



**International Conference
"Functional materials and
nanotechnologies
FM&NT – 2011"
April 5 – 8, 2011
Riga, Latvia**

Conference Program

Sponsored by ERAF project Nr. 2010/0204/2DP/2.1.1.2.0/10/APIA/VIAA/010

WELCOME

The Organizing Committee kindly welcomes you to the International Baltic Sea Region conference “Functional materials and nanotechnologies” **FM&NT-2011**. The conference is organized in co-operation with projects **ERANET “MATERA”** and **National Research programme in Materials Science of Latvia**.

The purpose of the conference is to bring together scientists, research staff, engineers, and students from universities, research institutes and related industrial companies aware in the field of advanced material science and materials technologies trends and future activities.

Scientific Themes are following:

- **Theoretical research and modeling of processes and materials;**
- **Materials for energetics, renewable energy technologies and photovoltaics;**
- **Multifunctional inorganic, organic and hybrid materials for photonic, micro and nanoelectronic applications and innovative methods for the research of nanostructures;**
- **Advanced technologies for the synthesis and the research of nanostructured materials, nanoparticles, thin films and coatings;**
- **Applications of innovative materials in science and economics.**

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The Organizing Committee sincerely hopes that the Conference will give all the participants new insights into the wide spread development of functional materials and nanotechnologies and will enhance the circulation of information released at the meeting.

On behalf of FM&NT-2011 organizers thank you all for coming and we wish you most successful and enjoyable Conference.

Sponsored by ERAF project Nr. 2010/0204/2DP/2.1.1.2.0/10/APIA/VIAA/010

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April 5	
16:00	Registration
17:00	Welcome party
18:30	

Materials for fuel cells and membranes (Joint session with workshop on ceramic membranes FP7 NASA-OTM project)
Spectroscopy and optical properties
Advanced nuclear energy materials
Materials for alternative energetics
Theory and modeling
Perspective new materials
Nanomaterials and nanostructures
Technologies and methods
Ferroelectrics and related materials

April 6			
8:00	Registration		
9:00	Opening		
9:30	M. Bundule European projects		
9:50	R. Merkle		
10:30	Technical information		
10:40	Conference photo		
10:50	Coffee 10:50 - 11:20		
×	HALL 1 (NASA)	×	HALL 2 (Opt)
11:20	W. Meulenberg	11:20	N. Christensen
11:50	J. Serra	11:50	I. Tale
12:20	V. Hendriksen	12:10	A. Kaminska
		12:30	B. Berzina
12:50	E. Kotomin	12:50	J. Piqueras
13:20	D. Gryaznov	13:10	C. Leonelli
13:40	Lunch 13:40 - 14:40		
×	HALL 1 (Nucl)	×	HALL 2 (Opt)
14:40	M. Freyss	14:40	W. Lojkowski
15:10	Y. Zhukovskii	15:10	D. Millers
15:40	O. Dumbrajs	15:30	K. Joy
		15:50	M. Kirm
16:10	A. Shugai	16:10	T. Shalapska
16:30	B. Kolbasov	16:30	M. Barczak
16:50	J. Kalnins	16:50	L. Dolgov
17:10	Coffee&snacks 17:10 - 17:30		
17:30	Poster session		
19:30			

April 7			
8:00	Registration		
×	HALL 1 (Ener)	×	HALL 2 (Theo)
8:50	Technical info	8:50	Technical info
9:00	C. G. Granqvist	9:00	R. Evarestov
9:30	O. Yanush	9:30	E. Blokhin
9:50	L. Frolova	9:50	A. Bandura
10:10	A. Ukshe	10:10	R. Eglitis
10:30	Coffee 10:30 - 11:00		
11:00	B. Serban	11:00	S. Kulkova
11:20	A. Kalle		
11:40	G. Chikvaidze	11:30	M. Brik
12:00	P. Fursikov	11:50	Y. Shunin
12:20	Lunch 12:20 - 13:20		
×	HALL 1 (Mat)	×	HALL 2 (Nano)
13:20	J. Zimmermann	13:20	S. Rols
13:50	L. Skuja	13:50	A. Volodin
14:10	A. Fedotovs	14:10	V. Bogdanov
14:30	S. Jursenas	14:30	D. Erts
		14:50	J. Andzane
15:00	J. Teteris	15:10	L. Dorogin
15:20	I. Strazdina	15:30	V. Chayauski
15:40	A. Mychko	15:50	J. Zicans
16:10	Coffee 16:10 - 16:30		
16:30	Excursion & Conference dinner		
22:30			

April 8			
×	HALL 1 (Tech)	×	HALL 2 (Ferro)
9:30	K. Schwartz	9:30	V. Trepakov
10:00	D. Tonneau	10:00	J. Petzelt
10:20	J. K. Thomas	10:30	A. Dejneka
10:40	P. Onufrijevs	10:50	O. Malyshkina
11:00	A. Ozols	11:10	J. Dec
11:30	Coffee 11:30 - 12:00		
12:00	V. Fateev	12:00	R. Dittmann
12:20	S. Tyutyunnikov		
12:40	E. Palcevskis	12:30	W. Kleemann
13:00	B. Polyakov	13:00	J. Banys
	HALL 1		
13:40	Closing		
14:00	Goodbye lunch 14:00 - 15:00		

DURING THE CONFERENCE THE EXHIBITION OF SEVERAL COMPANIES WILL BE HELD

Plenary - 40 min
Invited - 30 min
Oral - 20 min

International Conference Functional Materials and Nanotechnologies 'FMNT – 2011' PROGRAM

Tuesday, April 5

16:00 - 17:00	REGISTRATION
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17:00 - 18:30	WELCOME PARTY
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Wednesday, April 6

08:00 - 09:00	REGISTRATION
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HALL 1	OPENING
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Chairman of the conference: A. Sternberg

09:00 – 09:30	A. Sternbergs	Opening	
09:30 – 09:50	M. Bundule	European projects	
09:50 – 10:30	R. Merkle	Mechanistic Insight into Oxygen Exchange on Mixed Conducting Oxides from Experiments and Theory	PL - 1

10:30 – 10:40	Technical Information
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10:40 – 10:50	CONFERENCE PHOTO
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10:50 – 11:20	Coffee
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HALL 1	MATERIALS FOR FUEL CELLS AND MEMBRANES
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11:20 – 11:50	W. Meulenberg	Thin Film Mixed Ionic Electronic Conducting Membranes for Oxygen Separation	INV – 1
11:50 – 12:20	J. Serra	Catalytic Surface Activation of Oxygen Transport Membranes	INV – 2
12:20 – 12:50	P. Hendriksen	Oxygen Transport Membranes – from Material Parameters to Application Oriented Devices	INV – 3
12:50 – 13:20	E. Kotomin	First Principles Modeling of Oxygen Incorporation into Oxygen Permeation Membranes and Sofc Cathodes	INV – 4
13:20 – 13:40	D. Gryaznov	Thermodynamic Calculations on Defects in Perovskites: DFT and Frozen Phonon Method	OR – 1

HALL 2	SPECTROSCOPY AND OPTICAL PROPERTIES
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11:20 – 11:50	N. Christensen	Band-gap “Design” of Semiconducting Nitride Alloys	INV – 8
11:50 – 12:10	I. Tale	Dynamics of Exciton Creation and Decay Processes in Composition – Disordered InGaN Thin Films	OR – 5
12:10 – 12:30	A. Kaminska	Spectroscopy of Yb ³⁺ -doped III-V Semiconductors At Ambient At High Pressure: Experiment, <i>Ab-initio</i> and Crystal Field Studies	OR – 6
12:30 – 12:50	B. Berzina	Defect luminescence of III group element nitrides AlN and hBN	OR – 7
12:50 – 13:10	J. Piqueras	Structure, Fe Solubility and Luminescence of Fe Doped ZnO Nanowires and Nanorods	OR – 8
13:10 – 13:40	C. Leonelli	Industrial Scale Microwave-Assisted Production of Nanoparticles	INV – 9

13:40 – 14:40	LUNCH
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Wednesday, April 6

HALL 1	ADVANCED NUCLEAR ENERGY MATERIALS		
14:40 – 15:10	M. Freyss	First-Principles Study of Uranium and Oxygen Diffusion in Uranium Dioxide UO ₂	INV – 5
15:10 – 15:40	Y. Zhukovskii	First-Principles Simulations on Initial Stage of Uranium Nitride Surface Oxidation	INV – 6
15:40 – 16:10	O. Dumbrajs	European Gyrotrons for ITER	INV – 7
16:10 – 16:30	A. Shugai	Radiation Damage Induced by Swift Heavy Ions in Lu ₂ Al ₅ O ₁₂ Crystals	OR – 2
16:30 – 16:50	B. Kolbasov	Studies of Nanostructures Formed in T-10 Tokamak	OR – 3
16:50 – 17:10	J. Kalnin	Effective Diffusion Coefficient in One Dimensional Model	OR – 4
HALL 2	SPECTROSCOPY AND OPTICAL PROPERTIES		
14:40 – 15:10	W. Łojkowski	Optical Oxygen Nano-sensor	INV – 10
15:10 – 15:30	D. Millers	Short Lived and Stable Defects in Yttrium Stabilized Zirconia Single Crystal	OR – 9
15:30 – 15:50	K. Joy	Photoluminescence of oxygen related defects in sol gel derived nanocrystalline ZrO ₂ thin films	OR – 10
15:50 – 16:10	M. Kirm	Luminescence Spectroscopy of Ca-Apatites under VUV Excitation	OR – 11
16:10 – 16:30	T. Shalapska	5 <i>d</i> -4 <i>f</i> Luminescence of Lanthanide Ions in LiYP ₄ O ₁₂	OR – 12
16:30 – 16:50	M. Barczak	Microstructure and optical properties of TiO ₂ doped with ytterbium synthesized by sol-gel and solar physical vapour deposition process	OR – 13
16:50 – 17:10	L. Dolgov	Plasmon-Coupled Emission From the TiO ₂ :Sm ³⁺ Sol-Gel Film	OR – 14
17:10 – 17:30 Coffee & Snacks			
17:30 – 19:30 POSTER SESSION			

**DURING THE CONFERENCE THE EXHIBITION OF COMPANIES
FANEX and THORLABS
WILL BE HELD**

Thursday, April 7

08:00 – 08:50		REGISTRATION	
HALL 1	MATERIALS FOR ALTERNATIVE ENERGETICS		
08:50 – 09:00	Technical Information		
09:00 – 09:30	C. G. Granqvist	Green Nanotechnologies for Energy Efficient Buildings: A Sketch	INV – 11
09:30 – 09:50	O. Yanush	Thermochromic Glazing Materials for “Zero Net Energy” Houses	OR – 15
09:50 – 10:10	L. Frolova	Nanostructured Pt/ Ti _x Me _{1-x} O ₂ (Me = Nb, Ru) Electrocatalysts for Direct Alcohol Fuel Cells	OR – 16
10:10 – 10:30	A. Ukshe	Cluster Approach to Macroscopic Superprotonic Conductivity	OR – 17
HALL 2	THEORY AND MODELING		
08:50 – 09:00	Technical Information		
09:00 – 09:30	R. Evarestov	Symmetry and Structure of SrTiO ₃ Nanotubes	INV – 14
09:30 – 09:50	E. Blokhin	Phonon Calculations in Perfect and Defective SrTiO ₃ perovskites	OR – 27
09:50 – 10:10	A. Bandura	LCAO Calculations of SrTiO ₃ Nanotubes	OR – 28
10:10 – 10:30	R. Eglitis	Ab initio Calculations of SrTiO ₃ , BaTiO ₃ , PbTiO ₃ , CaTiO ₃ , BaZrO ₃ , SrZrO ₃ and PbZrO ₃ (001) and (011) Surfaces as well as Nb Impurity Segregation towards the SrTiO ₃ Surface	OR – 29
10:30 – 11:00		Coffee	
HALL 1	MATERIALS FOR ALTERNATIVE ENERGETICS		
11:00 – 11:20	B. Serban	Solar Cell Design Using HSAB and Coordination Chemistry Principles	OR – 18
11:20 – 11:40	A. Kalle	Innovative Method of Solar Grade Silicon Production	OR – 19
11:40 – 12:00	G. Chikvaidze	Electron-beam Refining of UMG-Si for Solar Energetics	OR – 20
12:00 – 12:20	P. Fursikov	Hydrogen Sorption Properties of Nanocomposites Mg-RE-Ni and Mg-RE-Ni-C	OR – 21
HALL 2	THEORY AND MODELING		
11:00 – 11:30	S. Kulkova	Halogen Adsorption on III-V Semiconductor (001) Surface	INV – 15
11:30 – 11:50	M. Brik	<i>Ab Initio</i> Calculations of Electronic, Optical, Elastic Properties and Microscopic Treatment of Crystal Field Effects for Some Cubic Crystals	OR – 30
11:50 – 12:10	Y. Shunin	Theoretical Simulations of Fundamental Properties of CNT-Me and GRN-Me Interconnects for Novel Electronic Nanodevices	OR – 31
12:20 – 13:20		Lunch	

Thursday, April 7

HALL 1				PERSPECTIVE NEW MATERIALS			
13:20 - 13:50	J. Zimmermann	Role of Oxygen and the Fluorine-bromine Ratio in the Storage Mechanism of BaFBr:Eu ²⁺	INV – 12				
13:50 – 14:10	L. Skuja	Effects of Temperature on Electron Paramagnetic Resonance of Dangling Oxygen Bonds in Amorphous Silicon Dioxide	OR – 22				
14:10 – 14:30	A. Fedotovs	Paramagnetic Impurities for Studies of the Oxyfluoride Glass Ceramics Structure	OR – 23				
14:30 – 15:00	S. Jursenas	Tailoring the Photophysical Properties of Multifunctional Molecular Systems	INV – 13				
15:00 – 15:20	J. Teteris	Photoinduced Mass Transport in Soft Materials	OR – 24				
15:20 – 15:40	I. Strazdina	Deposition of ZnO:Al Transparent Conductive Layers on Polymer Substrate by Magnetron Sputtering	OR – 25				
15:40 – 16:00	A. Mychko	NanoCones Formation on a Surface of CdZnTe by Laser Radiation: Exciton Quantum Confinement Effect	OR – 26				
HALL 2				NANOMATERIALS AND NANOSTRUCTURES			
13:20 – 13:50	S. Rols	Selected Examples of Molecular Confinement Using Nanocarbon Hosts	INV – 16				
13:50 – 14:10	A. Volodin	Carbon-Ceramic Composites Based on Alumina and Carbon Nanotubes	OR – 32				
14:10 – 14:30	V. Bogdanov	Nano Structure of Lead-Germanate Glasses and Their Melts	OR – 33				
14:30 – 14:50	D. Erts	Fabrication of Ultrathin Anodized Aluminum Membranes for Deposition of Nanodot Arrays	OR – 34				
14:50 – 15:10	J. Andzane	Application of Individual Semiconductor Nanowires in Gateless Bistable Nanoelectromechanical Switch	OR – 35				
15:10 – 15:30	L. Dorogin	Measurements of Static and Kinetic Friction of ZnO Nanowires on a Flat Surface	OR – 36				
15:30 – 15:50	V. Chayauski	Tribological Properties of Galvanic Cr Coatings with Carbon Nanomaterials	OR – 37				
15:50 – 16:10	J. Zicans	Structure and Electrical Properties of Styrene Acrylonitrile Copolymer Nanocomposites	OR – 38				
16:10 – 16:30				Coffee			
16:30 – 22:30				EXCURSION AND CONFERENCE DINNER			

Friday, April 8

HALL 1		TECHNOLOGIES AND METHODS	
09:30 – 10:00	K. Schwartz	Swift Heavy Ion Tracks in Dielectrics and Their Possible Applications for Nanotechnology	INV – 17
10:00 - 10:20	D. Tonneau	Coupling X-ray Spectroscopy and Scanning Probe Microscopy for Simultaneous Sample Topography and Chemical mapping	OR – 39
10:20 - 10:40	J. K. Thomas	Structural, Dielectric and Optical Characterization of BaMoO ₄ Nano powder Synthesized Through an Auto-Igniting Combustion Technique	OR – 40
10:40 - 11:00	P. Onufrijevs	Two-Stage Mechanism of Nano-Cones Formation by Laser Radiation on a Surface of Elementary Semiconductors and Semiconductor Solid Solutions	OR – 41
11:00 - 11:20	A. Ozols	Self-Enhancement of Scalar and Vector Holographic Gratings in Azobenzene Molecular Glassy Films	OR – 42
HALL 2		FERROELECTRICS AND RELATED MATERIALS	
09:30 – 10:00	V. Trepakov	Chromium Centers in SrTiO ₃ : Properties, Problems and New Data	INV – 18
10:00 - 10:30	J. Petzelt	Wide-range Dielectric Spectroscopy of BaTiO ₃ -based Nanoceramics and Various Nanocomposites	INV – 19
10:30 - 10:50	A. Dejneka	Strain Effects in Epitaxial SrTiO ₃ and KTaO ₃ Films	OR – 47
10:50 - 11:10	O. Malyshkina	Determination of Thermal Diffusivity Coefficients of Thin Films by TSWM	OR – 48
11:10 - 11:30	J. Dec	Multifunctionality of Strontium-Barium Niobate	OR – 49
11:30 - 12:00		Coffee	
HALL 1		TECHNOLOGIES AND METHODS	
12:00 – 12:20	V. Fateev	Development of Plasma Technologies for Nanostructured Materials: Nanoparticles, Thin Films and Coatings in NRC «Kurchatov Institute»	OR – 43
12:20 - 12:40	S. Tyutyunnikov	Experiments on application of high power microwave radiation to biomedicine using micro- and nanoparticles	OR – 44
12:40 - 13:00	E. Palcevskis	Formation of Alpha Phase in Nanosized Plasma Processed Alumina Powder	OR – 45
13:00 - 13:20	B. Polyakov	Manipulation of Gold Nanoparticles Inside Scanning Electron Microscope	OR – 46
HALL 2		FERROELECTRICS AND RELATED MATERIALS	
12:00 – 12:30	R. Dittmann	Scaling Potential of Local Redox-Processes in Memristive SrTiO ₃ Thin Film Devices	INV – 20
12:30 – 13:00	W. Kleemann	Supermagnetic States of Nanoparticles	INV – 21
13:00 - 13:30	J. Banys	Two Dimensional Distribution of the Relaxation Times	INV – 22
HALL 1		CLOSING	
Chairperson: A. Sternberg			
13:40 – 14:00	Closing of the conference		
14:00 – 15:00	GOODBYE REFRESHMENTS		