3rd International Conference on HIPIMS
Programme of Events
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**Programme of Events**  
**Tuesday, 19 June 2012**

**8:00-8:30**  
REGISTRATION AT CUTLERS’ HALL

**8:30-8:40**  
WELCOME ADDRESS:  
- Prof. Mike Smith, Board member Joint SHU-Fraunhofer IST HIPIMS Research Centre  
- Prof. Alan J Smith, Director Materials and Engineering Research Institute, SHU  
- Prof. Wolfgang Diehl, Deputy Director Fraunhofer IST  
- Prof. Arutjun Ehiasarian, Conference Chairman

**Morning Session.**  
**Moderator:** Ralf Bandorf, Fraunhofer IST, Germany

**8:40-9:00**  
SPUTTERING - RECENT DEVELOPMENTS AND PERSPECTIVES  
G. Bräuer, R. Bandorf, T. Jung, B. Szyszka, M. Vergöhl  
Fraunhofer Institute for Surface Engineering and Thin Films IST, Braunschweig, Germany

**9:00-9:20**  
CORRELATION BETWEEN PULSE PARAMETERS AND COATING GROWTH DURING S3P™ DEPOSITION OF TiAlN  
S.Krassnitzer, D.Kurapov, J. Hagmann, M.Arndt, H.Rudigier  
OC Oerlikon Balzers AG, Balzers, Liechtenstein

**9:20-9:40**  
NOVEL DEPOSITION OF MULTI-COMPOSITIONAL ALUMINUM TITANIUM NITRIDE (AlTiN) COATINGS BY HIGH POWER IMPULSE SPUTTERING (HIPIMS+) TECHNOLOGY  
A. Campiche¹, F. Papa¹, T. Sasaki², T. Ishikawa², H. Hourai², T. Krug¹  
¹ Hauzer Techno Coating, Venlo, Netherlands  
² Hitachi Tool Engineering Ltd., Matsue-shi, Shimane-ken, Japan

**9:40-10:00**  
TiN COATINGS FOR MACHINING: CAN HIPIMS STAND THE TEST?  
P. Cosemans, I. Truijen, T. Jacobs  
Sirris, Smart Coating Application Lab, Diepenbeek, Belgium

**10:00-10:20**  
INTRODUCTION OF ICIS A NOVEL TECHNOLOGY FOR IONISED SPUTTERING OF MAGNETIC MATERIALS  
A.P. Ehiasarian  
HIPIMS Technology Centre, Sheffield Hallam University, Sheffield, UK

**10:20-10:40**  
COFFEE BREAK AND EXHIBITION
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Tuesday, 19 June 2012.

Second Morning Session.
Moderator: Arutjun P. Ehiasarian, Sheffield Hallam University, UK

10:40-11:00
HISTORY OF VACUUM DEPOSITION USING ENERGETIC IONS
D. M. Mattox
Management Plus, Inc., Albuquerque, USA

11:00-11:20
LOCALIZATION OF IONIZATION IN HIGH POWER IMPULSE MAGNETRON SPUTTERING
A. Anders, P. Ni, and A. Rauch
Lawrence Berkeley National Laboratory, Berkeley, California

11:20-11:40
HIPIMS DISCHARGE DYNAMICS: EVOLUTION AND ORIGIN OF PLASMA INSTABILITIES
Institut for Experimental Physics II, Research Department Plasma, Ruhr-Universität Bochum, Germany

11:40-12:00
ION ENERGY DISTRIBUTION MEASUREMENTS IN pDC AND HIPIMS DISCHARGES
D. Gahan, P. Scullin, B. Dolinaj, D. O’ Sullivan and M. B. Hopkins
Impedans Ltd., Dublin, Ireland.

12:00-12:20
TEMPORALLY RESOLVED ION DISTRIBUTIONS IN HIPIMS SYSTEM WITH Ti TARGET
M. Cada¹, P. Adamek¹, J. Olejnícek¹, Z. Hubicka¹, J. Adamek², J. Stockel²
¹ Academy of Sciences of the Czech Republic, Institute of Physics, Czech Republic
² Academy of Sciences of the Czech Republic, Institute of Plasma Physics, Czech Republic

12:20-14:00
LUNCH BREAK and Conference Photograph
Programme of Events
Tuesday, 19 June 2012.

First Afternoon Session.

Moderator: Thomas Krug, Hauzer Techno Coating, The Netherlands

14:00-14:20
DEVELOPMENT OF HARD DLC COATINGS USING HIPIMS TECHNOLOGY
R. Bandorf, M. Ebert, M. Petersen, H. Gerdes, G. Bräuer
Fraunhofer Institute for Surface Engineering and Thin Films IST, Braunschweig, Germany

14:20-14:40
STUDY OF THE COATING PROPERTIES OF NICKEL DEPOSITED BY
INDUCTIVELY COUPLED IMPULSE SPUTTERING (ICIS)
D.A.L. Loch, A.P. Ehiasarian
HIPIMS Technology Centre, Sheffield Hallam University, Sheffield, UK

14:40-15:00
ANALYSIS OF IONIZATION RATIO OF Nb⁺/Nb AND Ar⁺/Ar
ON HIPIMS DISCHARGE
G. Terenziani¹, A.P. Ehiasarian², S. Calatroni³
¹ Technology Department-Vacuum Surface and Coatings, Surface Chemistry and Coatings group
(TE-VSC/VCC), CERN, Switzerland
² HIPIMS Technology Centre, Sheffield Hallam University, Sheffield, UK

15:00-15:20
THE INFLUENCE OF INERT GASES ON THE C/N₂/INERT GAS HIPIMS
DISCHARGE AND THIN FILM GROWTH
S. Schmidt¹, G. Greczynski¹, Zs. Czigány², L. Hultman¹
¹ Thin Film Physics Div., Department of Physics (IFM), Linköping University, Sweden
² Institute of Technical Physics and Materials Science, Research Centre for Natural Sciences of
the Hungarian Academy of Sciences, Budapest, Hungary

15:20-15:40
TEXTURED CrN THIN COATINGS OPENING UP NEW FIELDS
OF APPLICATION
E.M. Slomski, H. Scheerer, T. Troßmann, M. Oechsner
Technische Universität Darmstadt, Germany

15:40-16:00
COFFEE BREAK AND EXHIBITION
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Second Afternoon Session.
Moderator: Gery van der Kolk, IonBond, The Netherlands

16:00-16:20
STUDY OF ZrN SYNTHESISED WITH HIPIMS/UBM AND CATHODIC ARC
TECHNIQUES
Y. P. Purandare¹, A. P. Ehiasarian¹, G. Kamath¹, A. Santana² and P. Eh Hovsepian¹
¹ Nanotechnology Centre for PVD Research, Materials and Engineering Research Institute,
Sheffield Hallam University, UK
² IonBond AG, Olten, Switzerland, CH-4600.

16:20-16:40
ROLE OF SYNCHRONIZED PULSED SUBSTRATE BIAS DURING Ti₁₋ₓAlₓN
FILM GROWTH BY HYBRID HIPIMS/DCMS CO-SPUTTERING
G. Greczynski,¹ J. Lu,¹ J. Jensen,¹ I. Petrov,¹,² J.E. Greene,¹,²
W. Kölker,³ O. Lemmer,³ and L. Hultman¹
¹ Department of Physics, Chemistry, and Biology (IFM), Linköping University, Sweden
² Frederick Seitz Materials Research Laboratory, University of Illinois, Urbana, Illinois,
USA and Materials Science Department, University of Illinois, Urbana, Illinois, USA
³ CemeCon AG, Würselen, Germany

16:40-17:00
STRUCTURE AND PROPERTIES OF TANTALUM NITRIDE COATINGS
DEPOSITED BY MODULATED PULSED POWER MAGNETRON
SPUTTERING (MPP)
L. Mendizabal¹, U. Ruiz de Gopegui¹, R. Bayón², J. Barriga¹
¹ IK4 – Tekniker, Surface Physics and Technology Unit, Eibar, Spain
² IK4 – Tekniker, Tribology Unit, Eibar, Spain

17:00-17:20
DEPOSITION ALUMINIUM NITRIDE FILMS BY HIPIMS:
CORRELATION BETWEEN TIME-RESOLVED PLASMA
INVESTIGATIONS AND PHYSICAL PROPERTIES
A. Soussou, K. Ait Aissa, J. Camus, Q. Simon, L. LeBrizoual,
P-Y. Jouan, Y. Scudellen and M.A. Djouadi
Université de Nantes, UMR CNRS 6502, Institut des Matériaux Jean Rouxel, France

17:30-19:00
PLASMA DIAGNOSTICS DEMONSTRATIONS - HIDEN ANALYTICAL
AND IMPEDANS

19:30
CONFERENCE DINNER: CUTLERS’ HALL, SHEFFIELD
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First Morning Session.
Moderator: Jaroslav Vícek, University of West Boemia, Czech Republic

8:30-9:00
STRESS GENERATION IN LOW-MOBILITY METAL FILMS GROWN BY HIGH POWER IMPULSE MAGNETRON SPUTTERING
D. Magnfält, G. Abadias, U. Helmersson, K. Sarakinos
1 Plasma & Coatings Physics Division, IFM, Material Physics, Linköping University, Sweden
2 Institut P², Département Physique et Mécanique des Matériaux, CNRS-Université de Poitiers, France

9:00-9:20
INVESTIGATIONS OF VERY SHORT PULSE SEQUENCES IN HIPIMS MODE USING A REACTIVE PROCESS OF ALUMINIUM
H. Gerdes, R. Bandorf, I. Dosch, G. Bräuer
Fraunhofer Institute for Surface Engineering and Thin Films IST, Braunschweig, Germany

9:20-9:40
ZrSIN COATINGS DEPOSITED BY HIPIMS FOR HARD COATING CORROSION PROTECTION ON ALUMINIUM
A. Patelli, M. Colasuonno, D. Giordani, G. Mattei, V. Rigato
1 Veneto Nanotech S.C.p.A., Padova, Italia
2 Università di Padova, Dipartimento di Fisica. Padova, Italia
3 Laboratori Nazionali di Legnaro – INFN, Legnaro, Padova, Italia

9:40-10:00
OPTICAL EMISSION SPECTROSCOPY OF AIP-, HIPIMS- AND UBMS DEPOSITION OF TiAlN
R. Cremer, T. Takahashi, S. Hirota, K. Yamamoto
1 KCS Europe GmbH, Monschau, Germany
2 Kobe Steel Ltd., Takasago, Japan
3 Kobe Steel Ltd., Kobe, Japan

10:00-10:20
ON ECWR-ASSISTED HIPIMS DISCHARGE: TIME RESOLVED DIAGNOSTICS DURING DEPOSITION OF THIN FILMS
V. Stranak, A-P. Herrendorf, Z. Hubicka, M. Cada, S. Drache, R. Hippler
1 University of Greifswald, Institute of Physics, Greifswald, Germany
2 University of South Bohemia, Faculty of Science, Ceske Budejovice, Czech Republic
3 Academy of Sciences of the Czech Rep., Institute of Physics, Prague, Czech Republic

10:20-10:40
COFFEE BREAK AND EXHIBITION
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Second Morning Session.
Moderator: Andre Anders, Lawrence Berkeley National Laboratory, USA

10:40-11:00
HIGH-RATE REACTIVE DEPOSITION OF MULTIFUNCTIONAL Ta-O-N FILMS USING HIGH POWER IMPULSE MAGNETRON SPUTTERING
J. Rezek¹, J. Vlcek², J. Houska² and R. Cerstvy²
¹ European Centre of Excellence, NTIS - New Technologies for Information Society, University of West Bohemia, Plzen, Czech Republic
² Department of Physics, University of West Bohemia, Plzen, Czech Republic

11:00-11:20
PROCESS-PROPERTY RELATIONS IN PHOTOCATALYTIC Ta-O-N FILMS DEPOSITED BY HIGH-IONIZATION MAGNETRON SPUTTERING
J. Alami¹, K. Sarakinos²
¹ INI Coatings Ltd. Maarweg 32, 53619, Rheinbreitbach, Germany
² Plasma & Coatings Physics Division, IFM-Materials Physics, Linköping University, Sweden

11:20-11:40
ENHANCED PHOTOCATALYTIC ACTIVITIES UNDER VISIBLE LIGHT OF C-DOPED TiO₂ THIN FILMS DEPOSITED BY HIPIMS-PLD
V. Tiron, I. Mihaila, L. Sirghi, G. Popa
Alexandru Ioan Cuza University, Faculty of Physics, Iasi, Romania

11:40-12:00
PULSED HIPIMS DEPOSITION OF IRON OXIDE THIN FILMS
Z. Hubička, V. Straňák, Š. Kment, M. Čada
Institute of Physics ASCR, Prague, Czech Republic

12:00-12:20
GYROKINETIC AXISYMMETRIC MODELING OF A HPPMS PLANAR MAGNETRON DISCHARGE - A VALID APPROACH?
S. Gallian¹, D. Eremin¹, T. Mussenbrock¹, R.P. Brinkmann¹, W. N. G. Hitchon²
¹ Lehrstuhl fur Theoretische Elektrotechnik, Ruhr-Universität Bochum,
² Department of Electrical and Computer Engineering, University of Wisconsin-Madison, USA

12:20-12:40
MATERIAL FLUX OPTIMIZATION IN HIPIMS THROUGH THE CONTROL OF THE MAGNETIC FIELD
J. Capek¹², M. Hala¹, O. Zabeida¹, J.E. Klemberg-Sapieha¹, and L. Martinu¹
¹ Department of Engineering Physics, École Polytechnique de Montréal, Canada

12:40-13:00
ARC MANAGEMENT OPERATION UNDER CHANGING PROCESS CONDITIONS - NEW FEATURES, NEW POSSIBILITIES
Paweł Ozimek, Marcin Żelechowski, Andrzej Klimczak, Piotr Różański
Huettinger Electronic, Zielonka, Poland

13:00-14:00
LUNCH BREAK
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First Afternoon Session.

Moderator: Wolfgang Diehl, Fraunhofer IST, Germany

14:00-14:20
ADVANCEMENT OF HARDWARE AND PROCESS TECHNOLOGY FOR HIPIMS COATINGS FOR CUTTING TOOLS
O. Lemmer, W. Kölker, S. Bolz, C. Schiffers
CemeCon AG, Germany

14:20-14:40
CHARACTERISTICS OF A ONE-INCH HIPIMS PLASMA SOURCE
H. Ogiso1, K. Yukimura2, S. Nakano1, R. Mikawa1, K. Takaki2, S. Khumpuang1
1 National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan
2 Faculty of Engineering, Iwate University, Morioka, Iwate, Japan.

14:40-15:00
GAS TEMPERATURE AND HEAT FLUX TO THE SUBSTRATE IN ICP-ASSISTED MAGNETRON SPUTTER-DEPOSITION OF ALUMINIUM-DOPED ZnO FILMS
Y. Matsuda1, A. Hirashima2, K. Mine2, T. Hashimoto1, D. Matsuoka1, M. Shinohara1, and Tatsuo Okada3
1 Graduate School of Engineering, Nagasaki University, Nagasaki, Japan.
2 Graduate School of Sci. & Technology, Nagasaki University, Nagasaki, Japan.
3 Graduate School of Information Science and Electrical Engineering, Kyushu University, Fukuoka, Japan

15:00-15:20
HIPIMS ARC-FREE REACTIVE SPUTTERING OF NON-CONDUCTIVE FILMS USING THE ENDURA 200 MM CLUSTER TOOL
R. Chistyakov, B. Abraham
Zond Inc/Zpulser LLC, Mansfield, MA, USA

15:20-15:40
ON THE ENERGY DEPOSITION IN MAGNETRON DISCHARGES - FROM DCMS TO IPVD AND HIPIMS
J. Bretagne1, L. Caillault1, C. Costin2, I. Guesmi1 and T. Minea1
1 Laboratoire de Physique des Gaz et Plasmas, Unité Mixte de Recherche 8578,
CNRS - Université Paris-Sud XI, 91405 ORSAY Cedex France
2 Faculty of Physics, “Al. I. Cuza” University, 700506 Iasi, Romania

15:40-16:00
COFFEE BREAK AND EXHIBITION
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Second Afternoon Session.

Moderator: Papken Hovsepian, Sheffield Hallam University, UK

16:00-16:20
OPTIMIZED WIRE TREATMENT WITH HIPIMS DUE TO EFFECTIVE ANODE-TO-CATHODE CONFIGURATION
O. Vozniy, D. Duday, A. Lejars and T. Wirtz
Département de Science et Analyse des Matériaux, Centre de Recherche Public – Gabriel Lippmann – 41, rue du Brill – 4422 Belvaux, Luxembourg

16:20-16:40
3D THICKNESS AND PROPERTY DISTRIBUTION OF TiC FILMS DEPOSITED BY DC MAGNETRON SPUTTERING AND HIPIMS
M. Balzer, M. Fenker
FEM – Research Institute for Precious Metals And Metals Chemistry, Germany

16:40-17:00
STRUCTURE AND OPTICAL AND ELECTRICAL PROPERTIES OF AMORPHOUS ZINC-IRIDIUM OXIDE THIN FILMS
A. Azens, R. Kalendarev, K. Vilnis, M. Zubkins, A. Ecis, J. Purans
Institute of Solid State Physics, University of Latvia, Riga, Latvia

17:00-17:20
A SIMPLE MATHEMATICAL MODEL OF A GLOW DISCHARGE
A. E. Ross, D. R. McKenzie, M. M. M. Bilek
School of Physics A28, The University of Sydney, Sydney, Australia

17:20-17:40
HIPIMS POWER SUPPLY UTILIZATION FOR OXIDE COATING DEPOSITION ON ROLL POLYMERIC SUBSTRATES
J. Kazuss, V. Kozlov, E. Machevskis, M. Misels-Piesins
SIDRABE Inc, 17 Krustpils Str., Riga, LV1073, Latvia
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Poster Presentations.

Exhibition Hall - 19 and 20 June 2012.

COMPARISON OF DC AND HIPIMS SPUTTERED MOLYBDENUM FILMS
V. Sittinger, J. Mahrholz, C.C. Fölster, B. Szyszka, G. Bräuer
Fraunhofer Institute for Surface Engineering and Thin Films IST, Braunschweig, Germany

MECHANICAL AND TRIBOLOGICAL PROPERTIES OF TiN/WN MULTILAYER COATINGS DEPOSITED BY HIGH POWER IMPULSE MAGNETRON SPUTTERING
Zi-Heng Qiu, Ping-Hung Chen, Chia-Hao Wu, Wan-Yu Wu, Chi-Lung Chang, Da-Yung Wang
1 Department of Materials Science and Engineering, MingDao University, Taiwan, R.O.C.
2 Surface Engineering Research Center, MingDao University, Taiwan, R.O.C.

CLEANING OF SUBSTRATES PRIOR TO VACUUM COATING
H. Hofstetter.
BorerChemie AG, Zuchwil, Switzerland

CHROMIUM AND CHROMIUM NITRIDE THIN FILMS DEPOSITED BY HIPIMS USING SHORT IMPULSIONS
1 Université de Nantes, UMR CNRS 6502, Institut des Matériaux Jean Rouxel, France
2 Université Lille Nord de France, Laboratoire des Matériaux Céramiques et Procédés Associés, France
3 Laboratoire Commun MATPERF CEA-Mecachrome, Vibraye, France
4 National Institute for Laser, Plasma and Radiation Physics, Bucharest, Romania

17:40
CLOSE of CONFERENCE