



CONFERENCE ON FAST/SPS

From Research to Industry

October 16–18, 2023
Monday, 09.00–23.00
Tuesday, 09.00–21.00
Wednesday, 09.00–15.30

Airport Hotel Okęcie
24 Komitetu Obrony Robotników St.,
02-148 Warsaw, Poland

CONFERENCE PROGRAMME

DAY 1

OCTOBER 16, 2023 (MONDAY)

09.00–09.30 **Participants Registration**

09.30–09.45 **Opening Ceremony**

09.45–10.30 **Keynote Lecture I**

Session Chairman: Dariusz Garbiec

Field Assisted Sintering Technologies for Greener and Better Materials

*Olivier Guillon, Institute of Energy and Climate Research: Materials Synthesis and Processing
Forschungszentrum (IEK-1), Jülich, Germany*

10.30–11.15 **Keynote Lecture II**

Session Chairman: Marcin Chmielewski

Strategies to Overcome the Main Challenges of Spark Plasma Sintering Process and to Design Materials with Tailored Properties

Claude Estournes, Université de Toulouse, Toulouse, France

11.15–11.30 **Coffee Break**

11.30–12.30 **Session I**

Session Chairman: Olivier Guillon

11.30–11.50 **Metallic Tool in FAST/SPS**

Alexander Laptev, Łukasiewicz Research Network – Poznań Institute of Technology, Poznań, Poland

11.50–12.10 **A CoNi-based High Entropy Superalloy Processed by Spark Plasma Sintering**

Ahad Mohammadzadeh, IMDEA Materials Institute, Getafe, Madrid, Spain

12.10–12.30 **Remarkable Irradiation Resistance of ODS-HEA Alloys Sintered Using the Spark Plasma Sintering Technique**

Łukasz Kurpaska, National Centre for Nuclear Research, Otwock, Poland

12.30–12.45 **Coffee Break**

12.45–15.00 **Session II**

Session Chairman: Alexander Laptev

12.45–13.15 **70 years of FAST/SPS Sintering, 70 Years Dr. Fritsch**

Jens Huber, Dr. Fritsch, Fellbach, Germany

13.15–13.45 **U-FAST^{COMPACT} – the First Step Into Sintering Adventure**

Katarzyna Jach, GeniCore Sp. z o.o., Warsaw, Poland

13.45–14.00 **Latest Developments and Trends for the Industrial Application of FAST/SPS Technique**

Benjamin Luthardt, FCT Systeme GmbH, Frankenblick, Germany



14.00–14.15 Ultrasonic Atomization, a Novel Technology for Powder Production with Tailored Chemical Compositions

Bartosz Morończyk, AMAZEMET Sp. z o.o., Warsaw, Poland

14.15–14.30 Resonant Alternating Current Sintering (RACS) Technology

Andrzej Koleżyński, Materials Design, Systems & Devices, Krakow, Poland

14.30–14.45 The Imminent Surge of FAST/SPS Technology: Paving the Way to Mainstream Production in the Next Decade

Romain Epherre, Norimat, Labège, France

14.45–15.00 Advanced Materials Characterisation Techniques – Netzsch Portfolio

Krzysztof Hodor, NETZSCH Instrumenty Sp. z o.o., Krakow, Poland

15.00–16.30 Lunch Time

16.30–18.00 Poster Session

1. Manufacturing and Properties of 12Cr Ferritic ODS Steel with Zr Addition

Krzysztof Nowik¹, Rafał Zybala², Zbigniew Oksiuta³

¹*Białystok University of Technology, Białystok, Poland*

²*Łukasiewicz Research Network—Institute of Microelectronics and Photonics, Warsaw, Poland*

³*Białystok University of Technology, Białystok, Poland*

2. A New Method for the Formation of Tribotechnical Coatings by the Method of Electrospark Alloying

Oksana Haponova^{1,2}, Viacheslav Tarellyk³, Tomasz Mościcki¹, Nataliia Tarellyk³, Jacek Hoffman¹

¹*Institute of Fundamental Technological Research Polish Academy of Sciences, Warsaw, Poland*

²*Sumy State University, Sumy, Ukraine*

³*Sumy National Agrarian University, Sumy, Ukraine*

3. Effect of Diamond Particles Size on Microstructure and Materials Properties of Cu-C Composites Manufactured by SPS Method

Agata Strojny-Nędza¹, Marcin Chmielewski¹, Kamil Kaszyca¹, Grzegorz Kuderski¹, Krystian Kowiorski¹, Rafał Zybala¹, Bartosz Bucholc¹, Szymon Nosewicz²

¹*Łukasiewicz Research Network – Institute of Microelectronics and Photonics, Warsaw, Poland*

²*Institute of Fundamental Technological Research, Polish Academy of Sciences, Warsaw, Poland*

4. Thermal and Electrical Stability of Cu-Graphene and Ni-Graphene Materials Obtained by SPS/FAST Technique

Krystian Kowiorski¹, Kamil Kaszyca^{1,3}, Konrad Krzyżak¹, Agata Strojny-Nędza¹, Grzegorz Kuderski¹, Bartosz Bucholc^{1,2}, Rafał Zybala^{1,4}, Marcin Chmielewski^{1,5}

¹*Łukasiewicz Research Network - Institute of Microelectronics and Photonics, Warsaw, Poland*

²*Institute of Fundamental Technological Research Polish Academy of Sciences, Warsaw, Poland*

³*AGH University of Krakow, Krakow, Poland, Krakow, Poland*

⁴*Warsaw University of Technology, Warsaw, Poland*

⁵*National Centre For Nuclear Research, Otwock, Poland*

5. A Novel Method for Quick Characterization of Heat-Transfer Materials for Electronic Devices

Grzegorz Kuderski¹, Agata Strojny-Nędza¹, Bartosz Bucholc¹, Rafał Zybala¹, Kamil Kaszyca¹, Krystian Kowiorski¹, Marcin Chmielewski¹, Anna Gajewska-Midziątek²

¹*Łukasiewicz Research Network – Institute of Microelectronics and Photonics, Warsaw, Poland*

²*Łukasiewicz Research Network – Warsaw Institute of Technology, Warsaw, Poland*

6. Precise Surface Machining of Materials Sintered by SPS Method

Konrad Krzyżak, Rafał Zybala, Marcin Chmielewski, Kamil Kaszyca, Krystian Kowiorski, Agata Strojny-Nędza, Bartosz Bucholc, Michał Gajewski, Grzegorz Kuderski

Łukasiewicz Research Network – Institute of Microelectronics and Photonics, Warsaw, Poland



7. **Advanced Ceramic Cutting Tools Sintered by HPHT and SPS Methods**
Kinga Momot¹, Piotr Klimczyk¹, Beata Leszczyńska-Madej², Marcin Podsiadło¹, Agnieszka Gubernat²
¹Łukasiewicz Research Network - Krakow Institute of Technology, Krakow, Poland
²AGH University of Krakow, Krakow, Poland, Krakow, Poland
8. **Application of Spark Plasma Sintered MAX Phase Powders for Cold Spraying Technology**
Grzegorz Kubicki^{1,2}, Jakub Wiśniewski¹, Joanna Pótrolniczak¹, Jarosław Jakubowicz²
¹Łukasiewicz Research Network – Poznań Institute of Technology, Poznań, Poland
²Poznan University of Technology, Poznań, Poland
9. **Microstructure and Mechanical Properties of (Ti,Mo)C Reinforced Ti Matrix Composites Produced by FAST/SPS**
Rafał Rubach¹, Paweł Figiel², Anna Biedunkiewicz², Dariusz Garbiec¹
¹Łukasiewicz Research Network – Poznań Institute of Technology, Poznań, Poland
²West Pomeranian University of Technology, Szczecin, Poland
10. **Tribological Behavior in a Wide Temperature Range of Ti₃AlC₂ MAX Phase Obtained by FAST/SPS**
Jakub Wiśniewski, Wiktoria Krzyżaniak, Dariusz Garbiec
Łukasiewicz Research Network – Poznań Institute of Technology, Poznań, Poland
11. **3YSZ-10CNT Composites Manufactured by Spark Plasma Sintering Technology**
Maria Wiśniewska^{1,3}, Alexander M. Laptev¹, Alex Sullivan², Luca Celotti², Mirosław Szybowicz³, Dariusz Garbiec¹
¹Łukasiewicz Research Network – Poznań Institute of Technology, Poznań, Poland
²Azimuth Space GmbH, Berlin, Germany
³Poznan University of Technology, Poznań, Poland
12. **Process of Up-Scaling the FAST/SPS method Based on Production Sputtering Targets**
Maria Wiśniewska¹, Mateusz Marczewski¹, Alexander M. Laptev¹, Agnieszka Krawczyńska², Małgorzata Lewandowska², Tomasz Mościcki³, Dariusz Garbiec¹
¹Łukasiewicz Research Network – Poznań Institute of Technology, Poznań, Poland
²Warsaw University of Technology, Warsaw, Poland
³Institute of Fundamental Technological Research Polish Academy of Sciences, Warsaw, Poland
13. **Synthesis of Ti₂AlC Using Spark Plasma Sintering**
Joanna Pótrolniczak^{1,2}, Grzegorz Kubicki^{1,2}, Mateusz Marczewski¹, Jarosław Jakubowicz²
¹Łukasiewicz Research Network – Poznan Institute of Technology, Poznań, Poland
²Poznan University of Technology, Poznań, Poland
14. **Effects of Various Synthesis Methods and Additives on the Properties of Sintered Doped Zirconia for the Nuclear Applications**
Marcin Brykała, Wojciech Chmurzyński, Marcin Chmielewski, Magdalena Gawęda, Kinga Suchorab, Katarzyna Mulewska, Jarosław Jasiński
National Centre for Nuclear Research, Otwock-Swierk, Poland
15. **Characteristics of Fe-B-La Alloys Used for Hydrogen Storage**
Julia Popis¹, Sabina Lesz¹, Małgorzata Karolus²
¹Silesian University of Technology, Gliwice, Poland
²University of Silesia, Chorzów, Poland
16. **Development and Characterization of a High-Entropy Alloy (HEA) for Catalysts in Anion-Exchange Membrane Water Electrolysis**
Alexander Ahrend¹, Olaf Keßler¹, Hermann Seitz¹, Marcel Wetegrove³, Abdullah Riaz¹
¹University of Rostock, Rostock, Germany
²Leibniz Institute for Plasma Science and Technology, Greifswald, Germany



17. **Effect of Heat Treatment on Microstructure and Corrosion Behaviour of FAST Processed Cathodically Modified 17-4PH Stainless Steel**
Natasha Sweeney Fort¹, Richard Thackray¹, Hugh Hamilton², Gill Thornton³, Martha Briceno de Gutierrez², Xinjiang Hao³, Andy Fones²
¹University of Sheffield, Sheffield, England
²Johnson Matthey Technology Centre, Sonning Common, England
³Liberty Powder Metals, Middlesborough, England
18. **The Consolidation of WC Ceramics Using MAX Phases as a New Family of Sintering Activators**
Jarosław Woźniak, Mateusz Petrus, Dorota Moszczyńska, Tomasz Cygan, Kamil Broniszewski, Andrzej Olszyna
Warsaw University of Technology, Warsaw, Poland
19. **Mechanical and Electrical Properties of SiC – Graphene Composites Obtained Using Spark Plasma Sintering**
Kamil Broniszewski, Jarosław Woźniak, Tomasz Cygan, Marek Kostecki, Andrzej Olszyna
Warsaw University of Technology, Warsaw, Poland
20. **Sintering Behaviour, Microstructure and Mechanical Properties of Ultra-High Temperature Ceramics from TiB₂/ZrB₂-SiC/graphene Systems**
Tomasz Cygan, Marek Kostecki, Jarosław Woźniak, Andrzej Olszyna
Warsaw University of Technology, Warsaw, Poland
21. **Corrosion resistance of 316L oxide dispersion strengthened (ODS) steel**
Anna Dobkowska, Aleksandra Zielińska, Mirosław Jakub Kruszewski, Bogusława Adamczyk-Cieślak, Jarosław Mizera
Warsaw University of Technology, Warsaw, Poland

19.00–23.00 Conference Dinner

DAY 2
OCTOBER 17, 2023 (TUESDAY)

09.00–16.00 Industrial Session

09.00–09.05 Opening of the 2nd day of the Conference

09.05–09.50 Keynote Lecture III

Session Chairman: Piotr Klimczyk

The Use of SPS for Sustainable Development of High Entropy Alloys Using Pre-alloyed Commodity Powders

José Manuel Torralba, IMDEA Materials Institute, Getafe, Madrid, Spain

09.50–10.20 Coffee Break

10.20–12.00 Session III

Session Chairman: José Manuel Torralba

10.20–10.40 Tunable Microstructures of AlN-based Ceramics by Pressure Assisted Sintering Methods (SPS, HP): Influence on Electrical and Thermal Properties

Mickaël Coeffe Desvaux, IRCER – University of Limoges, Limoges, France

10.40–11.00 High Performance Duplex Ceramics For Efficient Machining Of Nickel Superalloys

Piotr Klimczyk, Łukasiewicz Research Network – Krakow Institute of Technology, Krakow, Poland



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- 11.00–11.20** **MAX-based Composites Made by SPS: Structure Formation and Unique Properties**
Volf Leshchynsky, Łukasiewicz Research Network – Poznań Institute of Technology, Poznań, Poland
- 11.20–11.40** **Micromechanical Testing of Magnetron Sputtered W-Ti-B Coatings from SPS Targets**
Tomasz Mościcki, Institute of Fundamental Technological Research PAS, Warsaw, Poland
- 11.40–12.00** **Spark Plasma Sintering For Synthesis Of Transition Metal Oxides**
Igor Veremchuk, Helmholtz-Zentrum Dresden-Rossendorf, Dresden, Germany
- 12.00–12.30** **Coffee Break**
- 12.30–14.10** **Session IV**
Session Chairman: Claude Estournes
- 12.30–12.50** **Investigation of Microstructure and Tribological Behavior of Al-SiC Composites with High SiC Content Processed through Spark Plasma Sintering**
Beata Leszczyńska-Madej, AGH University of Krakow, Krakow, Poland
- 12.50–13.10** **Fabrication and Evaluation of Co-based Diffusion Barriers for Skutterudite Thermoelectric Materials Obtained via Pulse Plasma Sintering**
Mirosław J. Kruszewski, Warsaw University of Technology, Warsaw, Poland
- 13.10–13.30** **Superionic Thermoelectric Materials Based on Cu₂X (X = S, Se) Sintered Using the SPS and the “SPS Melting” Method**
Paweł Nieroda, AGH University of Krakow, Krakow, Poland
- 13.30–13.50** **FAST/SPS Sintering of Tetrahedrites Cu₁₂-X(Tm₁Tm₂)Sb₄S₁₃ (Tm_x – Mn, Fe, Co) for Thermoelectric Applications**
Juliusz Leszczyński, AGH University of Krakow, Krakow, Poland
- 13.50–14.10** **Synthesis and Consolidation of Bi₂Te₃-based Thermoelectric Materials with the Use of SPS/FAST Technique**
Bartosz Bucholc, Łukasiewicz Research Network – Institute of Microelectronics and Photonics, Warsaw, Poland
- 14.10–15.30** **Lunch Time**
- 16.00–21.00** **Guided City Tour**

DAY 3

OCTOBER 18, 2023 (WEDNESDAY)

- 09.00–09.05** **Opening of the 3rd day of the Conference**
- 09.05–09.50** **Keynote Lecture IV**
Session Chairman: Rafał Zybala
Exploitation of FAST/SPS to Recycle Surplus Metal Powder for Sustainable Solutions and Near-Net Shape Components
Martin Jackson, The University of Sheffield, Sheffield, UK
- 09.50–10.20** **Coffee Break**
- 10.20–12.00** **Session V**
Session Chairman: Martin Jackson
- 10.20–10.40** **Field-Assisted Sintering of Load-Bearing Ti6Al4V-Barium Titanate Piezoelectric Scaffolds for Bone Tissue Engineering**
Abdullah Riaz, University of Rostock, Rostock, Germany



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- 10.40–11.00** **Quantitative Analysis of Influence of SPS Process Parameters on the Porous Materials Structure Using Combined EBSD and Computer Assisted Software**
Szymon Nosewicz, Institute of Fundamental Technological Research PAS, Warsaw, Poland
- 11.00–11.20** **The Investigation of Al/Mg₂B₂O₅ Composites Sintered by SPS and HPHT Methods: Chemical Interaction, Microstructure and Mechanical Properties**
Yuliia Rumiantseva, Łukasiewicz Research Network – Krakow Institute of Technology, Krakow, Poland
- 11.20–11.40** **In-Depth Analysis of the Influence of Bio-Silica Filler on the Properties of Mg Matrix Composites**
Anna Dobkowska, Łukasiewicz Research Network – Institute of Microelectronics and Photonics, Warsaw, Poland
- 11.40–12.00** **Thermo-Electric Model for FAST/SPS Sintering in Discrete Element Framework**
Fatima Nisar, Institute of Fundamental Technological Research PAS, Warsaw, Poland
- 12.00–12.30** **Coffee Break**
- 12.30–14.10** **Session VI**
Session Chairman: Abdullah Riaz
- 12.30–12.50** **Sputtering Targets Obtained by Induction Hot Pressing (IHP) and Spark Plasma Sintering (SPS) Methods**
Krzysztof Mars, AGH University of Krakow, Krakow, Poland
- 12.50–13.10** **The Effect of Process Optimization on Microstructure Evolution and Mechanical Properties of Low BPR Mechanically Alloyed CoCrFeNi High Entropy Alloy**
Artur Olejarz, National Centre for Nuclear Research, Otwock, Poland
- 13.10–13.30** **β-Type Titanium and Zirconium-Based Alloys Produced via Sustainable Spark Plasma Sintering of Nanocrystalline Powders**
Mateusz Marczewski, Łukasiewicz Research Network – Poznań Institute of Technology, Poznań, Poland
- 13.30–13.50** **Detailed Analysis of Microstructure and Properties of Copper Sintered by SPS Method**
Kamil Kaszyca, Łukasiewicz Research Network – Institute of Microelectronics and Photonics, Warsaw, Poland
- 13.50–14.10** **Characterization Of FeCrAl-Y₂O₃ ODS Alloys With the Additions of Ti and V Consolidated By SPS**
Tomasz Stasiak, National Centre for Nuclear Research, Otwock, Poland
- 14.10–14.30** **HEBM-FAST/SPS as a Way of Obtaining Composite Tool Material Made from WC-Ti & WC-Ti6Al4V Powder Mixtures**
Wiktoria Krzyżaniak, Łukasiewicz Research Network – Poznań Institute of Technology, Poznań, Poland
- 14.30–15.30** **LUNCH TIME**



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The organizers provide:

- Book of Abstracts,
- Lunch on October 16th, 17th and 18th, 2023,
- Conference Dinner on October 16th, 2023,
- Guided City Tour on October 17th, 2023.

Registration fee is 200 € or 1000 PLN (+ VAT).

Accommodation is paid by the participants.