

**53rd INTERNATIONAL CONFERENCE
ON MICROELECTRONICS,
DEVICES AND MATERIALS**

**and the WORKSHOP on
MATERIALS for ENERGY CONVERSION and
THEIR APPLICATIONS:
ELECTROCALORICS and THERMOELECTRICS**



CONFERENCE 2017

CONFERENCE PROGRAM

**October 4th - October 6th, 2017
Ljubljana, SLOVENIA**

**CONFERENCE MIDEM 2017 with Workshop on
MATERIALS for ENERGY CONVERSION and THEIR APPLICATIONS:
ELECTROCALORICS and THERMOELECTRICS**

SHORT PROGRAMME, Ljubljana

October 4 - October 6, 2017

	Wednesday 4.10.	Thursday 5.10.	Friday 6.10.
7:00 - 7:15			
7:15 - 7:30		Workshop	
7:30 - 7:45		Chairs: B. Malič and S. Bernik	
7:45 - 8:00			
8:00 - 8:15			
8:15 - 8:30	REGISTRATION	REGISTRATION	REGISTRATION
8:30 - 8:45			
8:45 - 9:00	OPENING CEREMONY	OPENING CEREMONY	
9:00 - 9:15	Optoelectronics Invited V. Sverdlov Chairman: M. Topič	Invited Workshop: Xavier Moya	Thin and Thick Films Chairman: S. Bernik
9:15 - 9:30			
9:30 - 9:45		Invited Workshop: Brahim Dkhil	Sensors and MEMS Chairman: D. Vrtačnik
9:45 - 10:00			
10:00 - 10:15			
10:15 - 10:30	Optoelectronics I Chairman: M. Topič	Invited Workshop: Sylvia Gebhardt	COFFEE BREAK
10:30 - 10:45			
10:45 - 11:00	COFFEE BREAK	COFFEE BREAK	
11:00 - 11:15			
11:15 - 11:30	Materials, Technology and Devices Invited E. Hennig Chair: B. Malič	Invited Workshop: Andrej Kitanovski	ELECTRONICS Chairman: A. Žemva
11:30 - 11:45			
11:45 - 12:00	Materials, Technology and Devices I Chair: B. Malič	Workshop regular papers I	CLOSING CEREMONY
12:00 - 12:15			
12:15 - 12:30			
12:30 - 12:45			
12:45 - 13:00			
13:00 - 13:15			
13:15 - 13:30	LUNCH	LUNCH	
13:30 - 13:45			
13:45 - 14:00			
14:00 - 14:15			
14:15 - 14:30			
14:30 - 14:45			
14:45 - 15:00	Materials, Technology and Devices II Chair: B. Malič	Workshop regular papers II	
15:00 - 15:15			
15:15 - 15:30			
15:30 - 15:45	Integrated Circuits and System On Chip Chairman: A. Sešek	Invited Workshop: Yuri Grin	
15:45 - 16:00			
16:00 - 16:15	COFFEE BREAK	COFFEE BREAK	
16:15 - 16:30			
16:30 - 16:45		Invited Workshop: Dario Narducci	
16:45 - 17:00			
17:00 - 17:15			
17:15 - 17:30	Optoelectronics II Chairman: M. Topič	Invited Workshop: Emmanuel Guilmeau	
17:30 - 17:45			
17:45 - 18:00			
18:00 - 18:15			
18:15 - 18:30			
18:30 - 18:45	WELCOME PARTY		
18:45 - 19:00			
19:00 -		CONFERENCE DINNER	

ORGANIZER

MIDEM - Society for Microelectronics, Electronic Components and Materials,
Stegne 7, 1000 Ljubljana, SLOVENIA

CONFERENCE SPONSORS

Jožef Stefan Institute, Ljubljana

Faculty for Electrical Engineering, University of Ljubljana

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Olga Zakrajšek, MIDEM, Slovenia

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GENERAL INFORMATION

Welcome to the 53rd International Conference on Microelectronics, Devices and Materials, (MIDEM 2017) and the joint Workshop on Materials for Energy Conversion and their Applications: Electrocalorics and Thermoelectrics. The conference continues the tradition of annual, international meetings organized by MIDEM – Society for Microelectronics, Devices and Materials, Ljubljana, Slovenia. These conferences have always attracted a large number of Slovene and foreign experts, as well as distinguished guest speakers, giving the opportunity to present their activities and research progress to the international audience and to discuss trends and problems related to their fields of work with other colleagues. This year, 37 reviewed regular papers and nine invited papers will be presented over the three days in the period October 4 – 6, 2017.

The regular conference contributions presented on the first and third day are grouped into five sessions: Materials, Technology and Devices; Electronics; Optoelectronics; Thin and Thick Films; Integrated Circuits and System on Chip. On the second day, the work will be organised as the Workshop on Materials for Energy Conversion and their Applications: Electrocalorics and Thermoelectrics.

We would like to express our thanks to the invited speakers and the contributors of regular papers for their valuable scientific contributions to the conference sessions and to the workshop. The members of the International Scientific Board of the conference, who made the review of the contributions, are gratefully acknowledged. We also thank all the Session Chairs and the members of the Conference Organizing Committee, who did their best to make the conference a success. Our special thanks go to the Jožef Stefan Institute as host to the conference.

We hope that you will remember this event, not only for the importance of the papers and discussions, but also for the new friendships and the pleasant memories of the country.

We wish you a pleasant stay in Ljubljana and in Slovenia.

Slavko Bernik, Chairman of the Conference MIDEM 2017 and Barbara Malič,
Chair-person of the Workshop

Ljubljana, October 2017

CONFERENCE VENUE

The Conference is held from October 4th to October 6th, 2017 at Jožef Stefan Institute in Ljubljana, Slovenia.

CONFERENCE PROCEEDINGS

Invited and accepted papers are published in the Conference Proceedings distributed at the Conference registration.

LANGUAGE

The official Conference language is English.

REGISTRATION

The registration fees are as follows:

FULL registration fee: 300 EUR

MIDEM Society members, MIDEM Sponsors: 244 EUR

The fee includes Conference Proceedings and free access to all Conference events (Welcome party and Gala dinner).

Accompanying persons may join Welcome party at an extra charge of 40 EUR and Gala dinner at 60 EUR. Price for additional conference materials is 50 EUR.

Undergraduate students have free access to all Conference sessions on submitting their student card / index. For other Conference events, there will be an additional charge.

SOCIAL EVENTS

The Welcome party will be held on Wednesday, October 4th in the Gallery of Jožef Stefan Institute.

The gala dinner will be held on Thursday, October 5th at 19:00 at Grad Kodeljevo.

ACCOMMODATION

Accommodation is available in:

City Hotel, Dalmatinova 15, Ljubljana – Slovenija

<https://www.cityhotel.si/>

Hotel Mrak, Rimska cesta 4, Ljubljana – Slovenija

Web: <http://www.hotelmrak.si/>

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Conference Web page: <http://www.midem-drustvo.si/conf2017>

CONFERENCE PROGRAM

WEDNESDAY, OCTOBER 4

- 08:00 REGISTRATION**
- 08:45 WELCOME AND OPENING CEREMONY**
- 09:00 CONFERENCE PLENARY TALK**
CHAIRPERSON: M. Topič
- 09:00 V. Sverdlov, J. Weinbub and S. Selberherr**
Spintronics as a Non-volatile Complement to Nanoelectronics
- 09:45 SESSION ON OPTOELECTRONICS**
CHAIRPERSON: M. Topič
- 09:45 R. Kimovec, H. Helmers, A. W. Bett and M. Topič**
Power Loss Mechanisms in Monolithic-interconnected Six-segment Laser Power Converter
- 10:00 M. Markočič, M. Kovačič**
Modelling and Evaluation of Small OLEDs for Light Outcoupling Research
- 10:15 Š. Tomšič, K. Brecl, B. Lipovšek**
Optimisation of a SiN_x Antireflective Coating in Crystalline Silicon Solar Cells by Considering Realistic Variable Illumination Conditions
- 10:30 G. Matič, M. Jankovec, M. Topič**
Development and Practical Evaluation of the Angular Response Measurement Setup for PV Cells
- 10:45 COFFEE BREAK**
- 11:15 CONFERENCE INVITED TALK**
CHAIRPERSON: B. Malič
- 11:15 E. Hennig**
Structure Property Relations in BNT-BT Based Lead-free Piezoceramics

- 11:45** **SESSION ON MATERIALS, TECHNOLOGY and DEVICES**
CHAIRPERSON: B. Malič
- 11:45** **S. Bernik, M. Podlogar, S. Rustja, M. Cergolj**
Influence of Granulate and Pressure on the Green Compacts and Current-voltage Characteristics of Sintered ZnO-based Varistor Ceramics
- 12:00** **M. Podlogar, Š. Hajduk, D. Luković Golić, T. Radošević, G. Branković, A. Rečnik, S. Bernik**
Growth of ZnO Films From Seed-grains With Different Morphologies
- 12:15** **S. Tominc, S. Bernik, A. Rečnik, N. Daneu**
Microstructural and Current-voltage Characteristics of SnO₂-based Varistor Ceramics
- 12:30** **M. Linec, J. Erjavec, B. Mušič**
Effect of Fillers With Different Coupling Agents on Mechanical Properties of Molded Composites
- 12:45** **LUNCH**
- 14:30** **SESSION ON MATERIALS, TECHNOLOGY and DEVICES**
CHAIRPERSON: B. Malič
- 14:30** **R. Šinkovec, B. Mušič**
The Effect of Different Lubricants on Molding Process and End Properties of Molded Composites
- 14:45** **A. Šahinović, B. Mušič**
Differences Between Thermoset and Thermoplastic Based Strontium Ferrite Composites for Injection Molding
- 15:00** **R. Zaplotnik**
Atmospheric Pressure Plasma in Dentistry
- 15:15** **SESSION ON INTEGRATED CIRCUITS and SYSTEM on CHIP**
CHAIRPERSON: A. Sešek
- 15:15** **R. Ražman, T. Pleteršek, J. Trontelj**
ASIC for Impedance Spectroscopy of Human Skin
- 15:30** **M. Gradišek, J. Trontelj, D. Strle**
High Precision Adjustable Gain Stage

- 15:45 D. Berčan, A. Sešek, J. Trontelj**
Design of Operational Transconductance Amplifier with Temperature Compensation
- 16:00 COFFEE BREAK**
- 16:30 SESSION ON OPTOELECTRONICS**
CHAIRPERSON: M. Topič
- 16:30 Ž. Lokar, J. Krč and M. Topič**
RCWA Simulation of Partial Hetero-junction Silicon Solar Cell Structures With Nano and Micro Textures
- 16:45 V. Gradišnik, D. Gumbarević, D. Caputo, G. de Cesare, S. Kraljević Pavelić**
Detection of Photoresponse of Cell Culture Medium by a:Si:H Photodiode Under Blue Light Exposure
- 17:00 J. Balent, J. Krč, A. Čampa, F. Smole and M. Topič**
Electrical Simulations of Hetero-junction Silicon Solar Cells
- 17:15 J. A. Vásquez and M. Topič**
An Overall Data Analysis Methodology for PV Energy Systems
- 17:30 S. Mitterhofer, M. Jankovec, M. Topič**
A Setup for In-situ Measurements of Potential and UV Induced Degradation of PV Modules Inside a Climatic Chamber
- 17:45 M. Pirc, M. Topič**
Light Intensity and Homogeneity of a LED Based Portable UV Light Source for Medical Research
- 18:00 WELCOME PARTY at JOŽEF STEFAN INSTITUTE**

THURSDAY, OCTOBER 5

- 08:00 REGISTRATION**
- 08:45 OPENING CEREMONY - WORKSHOP on MATERIALS for ENERGY CONVERSION and their APPLICATIONS: ELECTROCALORICS and THERMOELECTRICS**
- 09:00 WORKSHOP - INVITED PAPERS**
CHAIRPERSON: B. Malič
- 09:00 X. Moya, P. Lloveras, E. Stern-Taulats, M. Barrio, J.-Ll. Tamarit, S. Crossley, W. Li, V. Pomjakushin, A. Planes, Ll. Manosa and N. D. Mathur**
Multicaloric Ferroelectrics
- 09:35 B. Dkhil**
Materials Approach for Improving Caloric Responses Using Ferroelectrics
- 10:10 S. Gebhardt, C. Molin, A. Greiner, P. Neumeister, H. Neubert**
Development of Perovskite-type Ceramics and Multilayer Device Structures for Electrocaloric Applications
- 10:45 COFFEE BREAK**
- 11:10 A. Kitanovski, U. Tomc, J. Tušek, U. Plaznik, A. Poredoš**
Methods for Enhanced and Fast Heat Transfer in Electrocalorics
- 11:45 WORKSHOP - REGULAR PAPERS**
CHAIRPERSONS: S. Bernik and B. Malič
- 11:45 M. Vrabelj, R. Katiliūte, M. Ivanov, L. Fulanović, A. Bradeško, Z. Kutnjak, J. Banys, B. Malič**
Electrocaloric and Dielectric Properties of Mn-doped $0.9\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3$ - 0.1PbTiO_3 Ceramics
- 12:00 L. Fulanović, J. Koruza, N. Novak, V. Bobnar and B. Malič**
Stability of the High Electrocaloric-effect in Relaxor $\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3$ Multilayer Elements Upon Electric Field Cycling

- 12:15 A.Bradeško, M. Vrabelj, L. Fulanović, M. Otoničar, Z. Kutnjak, B. Malič and T. Rojac**
Influence of Cyclic Electrical Loading on The Electrocaloric Effect in PMN-xPT
- 12:30 R. Faye, S. Hirose, T. Usui, H. Strozyk, S. Nicolau, E. Defay**
Electrocaloric Prototyping With Multilayer Capacitors – Heat Exchange Issues
- 12:45 LUNCH**
- 14:30 WORKSHOP - REGULAR PAPERS**
CHAIRPERSONS: S. Bernik and B. Malič
- 14:30 U. Prah, M. Wencka, Z. Kutnjak, M. Vrabelj, S. Drnovšek, B. Malič, H. Uršič**
Multicaloric Effect in Polycrystalline $\text{Pb}(\text{Fe}_{0.5}\text{Nb}_{0.5})\text{O}_3$
- 14:45 B. Podmiljšak**
Is the Magnetic Heat Pump Coming?
- 15:00 B. Jančar, T. Sever, D. Vengust, G. Dražič, S. Bernik**
Bulk Thermoelectrics With Layered Crystal Structure
- 15:15 A. Ferrario, S. Boldrini, A. Miozzo, M. Fabrizio**
Modeling and Experimental Characterization of Thermoelectric Devices in Steady-state and Fast Pulsed Condition
- 15:30 WORKSHOP - INVITED PAPERS**
CHAIRPERSONS: S. Bernik and B. Malič
- 15:30 Y. Grin**
Chemistry of Thermoelectric Materials
- 16:05 COFFEE BREAK**
- 16:35 D. Narducci**
Empowering Communication by Powering Electronics.
Thermoelectrics for Heat Microharvesting

**17:10 E. Guilmeau, C. Bourges, V. Pavan Kumar, P. Lemoine, T. Barbier,
B. Raveau, B. Malaman, V. Nassif**
Towards High Thermoelectric Performances in Complex Sulphide
Materials

19:00 GALA DINNER AT GRAD KODELJEVO

The bus will arrive at Jožef Stefan Institute at 18:30.

FRIDAY, OCTOBER 6

- 08:00 REGISTRATION**
- 09:00 SESSION ON THIN and THICK FILMS**
CHAIRPERSON: S. Bernik
- 09:00 D. L. Sekulić, Z. Ž. Lazarević, Č. D. Jovalekić, N. Z. Romčević**
Characterization of Yttrium Orthoferrite (YFeO₃) Nanoparticles as Humidity Sensor Materials at Room Temperature
- 09:15 H. Mercier, B. Malič, H. Uršič, D. Kušcer, F. Levassort**
Processing and Sintering of Sodium-potassium Niobate-based Thick Films
- 09:30 SESSION ON SENSORS and MEMS**
CHAIRPERSON: D. Vrtačnik
- 09:30 D. Belavič, A. Bradeško, K. Makarovič, M. Hodnik, H. Uršič**
Fluidic Elements and Sensors in LTCC-based Ceramic Microsystems
- 09:45 B. Pečar, M. Možek and D. Vrtačnik**
Thermoplastic - PDMS Polymer Covalent Bonding for Microfluidic Applications
- 10:00 F. Gregor, M. Meyya, G. P. Ram**
Atmospheric Plasma Printing of Metal for Thin Layer Deposition, Nanowire Synthesis, and to Electronic Circuit Printing
- 10:15 COFFEE BREAK**
- 10:45 SESSION ON ELECTRONICS**
CHAIRPERSON: A. Žemva
- 10:45 T. Murovič, A. Trost**
Design and Verification of A Digital Signal Processor
- 11:00 D. Markič, A. Žemva**
Design and Implementation of Multi-functional Portable Charging Device

- 11:15 M. Hajdič, J. Podržaj**
Evaluation of Solder Joint Reliability in Power Module of Drive System
for Microfluidic Applications
- 11:30 M. Možek, B. Pečar, U. Aljančič, D. Resnik and D. Vrtačnik**
Low-power Piezoelectric Micropump Driving Module
- 11:45 CLOSING CEREMONY**

