

# Table of Contents

**Preface****Diagnostics in Reactive Plasmas with Optical Emission Spectroscopy, Probe Measurement and Energy-Mass Spectrometry**

P. Awakowicz 3

**Crystallography and Microstructure of Thin Films Studied by X-Ray and Electron Diffraction**

R.A. Schwarzer 23

**Surface and Thin Film Analysis with Electron and Mass Spectrometric Techniques**

A. Wucher 61

**The Manufacture of Thin Film Transistors and Color Filters for Flat Liquid Crystal Displays**

E. Lueder 87

**Doping Diamonds and Diamond Films for Electronic Applications**

R. Kalish 97

**Recent Results on Reactive Magnetron Sputtering for High-Rate Deposition of Ceramic Compound Films**

A. Billard and C. Frantz 107

**Fabrication of Micro- and Nanostructures**

R. Kassing 119

**Modelling of PVC Processes**

J. Machet, C. Gautier-Picard, P. Cledat and O. Piot 131

**Real Time Optical Method of Stress Measurements in Thin Films**

G. Moulard, G. Contoux, G. Motyl and M. Courbon 141

**Spectroellipsometric Method for Process Monitoring of Semiconductor Thin Films and Interfaces**

R. Brenot, M. Kildemo and B. Dréville 151

**Giant Magnetoresistive Sensors for Industrial Applications**

J. Wecker, W. Clemens and E. Hufgard 159

**Bioactive Films**

A. Hengerer, E. Prohaska, J. Decker, S. Hauck, E. Yacoub, S. Kößlinger, U. Reischl, S. Drost and H. Wolf 169

**In-Situ Control of Stoichiometry in Room Temperature MBE-Growth of ZrO<sub>2</sub> Thin Films Using a Novel Hyperthermal Oxygen Atom Source**

E. Wisotzki, H. Hahn and G.B. Hoflund 181

**Surface Analysis of Hard Coatings Deposited by Modified Pulse Arc Process**

K. Keutel, H. Fuchs, C. Edelmann and H. Mecke 185

**High Rate Deposition of Thick Oxide Layers on Plastic Substrates**

H. Morgner, M. Neumann, M. Krug and S. Straach 189

**Cathodic Arc Evaporation - A Versatile Tool for Thin Film Deposition**

F. Richter, G. Krannich, M. Kühn, S. Peter and C. Spaeth 193

**Thin Film Thermo-Mechanical Sensors Embedded in Metallic Structures**

T. Golnas and F.B. Prinz 201

**Novel Three Dimensionally Integrated Thin Film Color Detector for Digital Signal Processing**

D. Knipp, H. Stiebig, O. Kluth and H. Wagner 205

**Piezo-Spectroscopic Stress Measurement near PZT-Microstructures on Silicon**

R. Krawietz, W. Pompe, A. Gerbatsch, V. Sergio and L.C. Ciacchi 211

**Photoinduced Effects in Thin Amorphous Chalcogenide Films**

K. Petkov 215

**Optimized Amorphous Silicon Based Two-Terminal Thin Film Detectors for Color Recognition**

J. Zimmer, D. Knipp, H. Stiebig and H. Wagner 221

**Material-Selective Planarization of Oxide Layers: A Novel Technology**

T. Detzel and P. Hanesch 227

<b>Depth Profiling of Thin TiSi<sub>x</sub>-Films on Silicon Carbide by SNMS</b>	231
R. Getto, J. Freytag, M. Kopnarski and H. Oechsner	
<b>Flowfill-Process as a New Concept for Inter-Metal-Dielectrics</b>	235
U. Höckele, W. Kröninger, G. Pfeiffer, M.M. Frank, J. Marktanner and K. Beekmann	
<b>Copper Metallization of Submicron Trenches with Pulsed Vacuum Arc</b>	239
P. Siemroth, P. Wenzel, T. Witke and B. Schultrich	
<b>High Resolution TEM Investigations of Nanostructures in Hard Amorphous Carbon Films</b>	243
H. Banzhof, K. Brand, H. Lichte, A. Luft, F.-. Meyer, H.-. Scheibe, B. Schultrich and H. Ziegele	
<b>Properties of Si<sub>3</sub>N<sub>4</sub>-Layers Deposited by Medium Frequency Twin Magnetron Sputtering</b>	247
M. Ruske, G. Bräuer, J. Pistner, J. Szczyrbowski and A. Źmelty	
<b>On the Initial Cubic Phase Nucleation in Boron Nitride Films</b>	251
J. Ye and H. Oechsner	
<b>Structure, Composition and Residual Stresses of Magnesium Fluoride Thin Films Deposited by Direct Evaporation</b>	255
L. Dumas, J.-. Robic and Y. Pauleau	
<b>Gradient Interface Layers to Improve c-BN Thin Film Adhesion</b>	259
R. Freudenberg, S. Reinke, W. Kulisch, R. Fischer, J. Zweck, A. Bergmaier and G. Dollinger	
<b>Microhardness, Microstructure and Composition Behavior of Stainless Steel 304 Laser Surface Alloyed with Silicon</b>	263
Y. Isshiki, H. Nakai and M. Hashimoto	
<b>Titanium Nitride - Silicon Nitride Composite Coatings Deposited by Reactive Magnetron Sputtering</b>	267
J. Patscheider, M. Diserens and F. Lévy	
<b>Infrared Analysis of Boron Nitride Thin Films</b>	269
M.F. Plass, W. Fukarek, A. Kolitsch and W. Möller	
<b>Transferred Layers Properties in Dry Sliding Contact of Copper/Carbon-Carbon Composite Couple</b>	273
A. Samah, M. El Mansori, R. Bedri and D. Paulmier	
<b>Evaluation of Stiffness, Hardness and Adhesion of Thin Films</b>	275
S. Schädlich, D. Schneider and B. Schultrich	
<b>Residual Stress Evolution by the ex-situ Annealing of TiN Thin Films Deposited on Steel Substrates</b>	279
M. Ye, G. Berton, J.L. Delplancke, M.-. Delplancke, L. Segers, R. Winand and K. De Bruyn	
<b>Filtering Shields in Vacuum-Arc Plasma Sources</b>	283
I.I. Aksenov and V.M. Khoroshikh	
<b>Vacuum-Arc Systems for Depositing 'Drop-Free' Coatings onto Inner Surfaces</b>	287
I.I. Aksenov, V.M. Khoroshikh, V.A. Belous and S.A. Leonov	
<b>Coating Deposition by Condensing the Particle Flux from the Target Sputtered in the Low-Pressure Arc Plasma</b>	291
I.I. Aksenov and V.M. Khoroshikh	
<b>Treatment of Materials in Radial Low-Pressure Arc Plasma Streams</b>	295
I.I. Aksenov and V.M. Khoroshikh	
<b>Study of a Pulsed DC Glow-Discharge Used for Plasma-CVD with an Ultrafast Videosystem and a Langmuir-Probe</b>	299
T.A. Beer, D. Heim, J. Laimer and H. Störi	
<b>Ion Sputtering of Metals in a System with a Thermionic Inert Gas Plasma Source</b>	303
V.A. Belous and G.I. Nosov	
<b>Ion Nitriding of Steels in a System with a Thermionic Gas Plasma Source</b>	307
V.A. Belous and G.I. Nosov	
<b>Optical Emission Spectroscopy in High Target Powder Density Magnetron Source</b>	311
A. Brudnik, W. Posadowski and A. Czapla	
<b>Bias Enhanced Nucleation and Growth of Diamond Films on Titanium Substrates</b>	315
R. Fehling, M. Schreck, A. Bergmaier, G. Dollinger and B. Stritzker	
<b>An UHV-Compatible DC Off-Axis Sputtering Device for Reactive Sputtering and Investigation of the Plasma Properties during Niobium Deposition</b>	319
A. Krämer, H. Hammer and A. Schneider	
<b>Vacuum-Arc Evaporator of Metals with an Extended Planar Cathode</b>	323
L.P. Sablev, A.A. Andreev, V.V. Kunchenko and S.N. Grigoriev	

<b>Several Ways to Modify Structural and Morphological Properties of Thin Films Prepared by Reactive Sputtering</b>	327
N. Martin, H. Madjoud, D. Baretti and C. Rousselot	
<b>High Current Metal-Ion Source for Activated Deposition</b>	331
T. Witke and P. Siemroth	
<b>Field-Induced Deposition of Hard C-H Coatings on the Steel Surface in a Rich-Propane Flame Flow</b>	333
M. Zake and M. Lubane	
<b>CVD Deposition and Characterisation of Highly Conductive ZnO</b>	339
B. Hahn, M. Wörz, G. Heindel, E. Pschorr-Schoberer and W. Gebhardt	
<b>Effects of Reaction Temperature on the Physical Properties of Chemically Deposited CdS Films</b>	343
S.J. Castillo, M. Sotelo-Lerma, I.A. Neyra, M.B. Ortúñ, R. Ramírez-Bon and F.J. Espinoza-Beltrán	
<b>Phase Change during the Initial of Ni<sub>30</sub>Fe<sub>70</sub>(Invar) Films on MgO(001) by DC-Biased Plasma-Sputter-Deposition</b>	347
J.P. Yang, K. Makihara, H. Nakai, J.L. Shi, M. Hashimoto, A. Barna and P.B. Barna	
<b>Thermal- and Photo-Induced Changes of the Optical Properties of Amorphous As<sub>3</sub>Se<sub>2</sub> Thin Films</b>	353
J.M. González-Leal, E. Márquez, R. Prieto-Alcón, A.M. Bernal-Oliva, J.J. Ruiz-Pérez and C. Corrales	
<b>Structural Investigations of Sputtered Thin Films with X-Ray Absorption Techniques</b>	357
D. Lützenkirchen-Hecht, A. Krämer, H. Hammer and R. Frahm	
<b>Thin Film Properties of Ge-Containing Chalcogenide Glasses</b>	361
K. Petkov, R. Todorov and D. Kozuharova	
<b>A New Method for the Optical Characterization of Inhomogeneous Thin Films Based Only on Spectroscopic Reflection Measurements</b>	363
J.J. Ruiz-Pérez, E. Márquez, J.M. González-Leal, D. Jiménez-Garay and D. Minkov	
<b>Solid Solution Cd<sub>x</sub>Zn<sub>1-x</sub>S Thin Films Grown by Atomic Layer Epitaxy and Successive Ionic Layer Adsorption and Reaction Techniques</b>	367
M.P. Valkonen, M. Ritala, S. Lindroos and M. Leskelä	
<b>High Rates of Diamond Deposition with Various Crystals Sizes by Combustion Flame Method</b>	373
T. Le Huu, D. Paulmier, M. Schmitt and E.K. Kadiri	
<b>Tribological Behaviour of Diamond Coatings Obtained by Combustion Flame Process</b>	377
M. Schmitt, D. Paulmier and T. Le Huu	
<b>Influence of Plasma Conditions on the Deposition of Superhard Amorphous Carbon Films by Laser and Arc Methods</b>	381
B. Schultrich, F.-. Meyer, H.-. Scheibe, T. Witke and H. Ziegele	
<b>Deposition and Characterization of Metal Containing Amorphous Hydrocarbon Films (Me-C:H) Prepared by DC Magnetron Sputtering</b>	383
C. Specht, J. Schroeder, R. Wittorf, M. Grischke and K. Bewilogua	
<b>Correlation between Deposition Rate and Hardness of Remote PECVD Silicon Oxide Films</b>	389
C. Bayer and P.R. von Rohr	
<b>Study of the Growth Mechanisms and Properties of (Cr,O,N) Films Deposited by Vacuum Arc Evaporation</b>	393
C. Gautier-Picard and J. Machet	
<b>Measurements of the Loss Probability of Nitrogen Atoms versus Temperature on Aluminium</b>	397
L. Lefèvre, T. Belmonte, T. Czerwiec, A. Ricard and H. Michel	
<b>Theoretical Investigations of the Multitarget Reactive Sputtering Process: Application to the Titanium - Chromium - Oxygen System</b>	401
N. Martin and C. Rousselot	
<b>On the Use of SNMS for the Manufacture Control of Ag Colloid Containing Sol-Gel Fillms on Glass</b>	407
W. Bock, B. Kutsch, M. Kopnarski and H. Oechsner	
<b>Self Organization of Nanostructures during Surface Segregation of S on Ti</b>	411
R. Müller and H. Oechsner	

<b>Direct Writing of Metallic Nanostructures by Means of Metal Colloids</b>	413
G. Dumpich, J. Lohau, E.F. Wassermann, M. Winter and M.T. Reetz	
<b>Amorphous and Crystalline States in Thin Films of N<sub>2</sub>O</b>	419
N.V. Krainyukova and M.A. Strzhemechny	
<b>Thin Film Electrodes for Capacitive Chemo- and Biosensors: An Optimization of the Electrodes Geometry</b>	
V.M. Mirsky, M. Riepl, C. Krause, I. Novotný, M. Splonskowski, V. Rehacek, V. Tvarocek, H.J. Hummel and O.S. Wolfbeis	423
<b>Capacitive Study of Self-Assembled Alkylthiol Monolayers: Surface Charge Effects and Kinetics of Surfactants Adsorption</b>	
R. Schweiß, V.M. Mirsky and O.S. Wolfbeis	427
<b>New Class of Thin Amorphous Films Produced by PE CVD from Organic Compounds of Carbon Family</b>	
J. Tyczkowski and B. Pietrzyk	431
<b>Effect of Tensile Stress-Annealing on the Magnetical Behaviour of Some Thin Amorphous Ribbons for Fluxgate Sensors</b>	
E.D. Diaconu, H. Chiriac, H. Hoffmann, C. Ioan, C. Moldovanu and M. Macoviciuc	437
<b>Magnetic Domains in Microstructured Thin Films with Perpendicular Anisotropy</b>	
B. Lanchava, K. Prügl, S. Kreuzer, N. Nestle and H. Hoffmann	441
<b>Micromagnetics of Magnetic Multilayers</b>	
B. Lanchava, K. Prügl and H. Hoffmann	445
<b>Why Evaporated Permalloy/Cu Multilayers Do not Exhibit GMR Effect: In-situ Transport Properties</b>	
T. Luciński, G. Reiss, N. Mattern and R. Rank	449
<b>Structure of Laser-Deposited Fe/Al Multilayers</b>	
J. Noetzel, H. Geisler, A.I. Gorbunov, R. Dietsch, H. Mai, A. Mensch, W. Möller, W. Pompe, H. Reuther, A. Tselev, E. Wieser and H. Worch	455
<b>Investigations in the Structure Properties of Magneto-optical Multilayers with Fe, Tb and Nd</b>	
T. Schmidt, M. Unger, R. Scherschlicht and H. Hoffmann	459
<b>Effect of Sm Concentration and Ar Sputtering Gas Pressure on Magnetic Properties of SmCo/Cr Films</b>	
S. Takei, A. Morisako and M. Matsumoto	463
<b>Magneto-Optical Fe/Tb/Nd/Tb Multilayers: Anisotropy and Kerr Rotation</b>	
M. Unger, T. Schmidt, R. Scherschlicht and H. Hoffmann	467
<b>Theoretical Analysis of the Evolution of Composition Profiles in Nanoscale Multilayers</b>	
M. Hentschel, M. Bobeth, G. Diener and W. Pompe	473
<b>Coulomb Blockade and Single Electron Effects in Arrays of Selforganized Ultrasmall Metal Clusters Observed at Room Temperature</b>	
F. Kreupl, J. Vancea, L. Risch and H. Hoffmann	477
<b>Fractal Analysis of Island Structures of Al Thin Films</b>	
E. Kusano, Y. Kuroda, A. Satoh, M. Kitagawa, H. Nanto and A. Kinbara	479
<b>Magnetic and Magneto-Optical Properties of Composite Films of Ferromagnetic Ultrafine Particles Dispersed in Polymethyl Methacrylate</b>	
K. Yamaguchi, T. Sato, Y. Kato, M. Inoue and T. Fujii	483
<b>Optical Properties of Coatings with Cu and Copper Oxide Colloidal Particles in a SiO<sub>2</sub> Matrix</b>	
F.J. Espinoza-Beltrán, R. Bernal, J. Manzanares-Martínez, F.J. García-Rodríguez, J.F. Pérez-Robles, R. Ramírez-Bon, Y.V. Vorobiev and J. González-Hernández	489
<b>In Situ Preparation of Metal, Metaloxide and Metalnitride Films by Ion Beam Sputtering</b>	
H. Hammer, H. Busse and R. Kiefer	493
<b>Texture Control of TiN Films Deposited by a Dual Ion Beam IBAD</b>	
M. Schafft and H. Oechsner	497
<b>Influence of Deposition Parameters on the Properties of Titanium Nitride Films Formed by Ion Beam Assisted Evaporation</b>	
D. Wolff and H. Oechsner	499
<b>Spin Tunneling and Coulomb Blockade in Co-Al<sub>2</sub>O<sub>3</sub>-Permalloy Tunnel Junctions</b>	
H. Brückl, H. Vinzelberg, J. Kretz, I. Mönch and G. Reiss	503

<b>Ferromagnetic Resonance in Granular Co/Ag and NiFe/Ag Multilayers</b>	505
J. Dubowik, F. Stobiecki, B. Szymański and K. Röll	
<b>Giant Magnetostriiction in TbFe/FeCo Multilayers</b>	509
A. Ludwig, E. Quandt and J. Mencik	
<b>Influence of the Annealing Process on the GMR Effect in Permalloy/Copper Multilayers</b>	513
F. Stobiecki, T. Luciński, R. Gontarz and M. Urbaniak	
<b>Presence and Absence of Giant Magnetoresistance in Sputtered and Evaporated Permalloy/Copper Multilayers</b>	517
G. Reiss, L. v. Loyen, T. Luciński, D. Elefant, H. Brückl and C. Rehm	
<b>Application of Bioactive Layers for Chemical Sensors and Analysis Systems</b>	521
S. Drost, S. Hauck, E. Yacoub-George, H. Wolf, S. Koch, C. Kößlinger, B. Hillerich and K. Hieber	
<b>Simulations of the Electrical Properties of Bilayer Lipid Membrane</b>	525
R. Ivanic and V. Tvarocek	
<b>Pseudomorphous Ti Thin Layer in Ti/MgO Superlattices and on MgO(001) Substrates</b>	531
T. Kado	
<b>Unusual Growth Modes in Pulsed Laser Deposition of ZnSe Thin Films on GaAs</b>	535
L.M. Kukreja, P. Bhattacharya, T. Ganguli, B.M. Pandey and K.C. Rustagi	
<b>Study of the Growth Mechanisms of Chromium Nitride Films Deposited by Ion Plating</b>	539
O. Piot and J. Machet	
<b>Effect of Schwoebel Barriers on Growth Mechanisms and Morphology of Thin Film</b>	543
V.I. Trofimov, V.G. Mokerov and A.G. Shumyankov	