



Fourteenth International Conference on HIPIMS

26 - 27 June 2024, Sheffield, UK

Program of Events



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2024

CATAPULT
High Value Manufacturing

Program of Events

Cutlers' Hall, Church Street, Sheffield, S1 1HG, United Kingdom

Day One | Wednesday 26 June 2024

7:00 – 8:00 **Registration**

8:00 - 8:30 **Welcome Address** by

Dr. Ralf Bandorf, Fraunhofer Institute for Surface Technology, Braunschweig, Germany

Prof. Rory Duncan – Pro VC for Research, Sheffield Hallam University,

Prof. Jennifer Smith-McGuire, Dean for Research, Sheffield Hallam University

Prof. Chris Sammon – Director of Materials and Engineering Research Institute

Prof. Arutian P. Ehasarian, National HIPIMS Technology Centre – UK,

First Morning Session

Chairman: Prof. A.P. Ehasarian, Sheffield Hallam University, UK

Industrial Scale High Reactive Index Coatings – Control and Monitoring on the Example of TiO₂ and SiAlN **8:30 – 8:50**

S. Koerner¹, R. Bandorf¹

¹Fraunhofer IST, Riedenkamp 2,38108 Braunschweig, Germany

Reverse Pulse Strategies for Silicon Dioxide Thin Films Deposition by High Power Impulse Magnetron Sputtering **8:50 – 9:10**

A. Oniszczyk¹, D. Owen⁴, D. A. L. Loch², P. Ehasarian³, A.P. Ehasarian³

¹Trumpf Hüttinger Sp. z O.O., Zielonka, Poland

²Trumpf Hüttinger GmbH&Co. KG, Freiburg, Germany

³National HIPIMS Technology Centre – UK, Sheffield Hallam University, Howard St., Sheffield, S1 1WB, UK

⁴Biosciences and Microbiology Research Centre, Sheffield Hallam University, Howard St., Sheffield, S1 1WB

Plasma and energy flux characterization in high power impulse magnetron sputtering **9:10 – 9:30**

Caroline Adam¹, Luka Hansen^{1,2}, Holger Kersten^{1,2}

¹Institute of Experimental and Applied Physics IEAP, Kiel University, Kiel, Germany

²Kiel Nano, Surface and Interface Science KiNSIS, Kiel University, Kiel, Germany

Coffee Break, Exhibition and Poster Session **9:30 – 10:00**

Second Morning Session

Chairman: David Elliot, Director of Surface Engineering Association, UK

Digitalisation of the Magnetic Driven Cathodic Arc Spot Motion – a Semi Empiric Modelling Approach **10:00 – 10:20**

Christoph Leyens^{1,2}, Achim Mahrle¹, Madlen Borkmann¹,
Otmar Zimmer¹, Steffen Schenk¹

¹: Fraunhofer IWS Dresden, Winterbergstraße 28, D-01277 Dresden,
Germany

²: Institute of Materials Science, TU Dresden University of Technology, D-
01069 Dresden, Germany

The role of the magnetic field design in optimising the performance of HIPIMS based sputter deposition processes **10:20 – 10:40**

D.Monaghan (1), V. Bellido-Gonzalez (1), P. McCarthy (1), T. Sgrilli (1)

Robert Brown (1) I. Fernandez (2), A. Wennberg (2)

(1) Gencoa Ltd, Liverpool, UK

(2) Nano4Energy, Madrid, Spain

Effect of magnetic field on reverse discharge ignition in bipolar HiPIMS **10:40 – 11:00**

M. Farahani¹, A.D. Pajdarová¹, T. Kozák¹, J. Čapek¹

¹Department of Physics and NTIS-European Centre of Excellence,
University of West Bohemia, Plzeň, Czech Republic

Coffee Break, Exhibition and Poster Session **11:00 – 11:30**

Third Morning Session

Chairman: Prof. Christoph Leyens, TU Dresden, Germany

Focused Magnetron Sputtering: A High-Density Coating Deposition for Industrial Applications **11:30 – 11:50**

M. Učík^{1,5}, J. Kluson¹, F.F. Klimashin², M. Jilek¹, A. Lümekemann³, M. Beutner⁴, P. Klein⁵, J. Hnilica⁵, H. Bolvardi³

¹ PLATIT a.s., Průmyslová 3020, 787 01 Šumperk, Czech Republic

² EMPA – Swiss Federal Laboratories for Materials Science and Technology, Feuerwerkerstrasse 39, 3602 Thun, Switzerland

³ PLATIT AG, Eichholzstrasse 9, 2545 Selzach, Switzerland

⁴ IFQ - Institut für Fertigungstechnik und Qualitätssicherung, Universitätsplatz 2, 39106 Magdeburg, Germany

⁵ Department of Physical Electronics, Masaryk University, Kotlářská 2, 611 37 Brno, Czech Republic

Simulating the transport of atoms during HiPIMS deposition of NbC from a compound target **11:50 – 12:10**

T. Kozák, M. Farahani, A.D. Pajdarová,

Department of Physics and NTIS – European Centre of Excellence, University of West Bohemia, Univerzitni 8, 301 00 Plzeň, Czech Republic

HIPIMS – Fascinating technology to make next steps in decorative and functional applications **12:10 – 12:30**

Philipp Immich¹, Dave Doerwald¹, Andreas Fuchs¹, Chinmay Trivedi¹, Ivan Kolev¹, Ruud Jacobs¹, Daniel Barnholt¹, Huub Vercoulen¹; Geert-Jan Fransen¹, Holger Hoche², Thomas Ulrich², Peter Polcik³

¹IHI Hauzer Techno Coating B.V., Van Heemskerckweg 22, 5928 LL Venlo, The Netherlands

² Center for Engineering Materials (MPA-IfW), Technical University of Darmstadt, Grafenstraße 2, 64283 Darmstadt, Germany

³ Plansee Composite Materials GmbH, Siebenbürgerstraße 23, 86983 Lechbruck am See, Germany

Space Hub Yorkshire – Unlocking Space for people and business **12:30 – 12:40**

Kelvin Shek

Cluster Development Manager, Space Hub Yorkshire, UK

Conference Photograph **12:40 – 12:50**

In memoriam event for Professor Papken Eh. Hovsepiyan **12:50 – 13:10**

Lunch Break, Exhibition and Poster Session **13:10 – 14:00**

First Afternoon Session

Chairman: Dr. Ralf Bandorf, Fraunhofer IST, Germany

The importance of materials surfaces in the fight against antimicrobial resistance **14:00 – 14:20**

Thomas J Smith, Biomolecular Sciences Research Centre, Sheffield Hallam University, United Kingdom

Plasmonic arrays prepared at room temperature by HIPIMS deposition of titanium nitride **14:20 – 14:40**

Ryan Bower¹, Ethan Muir, Yashodhan Purandare, Arutiun Ehasarian², Peter Petrov¹

1, Imperial College London, London, United Kingdom

2, Sheffield Hallam University, Sheffield, United Kingdom

Ultrafast hot electron diffusion dynamics in titanium nitride **14:40 – 15:00**

Ming Fu^{1*}, Ryan Bower², Ethan Muir³, Daniel Price², Bruno Rente², Arunprabhu A. Sugumaran³, Yashodhan P. Purandare³, David Owen⁴, Thomas Smith⁴, Papken Hovsepian³, Arutiun Ehasarian³, Peter Petrov², Rupert Oulton¹

1 The Blackett Laboratory, Department of Physics, Imperial College London, London, United Kingdom

2 Department of Materials, Imperial College London, London, United Kingdom

3 Materials and Engineering Research Institute, Sheffield Hallam University, Sheffield, United Kingdom

4 Department of Biosciences and Chemistry, Sheffield Hallam University, Sheffield, United Kingdom

Coffee Break, Exhibition and Poster Session **15:00 – 15:30**

Second Afternoon Session

Chairman: Dr. Philipp Immich, Hauzer TechnoCoating, The Netherlands

Bactericidal Efficacy and Surface Morphology of Nanopatterned TiN **15:30 – 15:50**

Films Deposited by High Power Impulse Magnetron Sputtering

D.S. Owen¹, T.J. Smith¹, A. Sugumaran², E. Muir², R. Bower³, B. Rente³, P. Petrov³, M. Fu⁴, R. Oulton⁴, P.Eh. Hovsepian², A.P. Ehasarian²

¹Biomolecular Sciences Research Centre, Sheffield Hallam University, United Kingdom

²Materials and Engineering Research Institute, Sheffield Hallam University, Sheffield, United Kingdom

³Department of Materials, Imperial College London, London, United Kingdom

⁴The Blackett Laboratory, Department of Physics, Imperial College London, London, United Kingdom

Tempering transformed tough TiAlN: towards a robust implementation on cemented carbide substrates **15:50 – 16:10**

Jan Philipp Liebig, Veit Schier,

Walter AG, Derendinger Str. 53, 72072 Tübingen, Germany

Reactive and non-reactive deposition of tungsten carbide by HIPIMS **16:10 – 16:30**

Joern Kohlscheen, Christian Bareiss

Kennametal GmbH, Altweiherstrasse 27-31, 91320 Ebermannstadt, Germany

Coffee Break, Exhibition and Poster Session **16:30 – 17:00**

Third Afternoon Session

Chairman: Dr. Ton Hurkmans, IHI Ionbond, The Netherlands

Advancements in Nitrogen-Doped DLC coating for biopolymer moulding: bridging laboratory insights to field applications **17:00 – 17:20**

A. Bertè¹⁾, P. Colombi¹⁾, M. Cerioni¹⁾

¹⁾ R&D Department, Lafer Rivestimenti Spa, IT

Sustainable and Economical Production of High-Quality HiPIMS Coatings **17:20 – 17:40**

Biljana Mesic, Stephan Bolz , Oliver Lemmer, Christoph Schiffers
CemeCon AG, Adenauerstr. 20 A4, 52146 Wuerselen, Germany

Imaging of individual HiPIMS pulses by high-frame-rate camera **17:40 – 18:00**

Matjaž Panjan

Jožef Stefan Institute, Jamova cesta 39, 1000 Ljubljana, Slovenia

Quo Vadis panel discussion session: **18:00 – 18:30**
Surface Engineering in the Digital Age : Transformative Opportunities

End of first day **18:30**

Conference Dinner **19:00 – 21:30**

First Morning Session

Stable hybrid HiPIMS/RF sputtering process on a single magnetron for arc-free deposition of compact oxide films 09:00 – 09:20

Alexander Fromm¹, [Caroline Adam](#)^{1,2,3}, Frank Meyer¹, Günter Mark²,
Jonathan Löffler², Max Thomas Lorenz¹, Marco Wirth¹, Frank Burmeister¹

1: Fraunhofer Institute for Mechanics of Materials IWM, 79108 Freiburg,
Germany

2: MELEC GmbH, 76534 Baden-Baden, Germany

3: Institute of Experimental and Applied Physics IEAP, Kiel University,
24098 Kiel, Germany

Impact of substrate bias voltage on characteristics of HiPIMS deposited TiAlSiN and its performance in near-dry machining of austenitic stainless steel. 09:20 – 09:40

*Chayan Ranjan Das*¹, *Mufaddal Rangwala*², *Amitava Ghosh*¹

¹Indian Institute of Technology Madras, Chennai, India – 600036

²Addlife Coating Systems Private Limited, Bangalore, India – 560099

Manufacturing of nanohole arrays for stable vaccine formulations 09:40 – 10:00

Toby Lam, Ryan Bower, Bruno Rente and [Peter K Petrov](#)

Department of Materials, Imperial College London

Prince Consort Road, London SW7 2BP, UK

Coffee Break, Exhibition and Poster Session 10:00 – 10:30

Second Morning Session

Chairman: Peter K. Petrov, Imperial College London, UK

Tuning the film properties on insulating substrates using multi-pulse bipolar HiPIMS **10:30 – 10:50**

J. Čapek¹, A.D. Pajdarová¹, T. Kozák¹, M. Farahani¹

¹Department of Physics and NTIS - European Centre of Excellence, University of West Bohemia

Study of E-HiPIMS **10:50 – 11:10**

M-P. Besland*, T. Darny[§], B. Angleraud*, J. Barbe*, T. Minea[§], A. Caillard[#], J. Zgheib*, D. Boivin*, A. Rhallabi*, P-Y. Jouan*

* Nantes Université, CNRS, Institut des Matériaux de Nantes Jean Rouxel, IMN, F-44000 Nantes, France

[§] LPGP—Laboratoire de Physique des Gaz et des Plasmas, Université Paris-Saclay, CNRS, Orsay 91405, France

[#] GREMI, UMR 7344 Université d'Orléans/CNRS, 14 rue d'Issoudun BP 6744, 45067 Orléans, France

Ion energy comparison between HiPIMS and bipolar HiPIMS for the generation of superconducting thin films **11:10 – 11:30**

S. Simon^{1,2}, J. W. Bradley^{1,2}, R. Valizadeh^{2,3}

¹Department of Electrical Engineering and Electronics, University of Liverpool, Liverpool, United Kingdom, L69 3GJ

²Cockcroft Institute of Accelerator Science, Daresbury, United Kingdom, WA4 4AD

³STFC ASTeC Daresbury, Warrington, United Kingdom, WA4 4WAD

Solvent Cleaning in High-Tech-Coating Processes **11:30 – 11:50**

Richard Starkey, SAFECHEM

Karl Trautz, HEMO

Student Prize Announcement **12:00**

Lunch Break, Exhibition and Poster Session **12:15 – 13:30**

First Afternoon Session

Chairman: David Elliot, Surface Engineering Association, UK

Powder metallurgical target manufacturing – targets design challenges in case of depositing high entropy alloy coatings **13:30 – 13:50**

Dr.-Ing. Szilárd Kolozsvári, Dr.-Ing. Peter Polcik

Plansee Composite Materials GmbH, Siebenbürgerstraße 23, 86983

Lechbruck am See, Germany

Temporal plasma evolution during HIPIMS discharge and its relationship to the pulse time **13:50 – 14:10**

A.W. Oniszczyk⁽¹⁾, D.A.L. Loch⁽²⁾, A. A. Sugumaran⁽³⁾, W. Gajewski⁽¹⁾, K. Markowski⁽¹⁾, W. Trzewicznyński⁽¹⁾, A.P. Ehasarian⁽³⁾

⁽¹⁾TRUMPF Huettinger Sp. z o.o., Marecka 47, 05-220 Zielonka, Poland

⁽²⁾TRUMPF Hüttinger GmbH + Co. KG, Bötzingen Straße 80, 79111

Freiburg, Germany

⁽³⁾National HIPIMS Technology Centre - UK, Materials and Engineering Research Institute, Sheffield Hallam University, Howard St., Sheffield, S1 1WB, UK

Preparation of thin films by reactive multi-pulse magnetron sputtering **14:10 – 14:30**

T. Rada^{1,2}, P. Souček¹, J. Hnilica¹, P. Klein¹, P. Vašina¹

¹ Department of Plasma Physics and Technology, Masaryk University, Kotlářská 2, 611 37 Brno, Czech Republic

² PLATIT a.s., Průmyslová 3020, 787 01 Šumperk, Czech Republic

Closing remarks, A.P. Ehasarian, R. Bandorf

14:30

Poster Presentations | Wednesday 26 and Thursday 27 June 2024**Magnetron sputtered β -Ti₃AuAg coatings for long lasting artificial joints and beyond**

C.C. Lukose, M. Birkett

Faculty of Engineering and Environment, Northumbria University, Ellison place, Newcastle upon Tyne, NE1 8ST, UK.

Mechanical and anticorrosive properties of (TiAlZrTaNb)_{Nx} high entropy nitride thin films deposited by HIPIMS

Juan Pablo Gonzales Lozano ^[1], Ingrid Johana Gonzales ^[1], Oscar Edwin Piamba Tulcán ^[1] and Jhon Jairo Olaya Flórez ^[1].

^[1] Department of Mechanical and Mechatronics Engineering, Universidad Nacional de Colombia, Bogotá 111321, Colombia

Structural, morphological and topographic characterization of (TiAlZrTaNb)_{Nx} coatings deposited by HIPIMS

Ingrid Johana Gonzales ^[1], Juan Pablo Gonzales Lozano ^[1], Oscar Edwin Piamba Tulcán ^[1] and Jhon Jairo Olaya Flórez ^[1].

^[1] Department of Mechanical and Mechatronics Engineering, Universidad Nacional de Colombia, Bogotá 111321, Colombia.

Influence of pulse duration on plasma chemistry and thin film growth of plasmonic Titanium Nitride deposited by constant current regulated HIPIMS.

Ethan Muir¹, Arutiun P. Ehiasarian¹, Yashodhan Purandare¹, Ryan Bower²

¹ Materials & Engineering Research Institute (MERI), Sheffield Hallam University, Sheffield, United Kingdom.

² Department of Materials, Imperial College London, London, United Kingdom.

Fabrication of high temperature Kinetic Inductance Detectors (KID's) using High Power Impulse Magnetron Sputtering.

C.S. Woodhead, C. Dunscombe, T. Brien, M. Baghoria, S. Doyle, P. Hargrave,

University of Cardiff, United Kingdom

Assessment of slurry-erosion and aqueous corrosion behaviour of Niobium as an alternative cladding material for neutron producing targets

H. M. L. U. Madhuwanthi¹, Y. P. Purandare¹, A.P. Ehiasarian¹, A. Dey², L. Jones², S. Gallimore²

¹ Materials and Engineering Research Institute, Sheffield Hallam University, City Campus, Howard Street, Sheffield, S1 1WB, United Kingdom

² Rutherford Appleton Laboratory, Didcot, OX11 0QX, United Kingdom

A Novel High-Efficiency Plasma Nitriding Process Utilising a HIPIMS Discharge

Arutiun Papken Ehiasarian and Papken Ehasar Hovsepian

National HIPIMS Technology Centre, Sheffield Hallam University, Howard St, Sheffield, S1 1WB, UK



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