

- 08:30 - 09:15
Plenary Lecture
PL0002
Chair: Ulf Helmersson, Linköping, Sweden
Physics of High Power Impulse Magnetron Sputtering
Andre Anders¹
¹ Lawrence Berkeley National Laboratory, Berkeley, UnitedStates
- Oral Session**
Session 7 - HiPIMS II
Chairs: Jaroslav Vlcek, Plzen, Czech Republic
Sandra Seefeld, Dresden, Germany
- 09:25 - 09:55
Keynote Lecture
KN0700
Plasma Parameters Influencing Growth of HIPIMS-Deposited Monolithic, Nanolayer And Nanocomposite Films
Arutiun P. EHIASARIAN¹, Papken HOVSEPIAN¹, Gyorgy SAFRAN², Lajos SZEKELY², Christina WÜSTEFELD³, David RAFAJA³
¹ M.E.R.I., Sheffield Hallam University, Sheffield, UnitedKingdom, ² Research Institute for Technical Physics and Materials Science, Budapest, Hungary, ³ Technische Universität Bergakademie Freiberg, Freiberg, Germany
- 09:55 - 10:15
OR0701
On the phase formation of sputtered hafnium oxide and oxynitride films
Jochen Schneider¹, Kostas Sarakinos², Denis Music³, Stanislav Mráz³, Moritz to Baben³, Kaiyun Jiang³, Farwah Nahif³, Alexander Braun³, Conrand Zilkens³, Stephanos Konstantinidis⁴
¹ Materials Chemistry, Aachen, Germany, ² Plasma & Coatings Physics Division / Linköping University, Linköping, Sweden, ³ Materials Chemistry / RWTH Aachen University, Aachen, Germany, ⁴ Laboratoire de Chimie Inorganique et Analytique, Université de Mons, Mons, Belgium
- 10:15 - 10:35
OR0702
Reactive Sputter Deposition of Alumina Coatings by HIPP Processes
Ralf Bandorf¹, Holger Gerdes¹, Daniel Loch¹, Günter Bräuer¹
¹ Fraunhofer IST, Braunschweig, Germany
- 10:35 - 10:55
OR0703
Structure evolution in TiAlCN/VCN nanoscale multilayer coatings deposited by reactive High Power Impulse Magnetron Sputtering technology
Papken Hovsepian¹, Arutiun Ehiasarian¹, Ganesh Kamath¹, Rick Haasch², Ivan Petrov²
¹ Sheffield Hallam University, Sheffield, UnitedKingdom, ² University of Illinois at Urbana-Champaign, Illinois, United States
- 10:55 - 11:15
Coffee Break
- 11:15 - 11:35
OR0704
Low friction CrN/TiN multilayer coatings
Jörg Paulitsch¹, Christian Maringer², Paul H. Mayrhofer²
¹ Montanuniversität, Leoben, Austria, ² Department of Physical Metallurgy and Materials Testing, Montanuniversität, Leoben, Austria

- 11:35 - 11:55
OR0705 **Tribological and mechanical properties of HIPIMS sputtered CrNx films**
Jan Soldán¹, Jiří Vyskočil¹, Frank Papa², Tomáš Vítů³
¹ HVM Plasma, Prague, Czech Republic, ² Hauzer Techno Coating, Venlo, Netherlands, ³ CVUT, Prague, Czech Republic
- 11:55 - 12:15
OR0706 **Modulated Pulse Power Deposition of Aluminum Oxide and Aluminum Nitride Films.**
Roman Chistyakov¹, Bassam Abraham²
¹ Zond Inc, Mansfield, UnitedStates, ² Zpulsor LLC, Mansfield, Germany
- 12:15 - 12:35
OR0707 **High rate carbon deposition using an HIPIMS arc mixed mode**
Martina Lattemann¹, David R. McKenzie², Marcela M. M. Bilek², Ali Moafi³, Dougal G. McCulloch³
¹ Joint research Laboratory - TU Darmstadt, Darmstadt, Germany, ² School of Physics, The University of Sydney, Sydney, Australia, ³ Applied Physics, School of Applied Sciences, RMIT University, Melbourne, Australia
- 12:35 - 12:55
OR0708 **Deposition of γ -alumina by HPPMS in an industrial coating unit**
Stephan Bolz¹, Walter Reichert¹, Walter May¹, Werner Kölker¹, Oliver Lemmer¹, Christoph Schiffers¹
¹ CemeCon AG, Würselen, Germany
- 12:55 - 14:20
Lunch Break

08:30 - 09:15 Plenary Lecture PL0002, Room Richard-Strauss

Oral Session Session 8 - Carbon-Based Thin Films

Chairs: Lars Pleth Nielsen, Aarhus C, Denmark
Otmar Zimmer, Dresden, Germany

09:25 - 09:55 **Flexible DLC films on rubber: fundamentals and applications**

Keynote Lecture Yutao T. Pei¹, D. Martinez-Martinez¹, X. L. Bui¹, Jeff Th.M. De Hosson¹
KN0800 ¹ M2i, University of Groningen, Groningen, Netherlands

09:55 - 10:15 **Optimization of the mechanical properties of a-C:H DLC coatings**

OR0801 Jorgen Bottiger¹, Anders Berthelsen², Sascha Louring², Nis Madsen³, Klaus Almqvist⁴, Bjarke Christensen⁵, Lars Nielsen⁵
¹ Inst. of Physics and Astronomy, Aarhus U, Aarhus, Denmark, ² Inst. Physics and Astronomy, Aarhus University, Aarhus, Denmark, ³ Inst. Physics and astronomy, Aarhus University, Aarhus, Denmark, ⁴ Danish Technologic Institute, Aarhus, Denmark, ⁵ Danish Technological Institute, Aarhus, Denmark

10:15 - 10:35 **Characteristics of Multi-Layer Diamond Coatings on Cemented Carbides with different pre-treatment seeding powders**

OR0802 Christian Bareiss¹, Walter Reichert¹, Oliver Lemmer¹
¹ CemeCon AG, Würselen, Germany

10:35 - 10:55 **Cu-doped carbon coatings - driving mechanisms of friction and wear**

OR0803 Tomas Vitu¹, Petr Siroky², Ladislav Cvrcek², Rudolf Novak³, Albano Cavaleiro⁴, Tomas Polcar²
¹ Fac. of Transportation Sc., CTU in Pragu, Prague 1, Czech Republic, ² Faculty of Electrical Engineering, CTU in Prague, Prague, Czech Republic, ³ Faculty of Mechanical Engineering, CTU in Prague, Prague, Czech Republic, ⁴ SEG-CEMUC - Department of Mechanical Engineering, University of Coimbra, Coimbra, Portugal

10:55 - 11:15 Coffee Break

11:15 - 11:35 **Tribological behavior of W-alloyed carbon-based coatings in lubricated steel contact.**

OR0804 Manuel Evaristo¹, M. Evaristo², R. M. Balestra², A. M. G. Castro², T. Polcar³, A. Cavaleiro²
¹ SEG-CEMUC Dep. Mech. Eng. Univ. Coimbra, Coimbra, Portugal, ² SEG-CEMUC – Department of Mechanical Engineering, University of Coimbra, Coimbra, Portugal, ³ Department of Control Engineering, Faculty of Electrical Engineering, Czech Technical University, Prague 6, Czech Republic

11:35 - 11:55 **Influence of substrate pretreatment and Bias voltage on the tribological behavior of a-C-coatings under wet conditions**

OR0805 Wolfgang Tillmann¹, Evelina Vogli¹, Fabian Hoffmann¹
¹ LWT, Technische Universität Dortmund, Dortmund, Germany

11:55 - 12:15
OR0806

A systematic study of friction and wear behaviour of DLC coatings under various testing conditions

Volker Weihnacht¹, Stefan Makowski¹, Gregor Englinger¹
¹ Fraunhofer IWS, Dresden, Germany

12:15 - 12:35
OR0807

Tribological Behaviors on nano-structured surface of the diamond-like carbon (DLC) coated on soft polymer.

Geon-Ho Roh¹, Myoung-Woon Moon², Faruque Ahmed², Taegon Cha², Hoyoung Kim³, Kwangryeol Lee²

¹ Korea Institute of Science and Technolog, Seoul, SouthKorea, ² Korea Institute of Science & Technology, Seoul, South Korea, ³ Seoul National University, Seoul, South Korea

12:35 - 12:55
OR0808

Deposition of N, Si, F and O-doped Amorphous Carbon-Silicon Coatings in an Industrial DC-PACVD-System

Daniel Heim¹, Christian Forsich¹, Andreas Gebeshuber²

¹ University of Applied Science Wels, Wels, Austria, ² Rubig GmbH & CoKg, Wels, Germany

12:55 - 14:20

Lunch Break

08:30 - 09:15 Plenary Lecture PL0002, Room Richard-Strauss

Oral Session Session 9 - Plasma Treatment of Polymers and Textiles

Chairs: Farzaneh Arefi-Khonsari, Paris, France

Dirk Hegemann, St.Gallen, Switzerland

09:25 - 09:55 **Understanding super-hydrophobicity: combined control of surface
Keynote Lecture texturing by plasma etching and of surface chemistry by PECVD**

KN0900

Fabio Palumbo¹, Rosa Di Mundo², Riccardo d'Agostino³

¹ CNR-IMIP, Bari, Italy, ² Dipartimento di Chimica Università di Bari, Bari, Italy, ³

Plasma Solution s.r.l., Bari, Italy

09:55 - 10:15 **Surface modification of Polymers by Plasma-assisted Atomic Layer
OR0901 Deposition**

Tommi Kääriäinen¹, Sanna Lehti¹, Marja-Leena Kääriäinen¹, David
Cameron¹

¹ Lappeenranta University of Technology, Mikkeli, Finland

10:15 - 10:35 **The reaction of nitrogen traces in plasmas with polymer surfaces**

OR0902

Andreas Holländer¹, Stefan Kröpke²

¹ Fraunhofer IAP, Potsdam, Germany, ² Fraunhofer-Institut für Angewandte

Polymerforschung, Potsdam, Germany

10:35 - 10:55 **Combinatorial Analyses of Plasma-Polymer Interactions for
OR0903 Development of Advanced Nano-Process Technologies**

Yuichi Setsuhara¹, Kosuke Takenaka¹, Ken Cho¹, Masaharu Shiratani²,
Makoto Sekine³, Masaru Hori³

¹ Osaka University, Ibaraki, Osaka, Japan, ² Kyushu University, Fukuoka, Japan, ³
Nagoya University, Nagoya, Japan

10:55 - 11:15 Coffee Break

11:15 - 11:35 **Surface Modification and Permeability Analytical Studies of
OR0904 Poly(lactic Acid Induced by HMDSO-Plasma**

Chanokporn Chaiwong¹, Pornchai Rachtanapun², Somrutai Tunma³,
Rafael Auras⁴, Dheerawan Boonyawan¹

¹ Physics and Materials Science Dept., Chiangmai, Thailand, ² Packaging Technology
Dept., Agro-Industry Fac. Chiangmai University, Chiangmai, Thailand, ³ Plasma and
BeamPhysics Research Facility, Physics&Materials Science Dept., Science Fac.,
Chiangmai University, Chiangmai, Thailand, ⁴ School of Packaging, Michigan State
University, MI, MI, United States

11:35 - 11:55 **Plasma treatment of different polymer substrates for oxide barrier
OR0905 coatings**

Jungheum Yun¹, Sunghun Lee¹, Yujeong Jeong¹, Jae-Hye Jung¹,
Gun-Hwan Lee¹

¹ Korean Institute of Materials Science, Changwon, SouthKorea

11:55 - 12:15
OR0906

Gliding arc surface treatment of glass fibre reinforced polyester enhanced by ultrasonic irradiation

Yukihiro Kusano¹, Shailendra Vikram Singh¹, Alexander Bardenshtein², Niels Krebs²

¹ Risø National Laboratory, DTU, Roskilde, Denmark, ² FORCE Technology, Brøndby, Denmark

12:15 - 12:35
OR0907

Large area fabrication of stochastic nanostructures on polymer webs using ion- and plasma-treatment

Waldemar Schönberger¹, Gerald Gerlach¹, Matthias Fahland², Peter Munzert³, Ulrike Schulz³, Roland Thielsch⁴, Ronny Kleinhempel⁴

¹ TU Dresden, Solid-State Electronics Lab, Dresden, Germany, ² Fraunhofer Institute for Electron Beam and Plasma Technology FEP, Dresden, Germany, ³ Fraunhofer Institute for Applied Optics and Precision Engineering IOF, Jena, Germany, ⁴ Southwall Europe GmbH, Großröhrsdorf, Germany

12:35 - 12:55
OR0908

Modification of polymer surfaces using a compact laser plasma EUV source

Henryk Fiedorowicz¹, Andrzej Bartnik¹, Roman Jarocki¹, Jerzy Kostecki¹, Anna Szczurek¹, Mirosław Szczurek¹, Przemysław Wachulak¹

¹ Institute of Optoelectronics, MUT, Warsaw, Poland

12:55 - 14:20

Lunch Break

- 14:20 - 15:05
Plenary Lecture
PL0003
Chair: Gerry J. van der Kolk, Venlo, Netherlands
Thin Film Structures and Architectures for Mechanical Applications
Paul Mayrhofer¹
¹ Montanuniversitaet, Leoben, Austria
- Oral Session**
Session 10 - Multilayer and Nanocomposite films
Chairs: Jörg Patscheider, Dübendorf, Switzerland
Jörg Vetter, Bergisch Gladbach, Germany
- 15:15 - 15:45
Keynote Lecture
KN1000
Coating designs for thick cubic boron nitride coatings
Sven Ulrich¹, Jian Ye¹, Michael Stüber¹, Carlos Ziebert¹
¹ Karlsruher Institut für Technologie -KIT, Eggenstein-Leopoldshafen, Germany
- 15:45 - 16:05
OR1001
Thermally Enhanced Mechanically Properties of Arc Evaporated Ti0.34Al0.66N / TiN Multilayers
Axel Knutsson¹, Mats Johansson², Lennart Karlsson², Magnus Odén³
¹ Nanostructured Materials, IFM, Linköping, Sweden, ² Seco Tools AB, Fagersta, Sweden, ³ Nanostructured Materials, IFM, Linköpings Universitet, Linköping, Sweden
- 16:05 - 16:25
OR1002
Au-Al2O3 thin films for optical applications by reactive sputtering
Nuno Figueiredo¹, Filipe Vaz², Luís Cunha², Marc Torrelli², Bharathi Mohan³, João Oliveira³, Cristina Louro³, Albano Cavaleiro³
¹ SEG-CEMUC, University of Coimbra, Coimbra, Portugal, ² Universidade do Minho - Dept. Física, Guimarães, Portugal, ³ SEC-CEMUC - Universidade de Coimbra, Dept. Eng. Mecânica, Coimbra, Portugal
- 16:25 - 16:45
OR1003
Plasma-enhanced chemical vapor deposition of nanocomposite thin films
Rutul Trivedi¹, S. Lichovnikova¹, V. Cech¹
¹ Brno University of Technology, Brno, Czech Republic
- 16:45 - 17:15
Coffee Break
- 17:15 - 17:35
OR1004
Mechanical properties and oxidation resistance of CrAlN/BN nanocomposite coatings prepared by reactive d.c. and r.f. co-sputtering
Masateru Nose¹, Tokimasa Kawabata¹, Tomohiro Watanuki¹, Kaname Fujii², Kenji Matsuda¹, Susumu Ikeno¹
¹ University of Toyama, Takaoka, Japan, ² Ishikawa Prefectural Industrial Research Center, Kanazawa, Japan

17:35 - 17:55
OR1005

Cracking mechanism of CrSiN nanocomposite films: impact on tribological properties

Philippe STEYER¹, Thomas Schmitt², Julien Fontaine³, Nicolas Mary⁴, Frederic Sanchette⁵, Michael O'Sullivan⁶, Claude Esnouf⁴

¹ INSA de Lyon, Villeurbanne, France, ² INSA de Lyon-MATEIS/Ecole Centrale de Lyon-LTDS, Lyon, France, ³ Ecole Centrale de Lyon - LTDS, Ecully cedex, France, ⁴ INSA de Lyon - MATEIS, Villeurbanne cedex, France, ⁵ CEA - LTS, Grenoble, France, ⁶ Plansee Composite Materials GmbH, Lechbruck am See, Germany

17:55 - 18:15
OR1006

NANOCOMPOSITE GOLD/PEO-LIKE PLASMA POLYMERS

Andrei Choukourov¹, Ivan Gordeev¹, Anna Artemenko¹, Ondřej Kylián¹, Jaroslav Kousal¹, Oleksandr Polonskyi¹, Josef Pešička¹, Danka Slavínská¹, Hynek Biederman¹

¹ Charles University in Prague, KMF MFF, Prague, CzechRepublic

18:15 - 18:35
OR1007

Investigation of the optical properties of nanoparticle containing thin films produced by a novel plasma coating process as a function of particle size, filling factor and matrix material

Ralph Schmittgens¹, Andreas Wanke¹, Marcus Wolf¹, Eberhard Schultheiss²

¹ TU Dresden, Dresden, Germany, ² Fraunhofer FEP, Dresden, Germany

18:45 - 23:00

Poster Session 2, Foyer

18:45 - 23:00

Industrial Evening, Room Werdenfels, Foyer, Restaurant

14:20 - 15:05 Plenary Lecture PL0003, Room Richard-Strauss

Oral Session **Session 11 - Plasma Diffusion Treatment**
Chairs: Subroto Mukherjee, Gandhinagar, India
Reinar Grün, Siegen, Germany

15:15 - 15:45 **The role of noble gases ion bombardment (atomic attrition) on
Keynote Lecture** **plasma nitriding processes**

KN1100

Fernando Alvarez¹, E.A. Ochoa²

¹ Instituto de Fisica-UNICAMP, Campinas, Brazil, ² Institut de Fisica-Unicamp, Campinas, Sao Paulo, Brazil

15:45 - 16:05 **Expanding microwave plasma for thin molybdenum films nitriding:
OR1101** **nitrogen diffusion and surface structure investigations.**

Isabelle Jauberteau¹, Thérèse Merle-Méjean¹, Saïd Touimi¹, Sylvain Weber², Annie Bessaudou³, Armand Passelegue³, Jean Louis Jauberteau¹, Jacques Aubreton¹

¹ UMR6638 CNRS SPCTS, Limoges, France, ² UMR7556 CNRS LPM, Nancy, France, ³ XLIM UMR6172 CNRS, Limoges, France

16:05 - 16:25 **UP-SCALING OF PLASMA BORIDING**

OR1102

Peter Kaestner¹, Kyong-Tshong Rie¹, Guenter Braeuer²

¹ Institute for surface technology, IOT, Braunschweig, Germany, ² Fraunhofer IST, Braunschweig, Germany

16:25 - 16:45 **THE USE OF HYDROGEN IN PLASMA DIFFUSION PROCESSES**

OR1103

Carlos Figueroa¹, Ane Rovani¹, Felipe Cemin¹, Fernando Echeverrigaray¹, Ângela Crespi¹, Vânia Sonda¹, Cíntia Amorim¹, Rodrigo Basso¹, Gabriel Soares¹, Israel Baumvol¹

¹ Universidade de Caxias do Sul, Caxias do Sul, Brazil

16:45 - 17:15 Coffee Break

17:15 - 17:35 **Stainless steel patterning by combination of micro-patterning and
OR1104** **driven strain produced by plasma assisted nitriding**

Gregory MARCOS¹, Stephane Guilet², Franck Cleymand¹, Thierry Czerwiec¹

¹ Institut Jean Lamour, NANCY, France, ² LPN-CNRS, MARCOUSSIS, France

17:35 - 17:55 **Magnetic Layer Formation on Plasma Nitrided CoCrMo Alloy**

OR1105

Orhan Öztürk¹, Serdal Okur¹, Luc Pichon², Maciej Oskar Liedke³, Jean Paul Riviere²

¹ Izmir Institute of Technology, Urla - Izmir, Turkey, ² Institut PPRIME - UPR 3346 CNRS Université de Poitiers ENSMA, Département de Physique et Mécanique des Matériaux, Chasseneuil-Futuroscope, France, ³ Institute of Ion Beam Physics and Materials Research, Forschungszentrum Dresden-Rossendorf, Dresden, Germany

- 17:55 - 18:15
OR1106 **PULSED PLASMA SURFACE TREATMENT (PPST) OF STEELS AND INCONELS FOR MARINE AND OFFSHORE APPLICATIONS. --- PRACTICAL APPLICATIONS AND FUNDAMENTAL ASPECTS**
Rune Hoel¹
¹ MOTech Plasma, Oslo Research Park, Oslo, Norway
- 18:15 - 18:35
OR1107 **Plasma electrolytic process compete gaseous plasma nitriding of AISI 1045 steel**
Ahmad Reza Rastkar¹, Amir kiani¹, Faezeh Alvand¹, Babak Shokri¹
¹ Shahid Beheshti University, Tehran, Iran
- 18:45 - 23:00 Poster Session 2, Foyer
- 18:45 - 23:00 Industrial Evening, Room Werdenfels, Foyer, Restaurant

- 14:20 - 15:05 Plenary Lecture PL0003, Room Richard-Strauss
- Industrial Workshop** **Plasma Technologies for Reduction of CO2 Emission**
Chairs: Roel Tietema, Venlo, Netherlands
Ric P. Shimshock, SVC, USA
- 15:15-15:45 **Tailor Made Surface Technology for Energy Efficient Tribological Systems**
IW1
Tim Hosenfeldt¹
¹Schaeffler KG, Herzogenaurach, Germany
- 15:45-16:05 **Coatings for efficient high pressure diesel injection**
IW2
Ulrich May¹
¹Robert Bosch GmbH, Diesel Systems (DS/ETD3), Stuttgart, GERMANY
- 16:05-16:25 **Deposition of low-friction/high wear resistant ta-C coatings deposited by an industrial laser arc Technology**
IW3
Hans-Joachim Scheibe¹, Michael Falz²
¹Fraunhofer-Institut für Werkstoff- und Strahltechnik (IWS), Dresden, Germany, ²VDVakuum Technik Dresden GmbH, Dresden, Germany
- 16:25-16:45 **Comparison of the wear behaviour of DLC coatings in automotive engine applications and laboratory tribometer tests**
IW4
Jasmin Marti¹
¹BMW Group, München, Germany
- 16:45-17:15 Coffee break
- 17:15-17:35 **Barriers to the Use of Plasma Technologies in Large Engines and Machines**
IW5
Steven C. Taylor¹
¹Caterpillar Inc. - Advanced Materials Technology; Peoria-IL, USA
- 17:35-17:55 **Advanced coatings for aerospace applications to reduce fuel consumption**
IW6
Christoph Leyens¹
¹TU Dresden, Institute of Materials Science, Dresden, Germany
- 17:55-18:15 **Friction and Wear Behaviour of MoN-Cu Nanocomposite Coatings in Lubricated Conditions**
IW7
O. Eryilmaz¹, A. Erdemir¹, M. Urgan¹
¹Energy Technology Division of Argonne National Laboratory; Istanbul Technical University

18:15-18:35
IW8

Application Potential of Hard Coatings with Lubricants for Reduction of Friction Losses

K. Yilmaz¹

¹RWTH Aachen University, Surface Engineering Institute, Aachen, Germany

18:45 - 23:00

Poster Session 2, Foyer

18:45 - 23:00

Industrial Evening, Room Werdenfels, Foyer, Restaurant