

TECHNICAL PROGRAM

SUNDAY, 24 MAY

18:00 – 20:00 REGISTRATION
20:00 – 21:30 WELCOME COCKTAIL PARTY

MONDAY, 25 MAY

09:00 – 09:15 CONFERENCE OPENING

PLENARY SESSION

Chairman Prof. Steve Bull

09:15 – 10:05 *Invited Keynote Paper*
**Srearch for Ultrahard Materials & Recent Progress in
the Understanding, Preparation and Properties of
Nanocomposites**

S. Veprek¹, R. F. Zhang¹, M. G. J. Veprek-Heijman¹, S. H. Sheng¹ and A. S. Argon²

¹Department of Chemistry, Technical University Munich, Lichtenbergstr. 4, D-85747 Garching, Germany;

²Department of Mechanical Engineering, Massachusetts Institute of Technology, 77 Massachusetts Avenue, Cambridge, MA 02139, USA

10:05 – 10:55 *Invited Keynote Paper*
**Ultrananocrystalline Diamond/Amorphous Carbon
Composite Films – Deposition, Characterization and
Applications**

C. Popov¹, W. Kulisch² and J.P. Reithmaier¹

¹Institute of Nanostructure Technologies and Analytics (INA), University of Kassel, Germany

²Institute for Health and Consumer Protection, European Commission Joint Research Centre, Ispra, Italy

10:55 – 11:15 ***COFFEE BREAK***

11:15 – 11:35 **Nanosized Silicon Carbide Obtained from Rice Husks**
D.D.Radev, I.Uzunov
Institute of General and Inorganic Chemistry, BAS
Acad. G. Bontchev Str, Bl.11, 1113 Sofia, Bulgaria

11:35 – 11:55 **Atomic Layer Deposition (ALD), enhanced thin films**
N. Isomäki, Israel Ayala
Beneq Oy, P.O Box 262, FI-01511 Vantaa, Finland

11:55 – 12:15 **High Vacuum Plants for reactive sputter deposition
of multi-layer stacks**
Milko Angelov
Milko Angelov Consulting Co. Ltd. 59, Sankt Petersburg
Blvd, 4017, Plovdiv, Bulgaria

12:30 – 13:30 ***LUNCH***

PLENARY SESSION

Chairman Prof. Efsthios Polychroniadis

Invited Keynote Paper
14:00 – 14:50 **Nanomechanics of coatings for electronic and optics
applications**
S.J. Bull
Chemical Engineering and Advanced Materials, Newcastle
University,
Newcastle Upon Tyne, NE1 7RU, UK

Invited Keynote Paper
14:50 – 15:40 **Obtaining and characterization of some hard coatings –
AlN and diamond like carbon (DLC)**
B. Mednikarov
Central Laboratory of Photoprocesses (CLF)-”Acad.
J.Malinowski” Bulgarian Academy of Sciences (BAS),
Acad. G. Bonchev St. Bl 109, 1113 Sofia, Bulgaria

15:40 – 16:00 Comparison between Nanoindentation Method and Hybrid Microindentation-Finite Element Simulation Method for Determination of Mechanical Properties of Electrodeposited Copper Films

S. Cherneva¹, M. Yordanov², D. Stoychev³, R. Iankov¹

¹Institute of Mechanics, Bulgarian Academy of Sciences, BG-1113 Sofia, Acad. G. Bonchev str., bl. 4

²Technical University, BG 8800 Sliven, Burgasko shoes str., bl. 59

³Institute of Physical Chemistry, Bulgarian Academy of sciences, BG-1113 Sofia, Acad. G. Bonchev str., bl. 11

16:00 – 16:20 Advanced mechanical Surface Testing for thin hard coatings by Nanoindentation, Scratch and Tribology investigation

Gregory Favaro, François Davin

CSM Instruments, Rue de la Gare 4, CH-2034 Peseux - Switzerland

16:20 – 16:40 Industrial Applications of Hard, Tough and Superhard Nanocomposite Coatings

S. Veprek

Technical University Munich, Lichtenbergstr. 4, D-85747 Garching, Germany

16:40 – 17:00 *COFFEE BREAK*

17:00 – 18:30 POSTER SESSION

NMI Nanomaterials and thin films for solid-state electronics and energy technologies.

NM1-P1 Preparation and Characterization of Submicropores in MnO₂ Porous Semiconductor Films

L.Skatkov¹, V.Gomozov², S.Deribo²

¹PCB "Argo", Israel

²NTU "KhPI", Ukraine

- NM1-P2** **High effective selective absorbing coating for solar thermal collectors**
R. Kirilov, P.Stefchev, K.Ivanova, Tzv. Alexieva, Chr.Dikov
Laboratory for Solar Energy and New Energy Sources
(CLSENES), BAS, Bulgaria
- NM1-P3** **Thickness Dependence of Surface and Interface Phonon Polariton Modes in InN/AlN Nanolayers**
E. Valcheva, M. Baleva, G. Zlateva
Faculty of Physics, Sofia University, Sofia, Bulgaria
Faculty of Medicine, Sofia University, Sofia, Bulgaria
- NM1-P4** **Influence of thermal annealing on the electrical properties of sputtered Si rich silicon oxide films**
E. Manolov¹, M.A. Curiel², N. Nedev², D. Nesheva¹, J. M. Terrazas², B. Valdez² and R. Machoro³
¹ Institute of Solid State Physics, BAS, Sofia, Bulgaria
² Instituto de Ingeniería, Universidad Autónoma de Baja California, México
³ Centro de Nanociencias y Nanotecnología, Universidad Nacional Autónoma de México, B.C. México.
- NM1-P5** **Ferromagnetic Nanomaterials Obtained by Thermal Decomposition of Ferrocene**
N. Koprinarov¹, M. Konstantinova¹, M. Marinov², T. Ruskov³, P. Krastev³, I. Spirov³, Ts. Tsacheva²
¹SENES, BAS, Sofia, Bulgaria.
²Laboratory of Electron Microscopy and Microanalysis, Institute of Physical Chemistry, BAS, Sofia, Bulgaria.
³Institute for Nuclear Research and Nuclear Energy, BAS, Sofia, Bulgaria.
- NM1-P6** **Preparation and Characterization of Al₂O₃ Thin Films for Catalytic Activity Studies**
G. Atanasova¹, D. Guergova², D. Stoychev², N. Radic³, B. Grbic³, and P. Stefanov¹
¹Institute of General and Inorganic Chemistry
²Institute of Physical Chemistry, BAS, Sofia, Bulgaria
³ChTM, Department of Catalysis and Chemical Engineering, Belgrade, Serbia
- NM1-P7** **High-Quality GaInAsSb and GaAlAsSb layers for thermophotovoltaics grown by Liquid-Phase Epitaxy**

M. Milanova¹, R. Kakanakov¹, G. Koleva¹, P. Vitanov²,
V. Bakardjieva², M. Zamoryanskaya³, T. Popova³

¹Central Laboratory of Applied Physics, Plovdiv, Bulgaria

²Central Laboratory of Solar Energy and New Energy
Sources, Sofia, Bulgaria

³A. F. Ioffe Physico-Technical Institute, St. Petersburg,
Russia

NM1-P8

**Searching for a Suitable Ohmic Metallization Scheme
To GaN/AlGaN Heterostructures for Sub-Micron
Devices**

L. Kolaklieva¹, R. Kakanakov¹, V. Chitanov¹,
P. Dulgerova¹, V. Cimalla²

¹Central Laboratory of Applied Physics, BAS, Plovdiv,
Bulgaria

²Fraunhofer Institut für Angewandte Festkörperphysik,
Germany

NM1-P9

**Investigation of Pulsed Laser Annealing and Thermal
Annealing of CdS Layers Designed for Thin Layer Solar
Cells**

P. Shindov¹, R. Kakanakov², L. Bedikyan²,
S. Kaneva¹, T. Anastasova¹

¹TU – Sofia, Branch of Plovdiv, Plovdiv, Bulgaria

²Institute of Applied Physics – Plovdiv, BAS, Bulgaria

NM1-P10

**Electrical and optical properties of GaAsN and
InGaAsN thin films grown by LPE for solar energy
technologies**

M. Milanova¹, R. Kakanakov¹, G. Koleva¹,
B. Arnaudov², S. Evtimova², P. Vitanov³,
Z. Alexieva³, E. Goranova³, B. Clerjoud⁴

¹Central Laboratory of Applied Physics, 59 St. Petersburg
blvd, 4000 Plovdiv, Bulgaria

²Faculty of Physics, Sofia University, 5 J. Bourchier Blvd,
1164 Sofia, Bulgaria

³Central Laboratory of Solar Energy and New
Energy Sources, 72 Tzarigradsko shaussee blvd., 1784 Sofia,
Bulgaria

⁴Université Pierre et Marie Curie, Institut des NanoSciences
de Paris, rue de Lourmel 140, 75015 Paris, France

NH2 Nanocomposite films hard and superhard coatings, tribological corrosion-resistant coatings

NH2-P1 Deposition and Investigation of ZrN Hard Coatings obtained by ARC-Evaporation.

R. Kakanakov¹, Hr. Bahchedjiev¹, L. Kolaklieva¹, T. Cholakova¹, Sv. Evtimova², E. Polyhroniadis³, Eleni Pavlidou³, Ioannis Tsiaousis³

¹Institute of Applied Physics, BAS, Plovdiv, Bulgaria

²Department of Semiconductor Physics, Faculty of Physics, Sofia University

³Physics Department, Aristotle University of Thessaloniki, Thessaloniki, Greece

SI3 Surfaces and interfaces

SI3-P1 Wetting ability of Ag based molten alloys on graphite substrate

Z. Weltsch¹, A. Lovas¹, J. Takács¹, A. Cziráki², G. Tichy², A.L. Toth³, L. Illés³

¹ Budapest University of Technology and Economics, Department of Vehicles Manufacturing and Repairing Budapest Hungary

²Dept. of Materials Physics, Eötvös Univ. Budapest Hungary

³MTA-MFA Konkoly-Thege u 29-33, H-1121 Budapest Hungary

SI3-P2 Computer modeling of the system power source-load for electro-discharge polishing

A. Parshuta¹, V. Chitanov², L. Kolaklieva², R. Kakanakov²
¹220098, Belarus, Minsk, Rafieva 94-282.

²Central Laboratory of Applied Physics, BAS, Plovdiv, Bulgaria.

ND4 Nano-sensors&Nanodevices&Nanosystems

ND4-P1 Characterization and ethanol sensing properties of Pt doped Sn-O-Te thin films

B.Georgieva, I. Podolesheva, G. Spassov
Central Laboratory of Photoprocesses "Acad. J. Malinowski", BAS, Sofia, Bulgaria

- ND4-P2** **XPS Characterization of MoO₃ Films Deposited on Quartz Plates**
T. Tinchova¹, A. Baeva¹, Z. Raicheva², V. Lazarova² and P. Stefanov¹
¹Institute of General and Inorganic Chemistry, BAS, Sofia
²Institute of Solid State Physics, BAS, Sofia, Bulgaria.
- ND4-P3** **The Influence of Quartz Resonator Design and Thin Metaloxide Layers on QCM Parameters**
Z. Raicheva, V. Georgieva, L. Spassov, V. Gadjanova, L. Vergov, Ts. Angelov, M. Atanassov, Y. Lazarov
“Georgi Nadjakov” Institute of Solid State Physics,
Bulgarian Academy of Sciences, 72 Tzarigradsko chaussee
blvd., 1784 Sofia, Bulgaria
- ND4-P4** **Carbon nanotubes/PMMA composite gas sensor**
Vasilij Smatko¹, Peter Lobotka¹, Eva Kovacova¹, Viera Skakalova² and Viera Jablonska³
¹Institute of Electrical Engineering, Slovak Academy of Sciences, Dubravska cesta 9, 841 04 Bratislava, Slovak Republic
²Max Planck Institute for Solid State Research,
Heisenbergstr. 1, 70569 Stuttgart, Germany
³Institute of Informatics, Slovak Academy of Sciences,
Dubravska cesta 9, 845 07 Bratislava, Slovak Republic

NT5 Technology of nanostructures and advanced thin film.

- NT5-P1** **About the Surface Hardening of Tool Steels By Electrical Discharge Treatment in Electrolyte**
D. Krastev, B. Yordanov
Department of Physical Metallurgy and Heat Equipment,
University of Chemical Technology and Metallurgy
8 Kl. Ohridski Blvd, 1756 Sofia, Bulgaria
- NT5-P2** **Synthesis of “Main – Chain” Type Polyimide Matrix with a Chemically Bound Azo Group**
A. Georgiev¹, V. Strijkova², D. Dimov,² E. Spassova,²
J. Assa², G. Danev²
¹University of Chemical Technology and Metallurgy,
Department of Organic Chemistry, Sofia, BULGARIA
²Central Laboratory of Photoprocesses “Acad. J. Malinowski” , BAS, Sofia, BULGARIA

NT5-P3 **Pressureless Sintering of Boron Carbide-based Superhard Materials**
D.D.Radev
Institute of General and Inorganic Chemistry, Sofia, Bulgaria

EQ6 Technologies and equipment for deposition of nanocomposite films

EQ6-P1 **An arc discharge by closely situated electrodes for synthesis of nanostructures**
N. Korpınarov¹, M. Marinov², M. Konstantinova¹
¹Central Laboratory for Solar Energy and New Energy Sources, BAS, Bulgaria;
²Institute of Physical Chemistry, BAS, Bulgaria

TC7 Thin film characterization

TC7-P1 **Thickness-dependent interface parameters of silicon oxide films on plasma hydrogenated silicon**
S. Alexandrova¹, A. Szekeres²
¹Department of Applied Physics, Technical University, Sofia, Bulgaria
²Institute of Solid State Physics, BAS, Sofia, Bulgaria.

NC8 Structure and properties of nanomaterials/nanocomposites.

NC8-P1 **Nanosized Titania Supports for NiMo Hydrodesulfurization Catalysts**
N.G. Kostova¹, L.D. Dimitrov², A.A. Spojakina¹, K. Jiratova³
¹Institute of Catalysis, BAS, Sofia, Bulgaria
²Central Laboratory of Mineralogy and Crystallography, BAS, Sofia, Bulgaria
³Institute of Chemical Process Fundamentals, Academy of Sciences of Czech Republic, Prague, Czech Republic

NC8-P2 **Applications of Plasma-Chemically Produced Nanodispersed Si₃N₄ for Modification of Tool Steels**
B. Yordanov, D. Krastev
Department of Physical Metallurgy and Heat Equipment, University of Chemical Technology and Metallurgy, Sofia, Bulgaria

NC8-P3 **Substitution and size effects in nano- and microcrystalline barium hexaferrites $\text{BaFe}_{12-x}\text{X}_x\text{O}_{19}$ ($\text{X}=\text{Co},\text{Ti}; \text{Sc}$)**
Kiril Krezhov
Institute for Nuclear Research and Nuclear Energy, BAS
Sofia, Bulgaria

A9 Industrial application of hard and superhard coatings.

A9-P1 **Some Medical Applications of Nanomaterials**
V. Lovchinov¹, P. Simeonova, I. Radulov, I. Nedkov²
¹Laboratory of Environmental Physics, Institute of Solid State Physics, BAS, Sofia, Bulgaria
²Institute of Electronics, Bulgarian Academy of Sciences, 1784 Sofia, Bulgaria

A10 Industrial application of thin films technology

A10-P1 **Energy – Saving LED Lighting**
R. Kakanakov, S. Zahariev, M. Zaharieva, M. Neshev,
L. Bedikyan
Central Laboratory of Applied Physics, Plovdiv, BAS

A10-P2 **Thermoelectric Generator Modules as an Alternative Source of Electric Energy**
M.Neshev, L.Bedikyan, St.Zachariev, M.Zacharieva
Central Laboratory of Applied Physics, Plovdiv, BAS

19:00 – 20:00 ***DINNER***

TUESDAY, 26 MAY

PLENARY SESSION

Chairman Prof. Stan Veprek

09:00 – 09:50 ***Invited Keynote Paper***
It's a Long Way to "Superhard" Semiconductors ...
Ch. Brylinski
Université Claude Bernard Lyon 1, France

Invited Keynote Paper

09:50 – 10:40

Wide band gap semiconductors for MEMS and NEMS applications

V. Cimalla¹, C.-C. Röhlig¹, V. Lebedev¹, O. Ambacher¹, K. Tonisch², F. Niebelschütz², K. Brückner², M. Hein², C. Buchheim², and R. Goldhahn²

¹Fraunhofer Institute of Applied Solid State Physics, Tullastraße 72, 79108 Freiburg, Germany

²Institute of Micro- and Nanotechnologies, Technical University of Ilmenau, 98693 Ilmenau, Germany

10:40 – 11:00

COFFEE BREAK

11:00 – 11:20

Experimental-numerical approach for characterization of mechanical properties of thin electrochemically deposited chromium films

S. Cherneva¹, R. Iankov¹, D. Stoychev²

¹Institute of Mechanics, Bulgarian Academy of Sciences, BG-1113 Sofia, Acad. G. Bonchev str., bl. 4

²Institute of Physical Chemistry, Bulgarian Academy of sciences, BG-1113 Sofia, Acad. G. Bonchev str., bl. 11

11:20 – 11:40

Surface-confined Alloy Formation at Epitaxial Interface

Michail Michailov

Institute of Physical Chemistry, Bulgarian Academy of Sciences, 1113 Sofia, Bulgaria

11:40 – 12:00

Electronic and Chemical Properties of $Ce_{1-x}Zr_xO_2$ Thin Films

A.Tsanev¹, D. Guergova², D. Stoychev² and P. Stefanov¹

¹Institute of General and Inorganic Chemistry

²Institute of Physical Chemistry,

Bulgarian Academy of Sciences, 1113 Sofia, Bulgaria

12:00 – 12:20

Characterization of oblique deposited SiO_x films by ellipsometric and IR spectroscopies

A.Szekeres¹, E. Vlaikova¹, T. Lohner², A. L. Toth²,

I. Lisovskyy³, S. Zlobin³, P. E. Shepeliavyy³

¹Institute of Solid State Physics, Bulgarian Academy of Sciences, 72, Tzarigradsko Chaussee blvd., 1784 Sofia, Bulgaria

²Research Institute for Technical Physics and Materials Science, Hungarian Academy of Sciences, Konkoly Thege Miklós út 29-33, H-1121 Budapest, Hungary

³Institute of Semiconductor Physics, National Academy of Sciences of Ukraine, Prospekt Nauki 41, Kiev 03028, Ukraine

12:30 – 13:30 **LUNCH**

PLENARY SESSION

Chairman Prof. Christian Brylinski

Invited Keynote Paper

14:00 – 14:50

Some recent results on the 3C-SiC structural defects

M. Marinova, A. Mantzari, E.K. Polychroniadis

Physics Department, Aristotle University of Thessaloniki
54124, Thessaloniki, Greece

Invited Keynote Paper

14:50 – 15:40

Structural and magnetic properties of nanosized barium hexaferrite powders obtained by microemulsion technique

T. Koutzarova¹, S. Kolev¹, K. Grigorov¹,

Ch. Ghelev¹, A. Zaleski², R. E. Vandenberghe³,

M. Ausloos⁴, C. Henrist⁵, R. Cloots⁵, I. Nedkov¹

¹Institute of Electronics, Bulgarian Academy of Sciences,
1784 Sofia, Bulgaria

²Institute of Low Temperatures and Structural Research,
Polish Academy of Sciences, 50-422 Wroclaw, Poland

³Department of Subatomic and Radiation Physics,
University of Gent, 9000 Gent, Belgium

⁴SUPRATECS, Sart Tilman, B-4000 Liege, Belgium

⁵LSIC, Chemistry Department B6, University of Liege, Sart
Tilman, B-4000 Liege, Belgium

15:40 – 16:00

Modeling of the light emission spectra of InGaN/GaN quantum well with highly doped barriers

B. Arnaudov¹, D. S. Domanevskii², S. Evtimova¹,

Ch. Ivanov¹, R. Kakanakov³

¹Faculty of Physics, Sofia University, 5 J.Bourchier Blvd,
1164 Sofia, Bulgaria

²Belarussian National Technical University, 65
Independence Ave, 220013 Minsk, Republic of Belarus,

³Central Laboratory of Applied Physics, 59 St Petersburg
Blvd, 4000 Plovdiv, Bulgaria

16:00 – 16:20

Specific Heat of Nanocrystals

I. Avramov, M. Michailov

Institute of Physical Chemistry, Bulgarian Academy of
Sciences, 1113 Sofia, Bulgaria

16:20 – 16:40

**The advantage of nanoIndentation testing combined
with in-situ imaging - Tribology studies on structured
surfaces**

Ude Dirk Hangen

Hysitron, Inc.

10025, Valley View Road

55344 Minneapolis

16:40 – 17:00

G200 Features and Results

Krish Narain MBA

Nanoscale Measurements Division,

Agilent Technologies UK Limited, Registered Office: 710

Wharfedale Road, Winnersh Triangle, Wokingham,
Berkshire

17:00 – 17:15

CONFERENCE CLOSING

19:30 – 23:30

CONFERENCE GALA DINNER

WEDNESDAY, 27 MAY

10:00 – 13:00

SOCIAL EVENT