder metallurgy competes with other technologies, and in the current trend one of the emerging criteria, gaining more and more importance even compared to quality and economy, is sustainability. PM customers are more and more requiring towards their suppliers in terms of expected low carbon footprint, generally low emission levels, efficient use of resources, reduction of usage of critical materials, and other even less tangible features like ethical sourcing. So PM, in Press&Sinter but also in all other powder-based technologies, is asked to show not only a continuous improvement in quality and performance, but also a measurable advantage in terms of compliance to the "Green Deal" and all other "megatrends" that are impacting on the industrial scenario. Some of the aspects of this challenging process will be addressed during this Special Interest Seminar.

PRESENTATIONS



Life Cycle Assessment of PM Parts Production - Why and How Time: 13.00 - 13.30
Gediga, J (Sphera Solutions GmbH, Germany), Arnhold, V (Powder Metallurgy Solutions, Germany)



High temperature sintering of low alloy steels Time: 13.30 - 14.00
Wimbert, L (Hoeganaes Corporation Europe GmbH, Germany), Molinari, A (University of Trento, Italy)


Sustainability Aspects of Additive Manufacturing with Metals Time: 14.00 - 14.30
Pastowski, A (Wuppertal Institute, Germany)

Special Interest Seminar: Additive Manufacturing

Session 45 **Wednesday 07 October** Time: 13.10 - 14.40

AM connecting to Industry 4.0 and other digitalisation approaches

SESSION CHAIRS


Dipl.-Ing. Claus Aumund-Kopp (Fraunhofer IFAM, Germany)
Mrs Adeline Riou (Aubert&Duval, France)

Industry 4.0 is a holistic automation, business information, and manufacturing execution architecture to improve industry with the integration of all aspects of production and commerce across company boundaries for greater efficiency. Additive manufacturing is a set of technologies that are vital to fulfilling different requirements of Industry 4.0 due to the fact that Additive manufacturing is directly connected with information technologies (IT). In this manner, there is a need to study different applications of additive manufacturing with respect to Industry 4.0. The scope of this seminar is different approaches for the connection between Industry 4.0 and Additive Manufacturing.

PRESENTATIONS

Utilization Of Digital Twin In Quality Assurance Of Metal Additive Manufacturing Time: 13.10 - 13.40
Kotila, J (EOS Finland, Finland)

State of the art cost and productivity considerations of Binder Jetting technology Time: 13.40 - 14.10
Schmidt-Lehr, M (AMPOWER GmbH & Co, Germany)

A Systematic Approach to Building a Highly Valuable AM Digital Warehouse Time: 14.10 - 14.40
Thiébault, M (3YOURMIND, France)

Special Interest Seminar: Additive Manufacturing

Session 49 **Wednesday 07 October** Time: 14.50 - 16.20

Metal based multi-material AM - more degrees of freedom

SESSION CHAIRS


Dipl.-Ing. Claus Aumund-Kopp (Fraunhofer IFAM, Germany)
Mrs Adeline Riou (Aubert&Duval, France)

Multi-material AM is the second step of a revolution in manufacturing. It brings in performance improvements in user-definable locations such as throughout a single component, properties like hardness, corrosion resistance, and environmental adaptation can be defined in areas that require it the most. AM of metals, ceramics, and polymers is currently being evaluated to combine multiple materials in one operation and has already produced 'never before produced' parts. While multi-material AM is still in its childhood, researchers are changing their mindset toward this new approach to show that the technology is beginning to advance through a research and development stage in order to have real-world applications

PRESENTATIONS

Multi-material Cellular Structures Produced By Selective Laser Melting: A Suitable Transition Between NiTi And Ti6Al4V Alloys Time: 14.50 - 15.20
Bartolomeu, F (CMEMS - University of Minho, Portugal)

Metal Powder Cross-contamination Removal In Multi-material Additive Manufacturing Via Sedimentation Time: 15.20 - 15.50
Horn, M (Fraunhofer IGCV, Germany)

Multi-material metal 3 D printing applications with coldspray cold welding technology Time: 15.50 - 16.20
Ritt, S (SPEE3D GmbH, Germany)

Campfire Meetings

Additive Manufacturing | Metal Injection Moulding | New Materials, Processes and Applications

INDUSTRY SPEAKERS

What is a **Campfire Meeting?**

- Small in size but large in content, relaxed meeting to discuss a particular topic for 30 minutes
- Led by a facilitator, participants discuss the topic organically to drive the discussion
- Opportunity to share expertise

Why Should I **Participate?**

- Knowledge share
- Problem solving
- Advanced networking

Additive Manufacturing: Lithography-based Metal Manufacturing. Complementary to mass production with metal injection molding

Monday 5 October 2020 Time: 13.40 - 14.40

Speaker: Apollinaria Frydmann (INCUS, Austria)

Sinter-based additive manufacturing technologies result in material properties comparable to Metal Injection Molding (MIM). In lithography-based metal manufacturing (LMM), the liquid feedstock consists of photopolymers and metal powder, allowing a homogeneous recoating of a fresh layer throughout the whole printing process. Together with a high-resolution projector, the printing results in mechanically stable green parts with superior surface aesthetics. A thermal debinding and sintering step is necessary to achieve the final metal properties.

Non-destructive testing for all kinds of PM parts

Tuesday 6 October 2020 Room: 2.7 / 2.8 Time: 11.30 – 12.30

Speaker: Michael Weidner (Siemens Industry Software GmbH, Germany)

The plan is to give a short overview of common quality testing methods, their main benefits and limits (approx 10 minutes) in order to start the session. Then the participants have the opportunity to discuss their main requirements, like testing of geometry or hardness, crack and void testing in different materials, at different production stages, and at different regions (surface/volume/visible regions/accessible regions). Hopefully, some of them can take profit from the knowledge or experience of others.

Metal Powder Flow measurements – latest developments

Tuesday 6 October 2020 Time: 11.30 – 12.30

Speaker: Filip Francqui (Granutools, Belgium)

In this presentation Filip Francqui will revisit standard powder flow measurements in powder metallurgy, show their limitations and propose new methods. Key words: Hall Flowmeter, Granuflow, Granudrum, Tap density, Granupack Filip Francqui is Managing Director at Granutools, active member of various standardization groups and liaison expert between B119 and TC261.

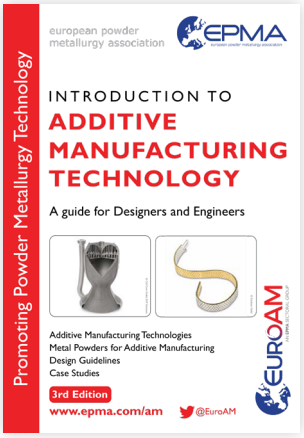
Developing the Powder Metallurgy Future

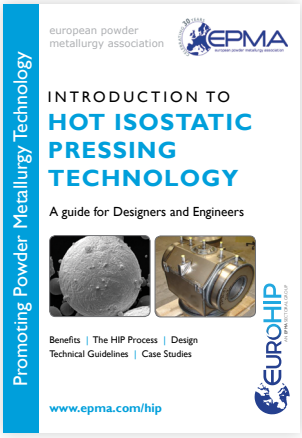
european powder metallurgy association

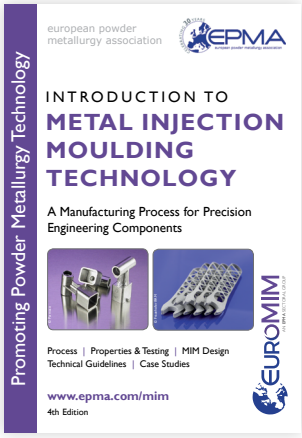
EPMA Publications

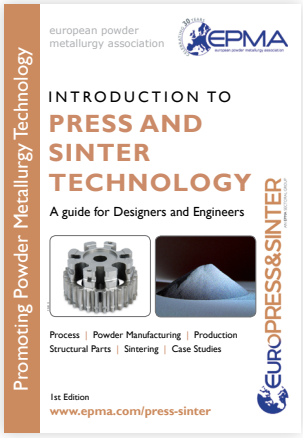
EPMA online PM publications catalogue is one of, if not the most comprehensive listing of Powder Metallurgy and associated titles in Europe.

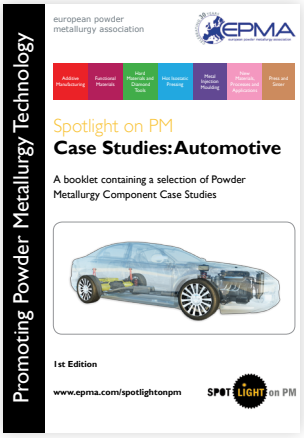
All publications featured are English language titles, with some titles exclusive to the EPMA.

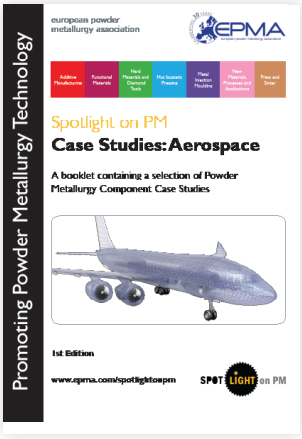


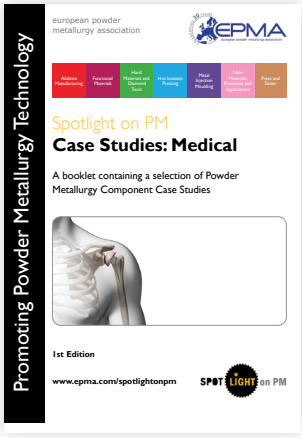


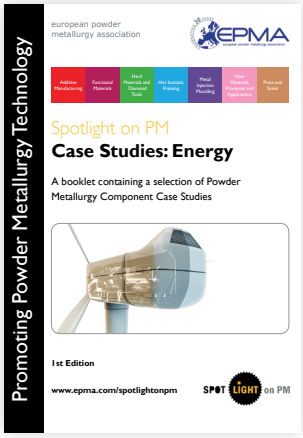












For further information visit: **www.epma.com/publications**

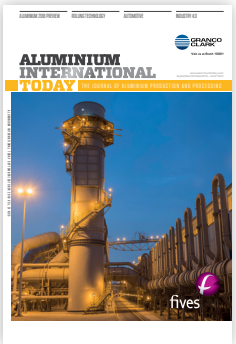
Publication Media Partners

Euro PM2020 will be providing the following magazines for the benefit of our delegates, available in the magazine area here.

3d Adept

3d Adept is a Communication Company dedicated to the 3D printing industry. 3D Adept Media provides the latest trends and analysis in the 3D printing industry in English & French. Our media include an online media and a bimonthly magazine, 3D Adept Mag. All issues of 3D Adept Mag are available to download free of charge. Our mission is to help any company develop its services and activities in the 3D printing industry.

www.3dadept.com/magazine-3d-adept-mag

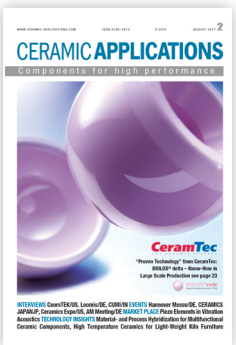


Aluminium International Today

Aluminium International Today is dedicated to all sectors of the international aluminium manufacturing and processing industry. It contains global news, events, and statistics, as well as detailed technical articles, company and country profiles, conference reports and regional economic briefings.

The journal has evolved since its formation in 1989. It has embraced the digital age and publishes news regularly on its website. It also publishes a free weekly newsletter sent to more than 20,000 industry professionals.

www.aluminiumtoday.com



Ceramic Applications

Ceramic Applications is the platform for advances in the development of ceramic components and systems for sustainable, economic applications in their wide range of industrial sectors. Design engineers need regular updates on innovative applications of ceramic materials as they can provide extraordinary combinations of mechanical, electrical, thermal and chemical properties for enhanced system engineering. Ceramic Applications aims to bridge the knowledge of ceramic manufacturers and the design engineers in the various industrial user sectors.

www.ceramic-applications.com

Ceramic Forum International

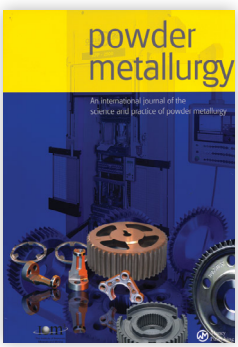
CFI Ceramic Forum International is the technical-scientific journal for the ceramic industry and provides a global overview of state-of-the-art technology and processes for all market sectors with a focus on tiles, tableware, sanitary ware, heavy clay and advanced ceramics, raw materials, refractories and powder metallurgy.

www.cfi.de

Diamante A&T Magazine

Diamante A&T is a quarterly international magazine featuring articles on diamond tools technology and industrial diamond applications in stone, building and mechanical sectors. First published in 1995 by G&M Associated, Diamante A&T is the leading magazine for tools manufacturers, distributors and end users thanks to the quality of its articles always a step ahead in reporting new researches and latest technologies.

www.gmassdiamonte.com



Powder Metallurgy

Powder Metallurgy is an international journal publishing peer-reviewed original research on the science and practice of powder metallurgy and particulate technology. The journal covers metallic particulate materials, PM tool materials, hard materials, composites, and novel powder-based materials.

Powder Metallurgy benefits from indexing in numerous databases, including Scopus and the Science Citation Index.

The journal is published by Taylor & Francis on behalf of The Institute for Materials, Minerals and Mining (IOM3).

Click Here to see the journal

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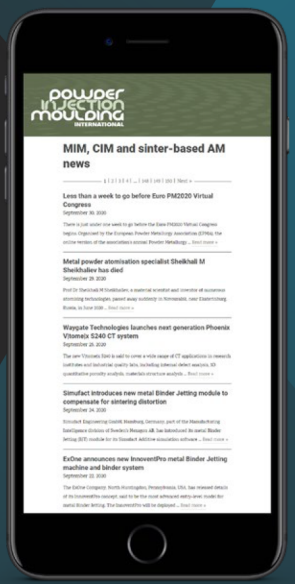

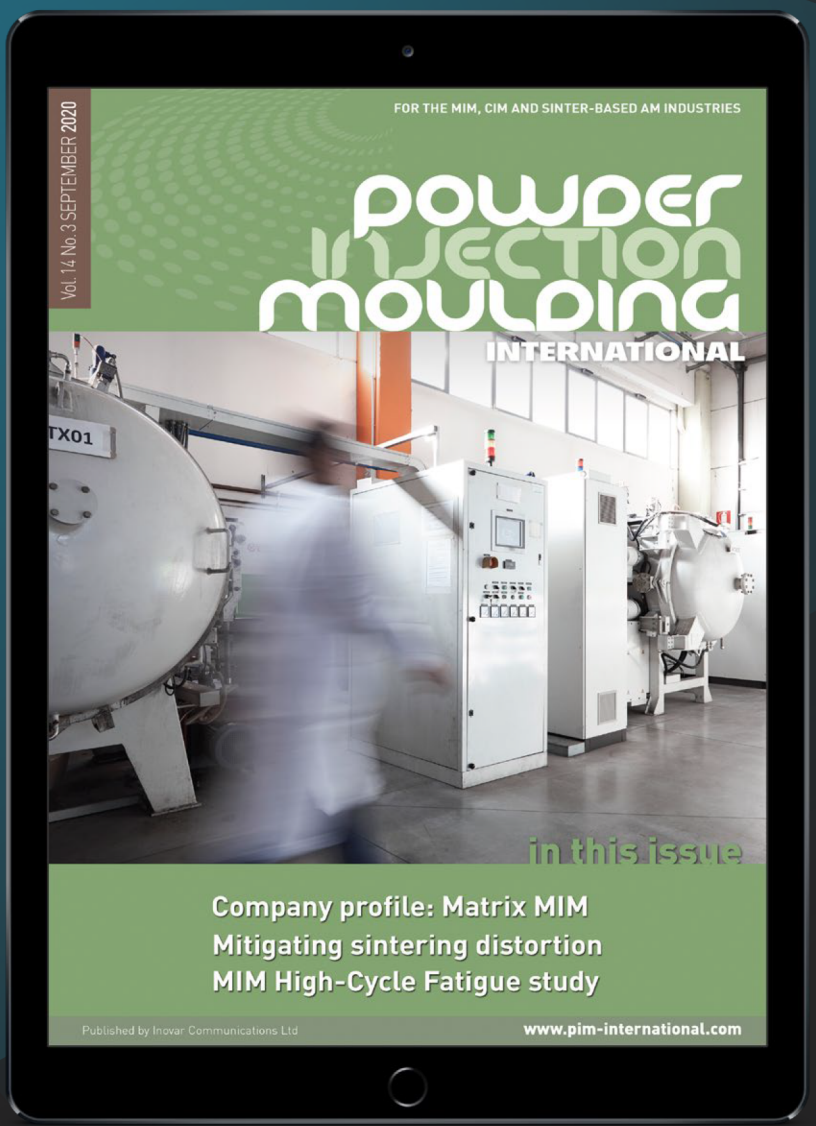

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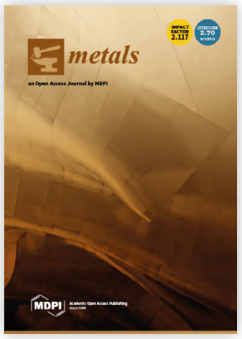
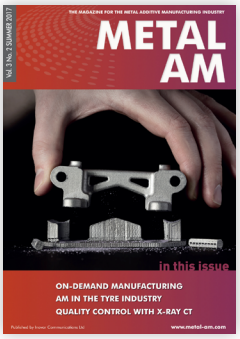


Metal Additive Manufacturing

Metals (ISSN 2075-4701; CODEN: MBSEC7) is an international, open access metallurgy journal published monthly online by MDPI. It has been indexed by Science Citation Index Expanded (SCIE) and Scopus (Elsevier). The Impact Factor of /Metals/ is 2.117, ranking 18/79 (Q1) in Metallurgy & Metallurgical & Engineering, 185/314 (Q3) in Materials Science, Multidisciplinary.

https://www.mdpi.com/journal/metals/events



Metal Additive Manufacturing

Metal Additive Manufacturing magazine is the leading news source for commercial and technical developments in the metal AM industry. Published quarterly in print and online, each issue features a number of exclusive in-depth articles and special features on metal Additive Manufacturing, as well as our extensive industry news rundown. Each new issue of Metal AM, as well as the complete archive, is available to download free of charge.

www.metal-am.com

Metal Powder Report

Metal Powder Report is the premier international and independent magazine for the powder metallurgy industry.

Provides:

- News of industry developments and product launches
- General and technical features
- Research articles on leading-edge technology
- Company profiles
- Industry comment
- Literature reviews
- Events diary
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www.materialstoday.com/metal-powder-report

Powder Injection Moulding International

PIM International is the only publication dedicated to serving the global PIM industry, comprising the metal and ceramic injection moulding sectors. Each issue includes specially commissioned features from industry experts covering end-user markets, regional developments and process innovations. We also regularly report on visits to PIM companies around the world.

www.pim-international.com

Powder Metallurgy Review

Powder Metallurgy Review is the international magazine for the Powder Metallurgy industry. Each issue focuses on the latest developments and technological innovations in the PM industry, including ferrous and non-ferrous components, hard metals, high alloy steels, superalloys, and more. Published quarterly, it is available as a free digital download or through subscription to our print edition.

www.pm-review.com

Refractories World Forum

Refractories Worldforum is the most comprehensive technical and scientific journal for the global refractories sector: production of refractories, industries processing and consuming refractories, raw materials and additives, plant and machine suppliers. Refractories Worldforum builds a bridge between industry and science.

www.refractories-worldforum.com

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General Information

- Registration and Fees
- General Information

EURO PM2020 VIRTU@L CONGRESS	Attendees type							
	Delegate				Student Delegate	Euro PM2020 Proceedings	Technical Sessions & SIS	Posters Gallery
	Presenting Authors or Session Chairs	EPMA Member	Non EPMA Member	End Users*				
Full package (Fees + Proceedings) before VAT	€ 450	€ 500	€ 600	€ 450	€ 350	included	included	included
Full package (Fees + Proceedings) including VAT (20%)	€ 540,00	€ 600,00	€ 720,00	€ 540,00	€ 420,00	included	included	included
Registration Fees before VAT	€ 250	€ 300	€ 400	€ 250	€ 150	€ 250	included	included
Registration Fees including VAT (20%)	€ 300,00	€ 360,00	€ 480,00	€ 300,00	€ 180,00	€ 250 + 20% VAT	included	included

French VAT (20%) may be reclaimed via the official method within your country.

Payments : Credit card and bank transfer
Please note bank transfer will not be possible after 16 September 2020

From 28 September 2020 and until the end of the event : only Non EPMA Member fees will be applied.

*End users are defined as: Original Equipment Makers (OEMs), Tier 1, Tier 2 and system supplier supply chain compagnies and personnel, who select the PM process to produce the components for their applications (automotive, aerospace, medical, energy, machinery, etc...) but generally do not produce PM parts themselves.

Registration

Registration for Euro PM2020 can only be done online via our website **www.europm2020.com**. The table on the previous page outlines the different delegate types and the fees applicable. The tick indicates what is included in each type of admission package.

Terms and conditions

EPMA reserves the right to alter the programme, speakers, and dates at any time, without notice. Should for any reason the event change or the event be cancelled due to an act of terrorism, extreme weather, disease control, industrial action or any eventuality beyond the control of the EPMA, we shall endeavour to reschedule, but the delegate hereby indemnifies the EPMA and holds the EPMA harmless from and against any costs, damages and expenses, incurred by the delegate.

Payment

Your place is not guaranteed at the Euro PM2020 Virtual Congress until payment in full is received by the organisers.

Cancellation Policy

Cancellation on or after 31st August 2020 will result in a 100% cancellation charge. Any cancellation must be notified to the organisers in written form to pm2020@epma.com (or registration-epma@shocklogic.com)

End Users (Defined as companies who sell directly to the open market not further down the supply chain.)

Please note that all End User Registrations will be checked to ensure your company activities are End User related, with incorrect registrations being charged at the higher Full or Daily Delegate rates.

If you require assistance with choosing the correct fee, please email Euro PM2020 Registrations **pm2020@epma.com** with a brief company description and current website link to assist with registration.

General Information

Congress Language

The congress will be conducted in English.

Congress Proceedings

The congress proceedings are included in the registration package for delegates as shown on page 15 and are provided and are provided in the form of a downloadable file. If proceedings are not included in your registration type, they can be purchased on EPMA website.

Online Presence and Referencing

EPMA has agreements with ProQuest LLC, Cambridge Scientific Abstracts, EBSCO and Scopus to enable the wider circulation of papers presented at EPMA conferences and to enhance their standing in the academic community. The papers from Euro PM2020 will subsequently be made available to the subscribers of these products after October 2020.

Proceedings are also available on www.epma.com/publications including Proceedings more than 4 years old available to download free of charge.

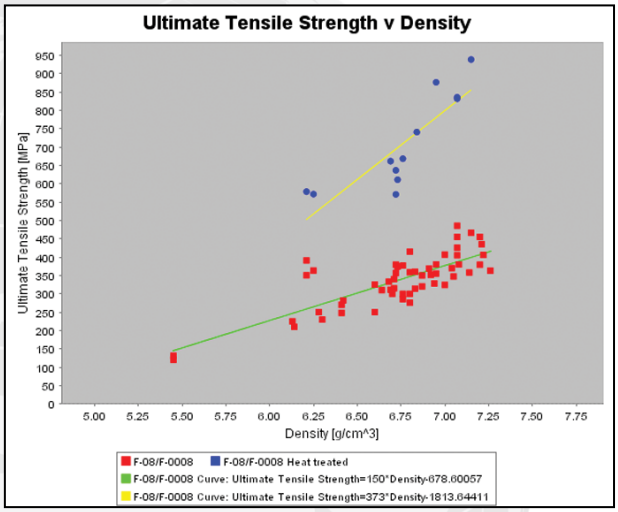
Global Powder Metallurgy Property Database

Introducing the latest material database development for Designers and Engineers worldwide

The Global Powder Metallurgy Property Database – a special online resource

The Global Powder Metallurgy Database (GPMD) was created in response to the absence of a readily accessible source of design data which was acting as a significant impediment to the wider application of PM products. The database was the result of a global collaboration between the three major regional trade associations: EPMA (Europe), MPIF (North America) and JPMA (Japan). Since its launch in 2004 the content has been steadily increased to a total of nearly 4000 lines of high quality data.

The GPMD provides physical, mechanical and fatigue data for a range of commercially available PM materials. Originally covering the mechanical and physical properties of PM Steels and Stainless Steels from 6.4 gm/cc upwards, Powder Forged Steels, non ferrous materials and bearing alloys over one thousand new lines of data have been added since the launch. These now additionally cover ferrous and non ferrous MIM materials, fatigue endurance limits and SN curves.



A well tested system of data collection and validation means that the maximum amount of technical information can be displayed without compromising the source and confidentiality of donating organisations. Current areas to be further developed include expanding the available MIM data, obtaining and verifying data from the PM HIP sector and additional data for fatigue properties. With over 9000 registered users from all parts of the world the database provides a significant resource to a very wide range of designers and engineers who may not be familiar with PM technology.

The free to access database allows detailed searches on physical and mechanical properties to be made and results downloaded as either spreadsheets or into well-known FEA packages such as Abacus or MSC. The associated website at www.pmdatabase.com also provides background data on the PM process and designing for PM. Users can also view a list of contributing PM parts makers with contact details. For more first class data please visit:

www.pmdatabase.com

Visit the website for more information on:

- How it can benefit you
- How to access it
- How it works

european powder
metallurgy association

EPMA
european powder metallurgy association

FIRST ANNOUNCEMENT

Euro PM2021 International Powder Metallurgy Congress & Exhibition

17 – 20 October 2021

Lisbon Congress Centre (CCL), Lisbon, Portugal

WWW.EUROPM2021.COM

EURO PM2021
CONGRESS & EXHIBITION

Developing the Powder Metallurgy Future

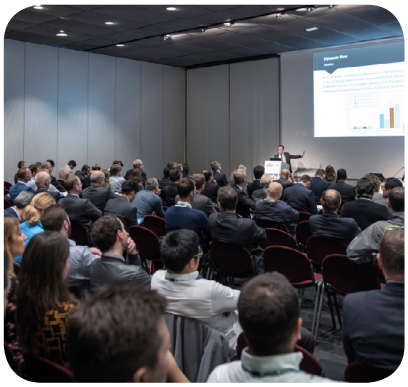
european powder
metallurgy association

Organised and Sponsored by EPMA
european powder metallurgy association

First Announcement

9 - 13 October 2022

Lyon Convention Center, Lyon



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