

# Monday Morning, May 1, 2006

## Hard Coatings and Vapor Deposition Technology

Room: Golden West - Session B7-1

### Properties and Characterization of Hard Coatings and Surfaces

Moderators: D. Gall, Rensselaer Polytechnic Institute, J. Patscheider, EMPA, Guido C.A.M. Janssen, TU Delft

10:30 am	<b>B7-1-1 Invited</b> TiN/SiN <sub>x</sub> Multilayer Thin Films, <b>L. HULTMAN</b> , LINKÖPING UNIVERSITY, SWEDEN	
10:50 am	Invited talk continued.	
11:10 am	<b>B7-1-3</b> Role of Coherent Structures in Hardening of Nanolayers and Nanocomposite Thin Films, G. ALLIDI, R. SANJINES, <b>A. KARIMI</b> , EPFL, SWITZERLAND	
11:30 am	<b>B7-1-4</b> Hardness and Density of CrN Coatings, <b>A.C. GLUHOI</b> , NIMR, NETHERLANDS, M. MOEKEN, GUIDO C.A.M. JANSSEN, TU DELFT, NETHERLANDS	
11:50 am	<b>B7-1-5</b> Thermal Decomposition of CrN Hard Coatings, W. ERNST, <b>J. NEIDHARDT</b> , UNIVERSITY OF LEOBEN, AUSTRIA, H. WILLMANN, MATERIALS CENTER LEOBEN, AUSTRIA, B. SARTORY, UNIVERSITY OF INNSBRUCK, AUSTRIA, C. MITTERER, UNIVERSITY OF LEOBEN, AUSTRIA	
12:10 pm	<b>B7-1-6</b> Stress Fradients in Cr and CrN Coatings, <b>GUIDO C.A.M. JANSSEN</b> , F.D. TICHELAAAR, C.C.G. VISSER, TU DELFT, NETHERLANDS	

# Monday Afternoon, May 1, 2006

## Hard Coatings and Vapor Deposition Technology

Room: Golden West - Session B7-2

### Properties and Characterization of Hard Coatings and Surfaces

Moderators: J. Patscheider, EMPA, D. Gall, Rensselaer Polytechnic Institute, Guido C.A.M. Janssen, TU Delft

1:30 pm	<b>B7-2-1 Invited</b> Nanostructure and Properties of TiC/a-C:H Composite Coatings, Y. PEI, D. GALVAN, J.T.M. DE HOSSON, UNIVERSITY OF GRONINGEN, NETHERLANDS	
1:50 pm	Invited talk continued.	
2:10 pm	<b>B7-2-3</b> Deposition of Nanometer- to Micron-Thick Crystalline TiC Films by Magnetron Sputtering, C.A. FREYMAN, Y.W. CHUNG, NORTHWESTERN UNIVERSITY	
2:30 pm	<b>B7-2-4</b> Syntheses and Mechanical Properties of Cr-Mo-N Coatings by a Hybrid Coating System, D.S. KANG, J.W. JEON, E.Y. CHOI, K.H. KIM, PUSAN NATIONAL UNIVERSITY, KOREA	
2:50 pm	<b>B7-2-5</b> Effect of Al on the Thermal Stability of CrN Thin Films, H. WILLMANN, MATERIALS CENTER LEOBEN, AUSTRIA, W. ERNST, UNIVERSITY OF LEOBEN, AUSTRIA, P.H. MAYRHOFER, RWTH, GERMANY, A.E. REITER, BALZERS LTD., LIECHTENSTEIN, L. HULTMAN, LINKOPING UNIVERSITY, SWEDEN, C. MITTERER, UNIVERSITY OF LEOBEN, AUSTRIA	
3:10 pm	<b>B7-2-6</b> Structure, Hardness and Thermal Stability of Ti(Al,N) Coatings, J.C. OLIVEIRA, A. MANAIA, A. CAVALEIRO, M.T. VIEIRA, UNIVERSIDADE DE COIMBRA, PORTUGAL	
3:50 pm	<b>B7-2-8</b> Effects of Substrate to Target Working Distance and the Nitrogen Pressure on Properties of CrAlN Coatings Deposited by Pulsed Closed Field Unbalanced Magnetron Sputtering (P-CFUBMS), J. LIN, B. MISHRA, J.J. MOORE, COLORADO SCHOOL OF MINES, W.D. SPROUL, REACTIVE SPUTTERING CONSULTING, LLC	
4:10 pm	<b>B7-2-9</b> The Microstructure and Mechanical Properties of Pulsed DC Magnetron Sputtered Nanocomposite Cr-Cu-N Thin Films, J.W. LEE, Y.-C. KUO, TUNG NAN INSTITUTE OF TECHNOLOGY, TAIWAN, S.-K. TIEN, NATIONAL TSING HUA UNIVERSITY, TAIWAN	
4:30 pm	<b>B7-2-10</b> Structure, Morphology and Electrical Properties of Sputtered Zr-Si-N Thin Films: from Solid Solution to Nanocomposite, C.S. SANDU, R. SANJINES, F. MEDJANI, F. LEVY, EPFL, SWITZERLAND	
4:50 pm	<b>B7-2-11</b> Influence of Oxygen Content in Powder Metallurgical TiAl <sub>33/67</sub> at% Targets on Characteristics of TiAlN Coatings, P. POLCIK, PLANSEE METALL GMBH, AUSTRIA, M. KATHREIN, CERATIZIT AUSTRIA GMBH, AUSTRIA, A. KOLBE, TECHNISCHE UNIVERSITAET BERGAKADEMIE FREIBERG, GERMANY, C. MICHOTTE, M. PENOY, CERATIZIT LUXEMBOURG S.À.R.L., LUXEMBOURG	
5:10 pm	<b>B7-2-12</b> Effect of Oxygen Flow Rate on the Structure and Properties of Nanocrystalline Zr(N,O) Thin Films Deposited by Ion Plating, J.-H. HUANG, NATIONAL TSING HUA UNIVERSITY, TAIWAN, K.H. CHANG, G.-P. YU, NATIONAL TSING HUA UNIVERSITY, TAIWAN	
5:30 pm	<b>B7-2-13</b> Hard Carbide Layers Produced on Tool Steel Surface in Vacuum Titanizing Process, E. KASPRZYCKA, A. NAKONIECZNY, Z. LATAS, B. BOGDANSKI, T. BABUL, INSTITUTE OF PRECISION MECHANICS, POLAND	

# Tuesday Morning, May 2, 2006

## Hard Coatings and Vapor Deposition Technology

Room: Golden West - Session B7-3

### Properties and Characterization of Hard Coatings and Surfaces

Moderators: J. Patscheider, EMPA, D. Gall, Rensselaer Polytechnic Institute, Guido C.A.M. Janssen, TU Delft

8:30 am	<b>B7-3-1 Invited</b> Formation of Ternary Nitride Thin Films by Magnetron Sputtering Co-Deposition: Solid Solution and Composite Materials, <b>C.S. SANDU</b> , R. SANJINES, M. BENKAHOUL, F. MEDJANI, F. LEVY, EPFL, SWITZERLAND	
8:50 am	Invited talk continued.	
9:10 am	<b>B7-3-3 Growth Morphology and Structure Formation in Pulsed Laser Deposited Multilayer Hard Coatings</b> , <b>W. WALDHAUSER</b> , JOANNEUM RESEARCH FORSCHUNGSGESELLSCHAFT GMBH, AUSTRIA, J.M. LACKNER, JOANNE RESEARCH FORSCHUNGSGESELLSCHAFT GMBH, AUSTRIA, L. MAJOR, B. MAJOR, POLISH ACADEMY OF SCIENCES, POLAND	
9:30 am	<b>B7-3-4 Stress and Texture in TiN/TiAlN Multilayered Thin Films</b> , <b>C.V. FALUB</b> , EPFL, SWITZERLAND, V.H. DERFLINGER, BALZERS AG, LIECHTENSTEIN, A. KARIMI, EPFL, SWITZERLAND	
9:50 am	<b>B7-3-5 Increase in Micro-Hardness of (Ti,Cr,Al,Si)N Films by Thermal Annealing at 1000°C</b> , <b>H.E. EZURA</b> , K.I. ICHIJO, KEIO UNIVERSITY, JAPAN, H. HASEGAWA, OKAYAMA UNIVERSITY, JAPAN, K. YAMAMOTO, KOBE STEEL LTD, JAPAN, A. HOTTA, T. SUZUKI, KEIO UNIVERSITY, JAPAN	
10:10 am	<b>B7-3-6 Some Nano-Scale Correlations Between Structure and Properties in PEO Alumina Films</b> , <b>R. KHAN</b> , A.L. YEROKHIN, A. PILKINGTON, A. LEYLAND, A. MATTHEWS, THE UNIVERSITY OF SHEFFIELD, UNITED KINGDOM	
10:30 am	<b>B7-3-7 Effect of Depth Profile of Residual Stress on Milling Performance of TiAlN Coated Inserts</b> , <b>H. FUKUI</b> , TOOL MATERIALS DEVELOPMENT GROUP, JAPAN, S. IMAMURA, SUMITOMO ELECTRIC HARDMETAL CORP., JAPAN, K. YAMAGUCHI, J. IHARA, SUMITOMO ELECTRIC INDUSTRIES, LTD., JAPAN	
10:50 am	<b>B7-3-8 Oxidation Resistance Properties of Al-Ti-Si-N Coatings Prepared by the Cathodic Arc Ion Plating Method for High Speed Cutting Applications</b> , <b>K. SATO</b> , A. KONDO, Y. TANAKA, MITSUBISHI MATERIALS CORPORATION, JAPAN, Y. ONISHI, N. ICHIMIYA, MITSUBISHI MATERIALS KOBE TOOLS CORPORATION, JAPAN	
11:10 am	<b>B7-3-9 Oxidation and Wear Behaviors of Ti-Based Thin Films</b> , <b>J.H. HSIEH</b> , MING-CHI UNIVERSITY OF TECHNOLOGY, TAIWAN, A.L.K. TAN, X.T. ZENG, SINGAPORE INSTITUTE OF MANUFACTURING TECHNOLOGY, SINGAPORE	
11:30 am	<b>B7-3-10 Oxidation Resistance of TiAlCN PVD Coatings</b> , <b>I.A. GEE</b> , SHEFFIELD HALLAM UNIVERSITY, UNITED KINGDOM, J. PERKINS, UNIVERSITY OF WARWICK, UNITED KINGDOM, A. KOVACS, P. BARNA, RESEARCH INSTITUTE FOR TECHNICAL PHYSICS & MATERIAL SCIENCE OF HAS, HUNGARY, M.A. STUEBER, FORSCHUNGSZENTRUM KARLSRUHE, GERMANY, P.EH. HOVSEPIAN, SHEFFIELD HALLAM UNIVERSITY, UNITED KINGDOM	
11:50 am	<b>B7-3-11 Corrosion Behaviour of MoS<sub>2</sub>-Based Coatings Deposited onto High Speed Steel by Reactive Magnetron Sputtering</b> , <b>M. FENKER</b> , H. KAPPL, A. SAVAN, FEM, GERMANY	
12:10 pm	<b>B7-3-12 Historical Perspective on Surfaces</b> , <b>F. MONNOYEUR</b> , CARNEGIE MELLON UNIVERSITY	

# Tuesday Afternoon, May 2, 2006

## Hard Coatings and Vapor Deposition Technology

Room: Golden West - Session B2-1

### Arc and E-Beam Coatings and Technologies

Moderators: A. Anders, Lawrence Berkeley National Laboratory, Greger Hakansson, Bobycote Varnebehandling

1:30 pm	<b>B2-1-1</b> Invited Missing - Kang, TAY BEN KANG	
1:50 pm	Invited talk continued.	
2:10 pm	<b>B2-1-3</b> An Investigation of Micro-Structure and Property of TiAlN/Cu Multilayered Thin Film, M.-S. LEU, S.-C. LO, J.-B. WU, INDUSTRIAL TECHNOLOGY RESEARCH INSTITUTE, TAIWAN, L. ZHAO, NATIONAL RESEARCH COUNCIL OF CANADA	
2:30 pm	<b>B2-1-4</b> Cr <sub>1-x</sub> Al <sub>x</sub> N Hard Coatings Deposited by a Vacuum Arc System with Lateral Rotating Cathodes for High Speed Machining Applications, X.Z. DING, SINGAPORE INSTITUTE OF MANUFACTURING TECHNOLOGY, SINGAPORE, X.T. ZENG, Y.C. LIU, F.Z. FANG, G.C. LIM, SINGAPORE INSTITUTE OF MANUFACTURING TECHNOLOGY, SINGAPORE	
2:50 pm	<b>B2-1-5</b> Deposition of CrAlSiN Thin Films by Cathodic Arc Plasma Deposition, S.K. KIM, UNIVERSITY OF ULSAN, KOREA	
3:10 pm	<b>B2-1-6</b> Corrosion Resistance and Growth Characteristics Comparison of ZrN Film Deposited by Both Methods on 304 Stainless Steel, C. LI, UNIVERSITY OF SCIENCE AND TECHNOLOGY BEIJING, CHINA, J. XU, X. LIU, WEST VIRGINIA UNIVERSITY, W. TANG, F. LV, UNIVERSITY OF SCIENCE AND TECHNOLOGY BEIJING, CHINA	
3:30 pm	<b>B2-1-7</b> Improved Linear Filtered Arc Source, R.P. WELTY, K. BRONDUM, VAPOR TECHNOLOGIES, INC.	
3:50 pm	<b>B2-1-8</b> Temperature Distribution in TiAl Arc Cathodes During PVD Process - A Comparison Between Modeling and In-Situ Measurements, P. POLCIK, PLANSEE METALL GMBH, AUSTRIA, W. WENZL, ARC LEICHTMETALLKOMPETENZENTRUM RANSHOFEN GMBH, AUSTRIA, U. HORNAUER, M. HAUCKE, G-ELIT PRAEZISIONSWERKZEUG GMBH, GERMANY, F.-R. WEBER, KONRAD FERDINAND GUMBEL CO. KG, GERMANY	
4:10 pm	<b>B2-1-9</b> UHV Arc for High Quality Film Deposition, R. RUSSO, SECONDA UNIVERSITAT DI NAPOLI, ITALY, L. CATANI, A. CIANCHI, INFN-ROMAII, ITALY, J. LANGNER, SINS, SWIERCH, ITALY, R. POLINI, UNIVERSITA' DI ROMA TOR VERGATA, ITALY, S. TAZZARI, INFN-ROMAII, UNIVERSITAT DI ROMA, ITALY, N.N. KOVAL, HCEI TOMSK, RUSSIA	
4:30 pm	<b>B2-1-10</b> Microstructure Change of (Cr,Fe) <sub>23</sub> C <sub>6</sub> in High Chromium Fe-Cr-C Hardfacing Alloys, W. WU, M.-C. CHEN, NATIONAL CHUNG HSING UNIVERSITY, TAIWAN, C. FAN, NATIONAL CHUNGHSING UNIVERSITY, TAIWAN	
4:50 pm	<b>B2-1-11</b> Investigating Hybrid Filtered Arc Plasma Source Ion Deposition Technologies to Deposit Nanostructured Functional Coatings on Ferritic Stainless Steels. Part I: Deposition Process Parameters and Basic Coating Characteristics, V.I. GOROKHOVSKY, ARCOMAC SURFACE ENGINEERING, LLC, P.E. GANNON, M.C. DEIBERT, R.J. SMITH, A. KAYANI, S. SOFIE, UNIVERSITY OF CALIFORNIA, RIVERSIDE, CALIFORNIA	
5:10 pm	<b>B2-1-12</b> The Application of Trimethylaluminum in Thin Films Synthesis Process by PAPVD and PACVD Techniques, M. BETIUK, K. BURDYNski, INSTITUTE OF PRECISION MECHANICS, POLAND, R. SOBIECKI, UNIVERSITY OF TECHNOLOGY, POLAND	

# Wednesday Morning, May 3, 2006

Hard Coatings and Vapor Deposition Technology Room: Golden West - Session B10		Hard Coatings and Vapor Deposition Technology Room: Golden West - Session B2-2	
PVD Process Modeling Moderator: Tomas Nyberg, Uppsala University		Arc and E-Beam Coatings and Technologies Moderators: A. Anders, Lawrence Berkeley National Laboratory, Greger Hakansson, Bobycote Varnebehandling	
8:30 am		8:30 am	<b>B2-2-1 Invited</b> Filtered Vacuum arc Deposition of Undoped and Doped ZnO Thin Films: Electrical, Optical, and Structural Properties, <b>S. GOLDSMITH</b> , TEL AVIV UNIVERSITY, ISRAEL, <b>R.L. BOXMAN</b> , TEL-AVIV UNIVERSITY, ISRAEL
8:50 am		8:50 am	Invited talk continued.
9:10 am		9:10 am	<b>B2-2-3</b> Effects of Oxygen Partial Pressure on Film Growth and Electrical Properties for Undoped ZnO Films with a Thickness Below 100 nm, <b>T. YAMAMOTO</b> , <b>S. KISHIMOTO</b> , KOCHI UNIVERSITY OF TECHNOLOGY, JAPAN, <b>K. INABA</b> , RIGAKU CORPORATION, JAPAN, <b>M. YAMAGUCHI</b> , CASIO COMPUTER CO., LTD., JAPAN, <b>K. IKEDA</b> , <b>H. MAKINO</b> , <b>T. YAMADA</b> , KOCHI UNIVERSITY OF TECHNOLOGY, JAPAN
9:30 am		9:30 am	<b>B2-2-4</b> Effects of Oxygen Partial Pressure on Doping Properties for Ga-Doped ZnO Films Prepared by Reactive Plasma Deposition with a Traveling Substrate, <b>T. YAMAMOTO</b> , <b>T. YAMADA</b> , <b>K. IKEDA</b> , <b>S. KISHIMOTO</b> , <b>H. MAKINO</b> , <b>M. YAMAGUCHI</b> , KOCHI UNIVERSITY OF TECHNOLOGY, JAPAN
9:50 am		9:50 am	<b>B2-2-5</b> Properties of ZnO Thin Films with Different Thicknesses Prepared by Electron Beam Evaporation, <b>S.-N. BAI</b> , CHIENKUO TECHNOLOGY UNIVERSITY, TAIWAN, <b>T.-Y. TSENG</b> , NATIONAL CHIAO-TUNG UNIVERSITY, TAIWAN
10:10 am		10:10 am	<b>B2-2-6</b> Carbon Based Tribological Coatings - Deposited with Stationary Rates of 100 nm/s, <b>B. SCHEFFEL</b> , <b>J.-P. HEINSS</b> , <b>CH. METZNER</b> , FRAUNHOFER INSTITUTE FEP DRESDEN, GERMANY
10:50 am	<b>B10-8 Invited</b> Heuristic and Atomistic Simulation of Reactive Magnetron Sputtering, <b>A. PFLUG</b> , <b>M. SIEMERS</b> , <b>B. SZYSZKA</b> , FRAUNHOFER IST, GERMANY, <b>D. SEVERIN</b> , <b>M. WUTTIG</b> , I. PHYSIKALISCHES INSTITUT, GERMANY, <b>T. NYBERG</b> , <b>O. KAPPERTZ</b> , UPPSALA UNIVERSITY, SWEDEN, <b>C. BERGER</b> , DARMSTADT UNIVERSITY OF TECHNOLOGY, GERMANY		
11:10 am	Invited talk continued.		
11:30 am	<b>B10-10</b> Reactive Magnetron Sputtering : the Effect of Ion Implantation, <b>D.J. DEPLA</b> , <b>R. DE GRUYSE</b> , UNIVERSITY GHENT, BELGIUM		
11:50 am	<b>B10-11</b> Linearized Model Analysis and LQR-Based Stabilizing Controller Design for Reactive Sputtering Processes, <b>D.J. CHRISTIE</b> , ADVANCED ENERGY INDUSTRIES, INC.		
12:10 pm	<b>B10-12</b> Monte Carlo Model for Vapour Propagation in a High Yield PVD Jet-Evaporation Channel, <b>B. TEICHERT</b> , <b>C. DEUS</b> , <b>S. COLLATZ</b> , VON ARDENNE ANLAGENTECHNIK GMBH, GERMANY		

# Wednesday Morning, May 3, 2006

<b>Hard Coatings and Vapor Deposition Technology</b> <b>Room: Golden West - Session B3</b>		<b>Hard Coatings and Vapor Deposition Technology</b> <b>Room: Royal Palm 1-3 - Session B4</b>	
<b>CVD Coatings and Technologies</b> <b>Moderators:</b> Claude Bernard, Institute National Polytechnique de Grenoble, Angel Saniurjo, SRI International		<b>Laser Assisted and Ion Beam Coatings and Technologies</b> <b>Moderators:</b> J.G. Jones, Air Force Research Laboratory, S. Weissmantel, University of Applied Sciences Mittweida	
8:30 am	<b>B3-1</b> Chemical Vapor Deposition of Transition Metal Diborides from Single Source Precursors, <b>Y. YANG</b> , D.Y. KIM, J.E. GERBI, G.S. GIROLAMI, J.R. ABELSON, UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN	B4-1 Invited	Missing - Metev, <b>SIMEON METEV</b>
8:50 am	<b>B3-2</b> Tribological Layers for Low Tempered Steels in Automotive Applications Prepared by PACVD Using Metal Organic Precursors, <b>J. MAHRHOLZ</b> , IOT, BRAUNSCHWEIG, GERMANY, T. HOSENFELDT, INA-SCHAEFFLER KG, GERMANY, K.-T. RIE, IOT, GERMANY	Invited talk continued.	
9:10 am	<b>B3-3</b> High Temperature Processing of Poly-SiC Substrates from the Vapor Phase for Wafer-Bonding, <b>M. PONS</b> , INP GRENOBLE, FRANCE	<b>B4-3</b> Adhesion and Film Growth Phenomena in High-Energetic Pulsed Laser Deposition on Polymer Surfaces, <b>J.M. LACKNER</b> , W. WALDHAUSER, JOANNEUM RESEARCH FORSCHUNGSGESELLSCHAFT GMBH, AUSTRIA	
9:30 am	<b>B3-4</b> TiN/SiN <sub>x</sub> Multilayer Coatings by Chemical Vapor Deposition in a Fluidized Bed Reactor at Atmospheric Pressure (AP/FBR-CVD), <b>J. PEREZ-MARIANO</b> , C. COLOMINAS, UNIVERSITAT RAMON LLULL, SPAIN	<b>B4-4</b> Wear Resistance and Tribological Properties of Superhard a-C Films Deposited on Various Materials by PLD, <b>s. WEISSMANTEL</b> , G. REISSE, D. ROST, UNIVERSITY OF APPLIED SCIENCES MITTWEIDA, GERMANY	
9:50 am	<b>B3-5 Invited</b> Vapor Growth of SiC Bulk Crystals and its Challenge of Doping, <b>P.J. WELLMANN</b> , R. MUELLER, D. QUEREN, UNIVERSITY OF ERLANGEN, GERMANY, S.A. SAKWE, UNIVERSITY OF ERLNAGEN, GERMANY, M. PONS, INP GRENOBLE, FRANCE	<b>B4-5</b> Photocatalysis of TiO <sub>2</sub> /TiO <sub>2-x</sub> N <sub>x</sub> Multilayers by Ion-Assisted Electron Beam Evaporation, Y.M. DENG, NATIONAL DONG HWA UNIVERSITY, TAIWAN, S.F. SHU, NATIONAL DONG HUA UNIVERSITY, TAIWAN, T.K. CHEN, M.S. WONG, NATIONAL DONG HWA UNIVERSITY, TAIWAN	
10:10 am	Invited talk continued.	<b>B4-6</b> Relationship Between the Nanostructure and Mechanical Properties of Pulsed Laser Deposited Dichromium Trioxide Thin Films, <b>M. TABBAL</b> , HARVARD UNIVERSITY, T.C. CHRISTIDIS, S. KAHWAJI, AMERICAN UNIVERSITY OF BEIRUT, LEBANON, H. HANYU, OSG CORPORATION, R&D CENTER, JAPAN, W. STEIN, ??????????, GERMANY	
10:30 am	<b>B3-7</b> TEM Investigation of CVD TiN/κ Alumina Multilayer Coatings, <b>s. CANOVIC</b> , M. HALVARSSON, CHALMERS UNIVERSITY OF TECHNOLOGY, SWEDEN, S.A. RUPPI, SECO TOOLS AB, SWEDEN	<b>B4-7</b> Crystalline Films and Nanowires of Lanthanum Monosulfide, <b>s. FAIRCHILD</b> , AIR FORCE RESEARCH LABORATORY, M. CAHAY, UNIVERSITY OF CINCINNATI, P. MURRAY, UNIVERSITY OF DAYTON	
10:50 am	<b>B3-8</b> CVD Deposition and Characterization of Coloured Al <sub>2</sub> O <sub>3</sub> /ZrO <sub>2</sub> Multilayers, <b>c. BJORMANDER</b> , AB SANDVIK TOOLING, SWEDEN	<b>B4-8</b> Plasma Diagnostics of Hybrid Magnetron Sputtering and Pulsed Laser Deposition, <b>J.G. JONES</b> , C. MURATORE, C.C. BAKER, A.A. VOEVODIN, AIR FORCE RESEARCH LABORATORY	
11:10 am	<b>B3-9</b> Mechanical Property Characterisation of CVD Al <sub>2</sub> O <sub>3</sub> Coatings, <b>s.a. RUPPI</b> , SECO TOOLS AB, SWEDEN, A. FLINK, LINKÖPING UNIVERSITY, SWEDEN		
11:30 am	<b>B3-10</b> Characteristics of Plasma-Deposited a-C:F:O:H Films, <b>s.f. DURRANT</b> , E.C. RANGEL, UNESP - UNIVERSIDADE ESTADUAL PAULISTA, BRAZIL, N.C. DA CRUZ, J.R.R. BORTOLETO, UNESP - SOROCABA, BRAZIL		
11:50 am	<b>B3-11</b> Aluminium Coating Modified with Hf on Ferritic Steels by CVD-FBR Technology, F.J. BOLÍVAR, M.P. HIERRO, J.A. TRILLEROS, <b>M.C. CARPINTERO</b> , F.J. BOLÍVAR, F.J. PÉREZ, UNIVERSIDAD COMPLUTENSE DE MADRID, SPAIN		
12:10 pm	<b>B3-12</b> Al-Mn CVD-FBR Protective Coatings for Hot Corrosion Application, S. TSIPAS, J.M. BROSSARD, M.P. HIERRO, J.A. TRILLEROS, L. SÁNCHEZ, F.J. BOLÍVAR, F.J. PÉREZ, UNIVERSIDAD COMPLUTENSE DE MADRID, SPAIN		
12:30 pm	<b>B3-13</b> Mechanical Stresses in Catalytic Chemically Vapour Deposited Polycrystalline Silicon Films, <b>G.E. AYVAZYAN</b> , A.H. VARDANYAN, A.V. AGHABEKYAN, ENGINEERING ACADEMY OF ARMENIA		

# Wednesday Afternoon, May 3, 2006

**Hard Coatings and Vapor Deposition Technology**  
**Room: Royal Palm 1-3 - Session B5**  
**Surface Pre-Treatment, Coating Post-Treatment and Duplex Technology**  
**Moderators:** K. Bobzin, RWTH Aachen, A. Leyland, The University of Sheffield

1:30 pm	<b>B5-1 Invited</b> Combination of Coating and Heat Treatment Processes, <b>o. KESSLER</b> , STIFTUNG INSTITUT FUER WERKSTOFFTECHNIK, GERMANY	
1:50 pm	Invited talk continued.	
2:10 pm	<b>B5-3 Missing - Fuss, H.-G. FUSS</b> , CEMECON AG, GERMANY	
2:30 pm	<b>B5-4 Missing - Mumme, F. MUMM</b>	
3:10 pm	<b>B5-6 Duplex Plasma Nitriding and Nanostructured TiAlN/CrN PVD Coating</b> , <b>G. EL NAYAL</b> , INSTITUTE OF MATERIALS RESEARCH, UNITED KINGDOM	
3:30 pm	<b>B5-7 Industrial Applications of Duplex Coatings</b> , <b>o. KAYSER</b> , M. ARNDT, F. MANZ, METAPLAS IONON OBERFLAECHEVEREDELUNGSTECHNIK GMBH, GERMANY	
3:50 pm	<b>B5-8 Effect of Nitrided Layer Thickness on Adhesion and Load Bearing Capacity of the in situ Deposited DLC Coating on Low Temperature Plasma Nitrided Substrate</b> , <b>M. RAHMAN</b> , NCPST AND MPRC, IRELAND, M.S.J. HASHMI, SCHOOL OF MECHANICAL AND MANUFACTURING ENGINEERINGITY, DUBLIN CITY UNIVERSITY (DCU), DUBLIN-9, IRELAND.	
4:10 pm	<b>B5-9 The influence of Substrate Preparation on the PVD Coating Graded Zirconium Carbide (ZrCg)</b> , <b>K. BOBZIN</b> , E. LUGSCHEIDER, <b>o. KNOTEK</b> , N. BAGCIVAN, RWTH AACHEN, GERMANY, N. GOEBBELS, SURFACE ENGINEERING INSTITUTE, GERMANY	
4:30 pm	<b>B5-10 Improvements on the Wear Resistance of High Thermal Conductivity Cu Alloys Using an Electroless Ni-P Coating Prior to PVD Deposition</b> , <b>J.C. AVELAR-BATISTA</b> , E. SPAIN, M. LETCH, J. HOUSDEN, <b>R.N. TURNER</b> , TECVAC LTD., UNITED KINGDOM, R. BEECHEY, COPPERPLAS, UNITED KINGDOM	
4:50 pm	<b>B5-11 Effect of Heating Post-treatments on Nitrided Stainless Steel</b> , <b>v.h. BAGGIO-SCHIED</b> , A.J. ABDALLA, G. DE VASCONCELOS, AEROSPACE TECHNICAL CENTER, BRAZIL	
5:10 pm	<b>B5-12 Pulse Plasma Processing Intended for Surface Treatment of Wind Turbine Steel Components</b> , <b>M. ZLATANOVIC</b> , BELGRADE UNIVERSITY, SERBIA AND MONTENEGRO, N. POPOVIC, NUCLEAR SCIENCE INSTITUTE, YUGOSLAVIA	
5:30 pm	<b>B5-13 Modeling, Production and Characterization of Duplex Coatings (HVOF and PVD) on Ti6Al4V substrate for specific mechanical applications.</b> , <b>E. BEMPORAD</b> , M. SEBASTIANI, F. CARASSITI, UNIVERSITY OF ROME, ITALY, F. CASADEI, CENTRO SVILUPPO MATERIALI (CSM) SPA, ITALY	

# Thursday Morning, May 4, 2006

<b>Hard Coatings and Vapor Deposition Technology</b> <b>Room: Royal Palm 1-3 - Session B1-1</b>		<b>Hard Coatings and Vapor Deposition Technology</b> <b>Room: Golden West - Session B8-1</b>	
<b>Sputtering Coatings and Technologies</b> <b>Moderators:</b> David Glocker, Isoflux Inc., F. Richter, Chemnitz University of Technology		<b>Hard and Multifunctional Nano-Structured Coatings</b> <b>Moderators:</b> Aharon Inspektor, Kennametal, Inc., P.H. Mayrhofer, RWTH Aachen University, J.J Moore, Colorado School of Mines	
8:30 am	<b>B1-11 Invited</b> Fundamental Understanding and Development of Nanostructured Ti-Al-Si-N and Zr-N-O Thin Films, L. REBOUTA, UNIVERSIDADE DO MINHO, PORTUGAL, K. SHEIN, RUSSIAN ACADEMY OF SCIENCES, RUSSIA, P. CARVALHO, F. VAZ, S. CARVALHO, UNIVERSIDADE DO MINHO, PORTUGAL	8:30 am	<b>B8-1-1 Invited</b> Materials Aspects of the Nanoscale Thin Film Design, H. HOLLECK, M.A. STUEBER, S. ULRICH, C. ZIEBERT, H. LEISTE, FORSCHUNGSZENTRUM KARLSRUHE, GERMANY
8:50 am	Invited talk continued.	8:50 am	Invited talk continued.
9:10 am	<b>B1-13</b> Ti-Al-Cr-Si-V)N Multi-Component Coatings on Mild Steel by RF Magnetron Sputter, C.-H. LIN, NATIONAL TSING HUA UNIVERSITY, TAIWAN, J.G. DUH, NATIONAL TSING HUA UNIVERSITY, TAIWAN	9:10 am	<b>B8-1-3</b> Grain Size Evaluation of Pulsed TiAlN Nanocomposite Coatings for Cutting Tools, K. BOBZIN, E. LUGSCHEIDER, M. MAES, RWTH AACHEN, GERMANY, P. IMMICH, AACHEN UNIVERSITY, GERMANY
9:30 am	<b>B1-14</b> The Influence of Nitrogen on the Microstructure and Nanomechanical Properties of TaSiN Thin Films by Magnetron Reactively Co-Sputtering, C.-K. CHUNG, T.-S. CHEN, C.-C. PENG, B.-H. WU, NATIONAL CHENG KUNG UNIVERSITY, TAIWAN	9:30 am	<b>B8-1-4</b> Hardening Effects in Annealed EB-PVD Nanocomposite TiAlBN Films, C.G. REBHOLZ, UNIVERSITY OF CYPRUS, P.H. MAYRHOFFER, J.M. SCHNEIDER, RWTH AACHEN UNIVERSITY, GERMANY, M.A. MONCLUS, M.A. BAKER, UNIVERSITY OF SURREY, UNITED KINGDOM, A. LEYLAND, A. MATTHEWS, THE UNIVERSITY OF SHEFFIELD, UNITED KINGDOM
9:50 am	<b>B1-15</b> Reactive Gas Effects in Pulsed Magnetron Sputtering: Time-Resolved Investigation, TH. DUNGER, TH. WELZEL, F. RICHTER, CHEMNITZ UNIVERSITY OF TECHNOLOGY, GERMANY	9:50 am	<b>B8-1-5</b> High Temperature Nanohardness Evolution of nc-Cr <sub>7</sub> N / a-SiN <sub>x</sub> Nanocomposite Coatings Obtained by Arc-Magnetron Hybrid Process, V. RACHPECH, J.F. PIERSON, ECOLE DES MINES, FRANCE, V. CHAPUSOT, PVDCCO S.Á.R.L., FRANCE, J. VON STEBUT, A. BILLARD, ECOLE DES MINES, FRANCE
10:10 am	<b>B1-16</b> AC Powered Reactive Magnetron Deposition of Indium Tin Oxide (ITO) Films from a Metallic Target, H. KUPFER, R. KLEINHEMPEL, TH. WELZEL, TH. DUNGER, F. RICHTER, CHEMNITZ UNIVERSITY OF TECHNOLOGY, GERMANY, W.-M. GNEHR, T. KOPE, FRAUNHOFER INSTITUTE FOR ELECTRON BEAM AND PLASMA TECHNOLOGY, GERMANY	10:10 am	<b>B8-1-6</b> CrAlYN/CrN Superlattice Coatings Deposited by the Combined High Power Impulse Magnetron Sputtering / Unbalanced Magnetron Sputtering Technique, P.EH. HOVSEPIAN, C. REINHARD, A.P. EHIASARIAN, SHEFFIELD HALLAM UNIVERSITY, UNITED KINGDOM
10:30 am	<b>B1-17</b> The Effect of Pulsed Magnetron Sputtering on the Structure and Mechanical Properties of CrB <sub>2</sub> Coatings, M. AUDRONIS, A. LEYLAND, THE UNIVERSITY OF SHEFFIELD, UNITED KINGDOM, P.J. KELLY, MANCHESTER METROPOLITAN UNIVERSITY, UNITED KINGDOM, A. MATTHEWS, THE UNIVERSITY OF SHEFFIELD, UNITED KINGDOM	10:30 am	
10:50 am	<b>B1-18</b> New Horizons in Magnetron Sputtering Systems by Combination of RF and DC Modes for Hard Carbon Coatings, M.A. STUEBER, S. ULRICH, FORSCHUNGSZENTRUM KARLSRUHE, GERMANY, J. VETTER, V. VON DER HEIDE, SULZER METAPLAS IONON, GERMANY	10:50 am	<b>B8-1-8</b> Comparison of Cr <sub>1-x</sub> Al <sub>x</sub> Si <sub>3</sub> N and Ti <sub>1-x</sub> Al <sub>x</sub> Si <sub>3</sub> N coatings prepared by arc evaporation, P. KARVANKOVA, A. KARIMI, EPFL, SWITZERLAND, O. CODDET, T. CSELLE, M. MORSTEIN, PLATIT, SWITZERLAND
11:10 am	<b>B1-19</b> Preparation and Characterization of Non-Evaporable Porous Ti-Zr-V Getter Films, C.-C. LI, J.-L. HUANG, NATIONAL CHENG-KUNG UNIVERSITY, TAIWAN, R.-J. LIN, INTELLECTUAL PROPERTY EXCHANGE LIMITED, TAIWAN	11:10 am	<b>B8-1-9</b> Deposition and Mechanical Properties of Ti-Si-B-C-N Nanocomposite Coatings by DC Unbalanced Magnetron Sputtering, I.W. PARK, A.O. KUNRATH, D. ZHONG, J.J. MOORE, COLORADO SCHOOL OF MINES, A.A. VOEVODIN, AIR FORCE RESEARCH LABORATORY, K.H. KIM, PUSAN NATIONAL UNIVERSITY, KOREA
11:30 am	<b>B1-110 Invited</b> An Analysis of Target Processes in Reactive Magnetron Sputtering, A. BILLARD, ECOLE DES MINES, FRANCE	11:30 am	<b>B8-1-10</b> Growth and Characterization of Epitaxially Stabilized SiN <sub>x</sub> in TiN/SiN <sub>x</sub> Multilayer Films, H. SÖDERBERG, LULEÅ UNIVERSITY OF TECHNOLOGY, SWEDEN, L. HULTMAN, J. BIRCH, A. FLINK, LINKÖPING UNIVERSITY, SWEDEN, M. ODÉN, LULEÅ UNIVERSITY OF TECHNOLOGY, SWEDEN
11:50 am	Invited talk continued.	11:50 am	
12:10 pm	<b>B1-112</b> Monitoring and Control During Deposition of AlN Films by a PVD Process, J. ACOSTA, A. ROJO, O SALAS, ITESM, MEXICO, J. OSEGUERA, ITESM-CEM, MEXICO	12:10 pm	<b>B8-1-12</b> Tribological Performance of Nano-Structured Ti-Si-N Films Synthesized by Cathodic Arc Evaporation, S.-M. YANG, NATIONAL CHUNG HSING UNIVERSITY, Y.-Y. CHANG, MINGDAO UNIVERSITY, TAIWAN, W.-T. WU, INDUSTRIAL TECHNOLOGY RESEARCH INSTITUTE, TAIWAN, D.-Y. WANG, MINGDAO UNIVERSITY, TAIWAN



# Thursday Afternoon, May 4, 2006

**Hard Coatings and Vapor Deposition Technology**  
**Room: Golden West - Session B8-2**

**Hard Coatings and Vapor Deposition Technology**  
**Room: Royal Palm 1-3 - Session B9**

**Hard and Multifunctional Nano-Structured Coatings**

**Moderators:** Aharon Inspektor, Kennametal, Inc., P.H. Mayrhofer, RWTH Aachen University, J.J Moore, Colorado School of Mines

**Max Phases and other Nanolaminated Coatings**

**Moderator:** U. Jansson, Uppsala University

1:30 pm	<b>B8-2-1 Invited</b> Multifunctional Biocompatible Nanostructured Coatings for Load-Bearing Implants, <b>D.V. SHTANSKY</b> , SCIENTIFIC-EDUCATIONAL CENTER OF SHS, RUSSIA, N.A. GLOUSHANKOVA, CANCER RESEARCH CENTER OF RAMS, RUSSIA, I.A. BASHKOVA, MOSCOW STATE INSTITUTE OF STEEL AND ALLOYS, RUSSIA, M.A. KHARITONOVA, CANCER RESEARCH CENTER OF RAMS, RUSSIA	<b>B9-1 Invited</b> Applications and Industrial Implementation of MAX-Phases, <b>J.P. PALMQUIST</b> , KANTHAL AB, SWEDEN
1:50 pm	Invited talk continued.	Invited talk continued.
2:10 pm	<b>B8-2-3</b> Improvement of the Tribological Behaviour of PVD Nanostratified TiN/CrN Coatings, an Explanation, <b>C. MENDIBIDE</b> , LABORATOIRE DES TECHNOLOGIES INDUSTRIELLES, FRANCE, <b>P. STEYER</b> , INSA DE LYON-LPCI, FRANCE, <b>J. FONTAINE</b> , ECOLE CENTRALE DE LYON, FRANCE, <b>PH. GOUDEAU</b> , UNIVERSITY OF POITIERS, FRANCE	<b>B9-3</b> Synthesis and Elastic Properties of Cr <sub>2</sub> AlC Thin Films by Magnetron Sputtering, <b>D.P. SIGUMONRONG</b> , <b>C. WALTER</b> , <b>T. EL-RAGHY</b> , <b>J.M. SCHNEIDER</b> , RWTH AACHEN UNIVERSITY, GERMANY
2:30 pm	<b>B8-2-4</b> Grain Boundary Sliding Mechanisms in ZrN-Ag, ZrN-Au, and ZrN-Pd Nanocomposite Films, <b>S.M. AOUADI</b> , <b>P. BASNYAT</b> , <b>Y. ZHANG</b> , <b>Q. GE</b> , <b>P. FILIP</b> , SOUTHERN ILLINOIS UNIVERSITY	<b>B9-4</b> Deposition and Characterization of DC Magnetron Sputtered Ti-Al-C and Ti-(Al <sub>1-x</sub> Si <sub>x</sub> )-C Thin Films, <b>O. WILHELMSSON</b> , <b>E. LEWIN</b> , UPPSALA UNIVERSITY, SWEDEN, <b>J.E. EMMERLICH</b> , <b>P.E. EKLUND</b> , <b>H.H. HÖGBERG</b> , <b>L. HULTMAN</b> , LINKÖPING UNIVERSITY, SWEDEN, <b>U. JANSSON</b> , UPPSALA UNIVERSITY, SWEDEN
2:50 pm	<b>B8-2-5</b> Thermal Stability, Oxidation and Wear Resistance of Cr-Cu Based PVD Metallic Coatings, <b>K. KANAKIS</b> , <b>O. JIMENEZ</b> , UNIVERSITY OF SHEFFIELD, UNITED KINGDOM, <b>M.A. BAKER</b> , <b>M.A. MONCLUS</b> , UNIVERSITY OF SURREY, UNITED KINGDOM, <b>A. LEYLAND</b> , UNIVERSITY OF SHEFFIELD, UNITED KINGDOM, <b>A. MATTHEWS</b> , THE UNIVERSITY OF SHEFFIELD, UNITED KINGDOM	<b>B9-5</b> Si - the Weak Link in Ti <sub>3</sub> SiC <sub>2</sub> MAX Phases; Thermal Stability and High-Temperature Friction Measurements of (0001)-Oriented Thin Films, <b>J.E. EMMERLICH</b> , LINKÖPING UNIVERSITY, SWEDEN, <b>M. RESTER</b> , ACADEMY OF SCIENCE, AUSTRIA, <b>O. WILHELMSSON</b> , UPPSALA UNIVERSITY, SWEDEN, <b>G. GASSNER</b> , UNIVERSITY OF LEOBEN, AUSTRIA, <b>H. HOEGBERG</b> , LINKÖPING UNIVERSITY, SWEDEN, <b>U. JANSSON</b> , UPPSALA UNIVERSITY, SWEDEN
3:10 pm	<b>B8-2-6</b> New PVD Arc Coatings Tailored for Sophisticated Cutting Tools, <b>M. ARNDT</b> , METAPLAS IONEN OBERFLAECHEVEREDELUNGSTECHNIK GMBH, GERMANY	<b>B9-6</b> Nucleation, Growth, and Phase Stability of Magnetron Sputtered Ti <sub>2</sub> AlN MAX Phase Thin Films, <b>M. BECKERS</b> , <b>N. SCHELL</b> , <b>A. MÜCKLICH</b> , <b>R.M.S. MARTINS</b> , <b>W. MÖLLER</b> , FORSCHUNGSZENTRUM ROSSENDORF, GERMANY, <b>L. HULTMAN</b> , LINKÖPING UNIVERSITY, SWEDEN
3:30 pm		<b>B9-7</b> Stability of Interface in Fe/Ti Nanometer-Scale Multilayers, <b>T. CHEN</b> , DALIAN UNIVERSITY OF TECHNOLOGY, CHINA, <b>Z.L. WU</b> , <b>B.S. CAO</b> , DALIAN UNIVERSITY OF TECHNOLOGY, CHINA, <b>M.K. LEI</b> , DALIAN UNIVERSITY OF TECHNOLOGY, CHINA
3:50 pm	<b>B8-2-8</b> Multilayered Adaptive Nanocomposite Coatings Exhibiting Low Friction Throughout a Broad Temperature Range, <b>C. MURATORE</b> , <b>J.J. HU</b> , <b>A. KORENYI-BOTH</b> , <b>A.A. VOEVODIN</b> , AIR FORCE RESEARCH LABORATORY	<b>B9-8</b> Electronic Structure and Elastic Properties of Nanolaminated Phases, <b>D. MUSIC</b> , <b>J.M. SCHNEIDER</b> , RWTH AACHEN UNIVERSITY, GERMANY
4:10 pm	<b>B8-2-9</b> Investigation of Processing Parameters for Pulsed Closed-Field Unbalanced Magnetron Co-Sputtered Titanium Carbide Thin Films, <b>J.M. ANTON</b> , <b>B. MISHRA</b> , <b>J.J. MOORE</b> , COLORADO SCHOOL OF MINES, <b>A.J. REES</b> , HIDDEN ANALYTICAL LTD., <b>W.D. SPROUL</b> , REACTIVE SPUTTERING CONSULTANTS	<b>B9-9</b> On the Heat Capacities of M <sub>2</sub> AlC (M = Ti, V, Cr) Ternary Carbides, <b>H. DRULIS</b> , <b>M. DRULIS</b> , INSTITUTE OF LOW TEMPERATURE AND STRUCTURE RESEARCH PAS, POLAND, <b>S. GUPTA</b> , <b>T. EL-RAGHY</b> , <b>M.W. BARSOUM</b> , DREXEL UNIVERSITY
4:30 pm	<b>B8-2-10</b> Deposition and Characterization of Hybrid Filtered Arc-Magnetron Multilayer Nanocomposite Cermet Coatings for Advanced Tribological Applications, <b>V.I. GOROKHOVSKY</b> , <b>C. BOWMAN</b> , ARCOMAC SURFACE ENGINEERING, LLC, <b>P.E. GANNON</b> , MONTANA STATE UNIVERSITY-BOZEMAN, <b>D. VANVOROUS</b> , ARCOMAC SURFACE ENGINEERING, LLC, <b>J.J. HU</b> , <b>C. MURATORE</b> , A.A. KORENYI-BOTH, AIR FORCE RESEARCH LABORATORY, HUNTSVILLE, ALABAMA	<b>B9-10</b> Properties of MAX Phases M <sub>2</sub> TiC (M = Ti, Zr, Hf), and M <sub>2</sub> GaN (M = Ti, V, Cr) Using ab Initio Calculations, <b>J.A. WARNER</b> , THE UNIVERSITY OF WISCONSIN-MADISON, <b>S.K.R. PATIL</b> , <b>S.V. KHARE</b> , THE UNIVERSITY OF TOLEDO
4:50 pm	<b>B8-2-11</b> Nanocomposite nc-MeC/a-C Thin Films for Electrical Contact Applications, <b>E. LEWIN</b> , <b>O. WILHELMSSON</b> , <b>U. JANSSON</b> , UPPSALA UNIVERSITY, SWEDEN	
5:10 pm	<b>B8-2-12</b> Effects of Heat Treatment on Structural Properties of Co <sub>3</sub> Pt Thin Films, <b>P. DAVID</b> , <b>E.I. MELETIS</b> , <b>R. MAHARSIA</b> , LOUISIANA STATE UNIVERSITY	

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