

**45th INTERNATIONAL CONFERENCE
ON MICROELECTRONICS,
DEVICES AND MATERIALS**

and the WORKSHOP on

**ADVANCED PHOTOVOLTAIC DEVICES
and TECHNOLOGIES**



CONFERENCE 2009



SLOVENIAN RESEARCH AGENCY



Slovenia Chapter

CONFERENCE PROGRAM

**September 9 – September 11, 2009
Jamski DVOREC, Postojna, SLOVENIA**

CONFERENCE MIDEM 2009 - SHORT PROGRAM

Jamski dvorec - Postojna, September 9. - September 11. 2009

DAY/ HOUR	sep.09 Wednesday	sep.10 Thursday	sep.11 Friday
9:00	OPENING CEREMONY	WORKSHOP - OPENING INVITED PAPERS Wim Sinke S.P. Philipps Antonio Luque Chairman: J. Krč Coffee Break INVITED PAPERS Jože Rakovec Hubert Fechner Chairman: J. Krč	INVITED PAPER Andrzej Dziedzic Chairman: M. Hrovat
9:15	INVITED PAPER		SESSION ON THIN&THICK FILMS Chairman: A.Dziedzic
9:30	Jerzy Krupka		
9:45	Chairman :B. Malič		
10:00	Coffee Break		
10:15	SESSION ON MATERIALS, AND DEVICES Chairman : B. Malič		
10:30			
10:45			
11:00			
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11:30			
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12:00			
12:15			
12:30	LUNCH	LUNCH	LUNCH
12:45			
13:00			
13:15			
13:30	SESSION ON MATERIALS, AND DEVICES Chairman: B. Malič Coffee Break	WORKSHOP INVITED PAPERS James R. Sites Miro Zeman Andrea Feltrin Chairman: M. Topič Coffee Break	SESSION ON INTEGRATED CIRCUITS Chairman: J. Trontelj
13:45			
14:00			
14:15			
14:30			
14:45			
15:00	INVITED PAPER Michael A. Morris Chairman: D. Vrtačnik		
15:15			
15:30	SESSION ON ELECTRONICS Chairman: D. Vrtačnik SESSION ON OPTOELECTRONICS Chairman: M. Topič REUNION IN FRONT OF THE ENTRANCE VISIT TO POSTOJNA CAVE	WORKSHOP REGULAR PAPERS Chairman: J. Krč	SESSION ON SENSORS AND ACTUATORS Chairman: S. Amon CLOSING CEREMONY
15:45			
16:00			
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20:45			
21:00			
		DINNER	

ORGANIZER

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

CONFERENCE SPONSORS

Slovenian Research Agency

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ZAVOD TC SEMTO, Ljubljana

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Dr. Andrej Čampa, Faculty of Electrical Engineering, University of Ljubljana, Slovenia

GENERAL INFORMATION

Welcome to the 45th International Conference on Microelectronics, Devices and Materials, (MIDEM 2009) and joint Workshop on Advanced Photovoltaic Devices and Technologies. This 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. At the conferences scientists have 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, 59 regular and 11 invited participants will present their achievements during three days from Wednesday to Friday. The contributions are grouped in 7 conference sessions: Materials, technology and devices, Electronics, Optoelectronics, Thin and thick films, Integrated circuits, Sensors and actuators and in the conference Workshop. The Workshop is this year devoted to recent advances in photovoltaic devices and technologies. Distinguished invited lecturers and regular workshop contributors will present the current status, latest trends, research achievements and breakthroughs in the field of photovoltaics. Different topics related to material science combined with device engineering, advanced technologies and photovoltaic systems for efficient conversion of solar energy to electricity will be covered. Nowadays, photovoltaics presents an important research, industry and economy sector worldwide. Further accelerations of R&D are required to fully exploit the potential of photovoltaics in the role of a reliable sustainable energy source. We hope this workshop will be one of the sunflowers, following highlighting bright directions for further progress in the field of photovoltaics.

We would like to express our thanks to invited speakers and 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 the Conference Organizing Committee members who did their best to make the conference successful.

We hope that all of you will enjoy the conference talks and events, and that you will have an interesting and pleasant stay in Postojna.

CONFERENCE VENUE

The Conference is held from September 9th to September 11th, 2009 at Jamski Dvorec, Postojna, 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 : **250 EUR(*)**
- MIDEM Society members, MIDEM Sponsors : **200 EUR**

(*) full registration fee applies to non MIDEM society members only and includes a two year full MIDEM Society membership.

The fee includes Conference Proceedings and free access to all Conference events (Visit to Postojna Cave and Dinner).

Accompanying persons who do not take part in the conference may join other conference events at an extra charge (Visit to Postojna Cave: 35 EUR, Dinner: 50 EUR, additional conference materials: 100 EUR).

Undergraduate students have free access to all Conference sessions on submitting their study papers. For other Conference events there will be an additional charge.

SOCIAL EVENTS

Visit to Postojna Cave is scheduled for Wednesday, September 9th at 19:30 in front of the entrance of the Cave. The visit finishes at 21:00.

The Conference dinner will be held on Thursday, September 10th at 19:30 in Jamski Dvorec.

ACCOMMODATION

Please send your room reservations indicating " for MIDEM 2009 Conference", directly to:

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Conference Web page: <http://www.midem-drustvo.si/conf2009>

CONFERENCE PROGRAM

WEDNESDAY, SEPTEMBER 9

09:00 WELCOME AND OPENING CEREMONY

09:15 INVITED PAPER

CHAIRPERSON : B. Malič

09:15 J.Krupka

Measurements of Materials at Microwave Frequencies

10:00 COFFEE BREAK

10:15 SESSION ON MATERIALS, TECHNOLOGY AND DEVICES

CHAIRPERSON : B. Malič

10:15 B.Cvikl and M.Koželj

On the Difference Between Drift and Drift-diffusion Interpretation of Electron Current in Single Layer Metal/Organic Semiconductor Structure

10:30 D.Korošak, G.Mandžuka, M.Samec, W.Chen

Slow Kinetics of Charged Particles in Soft Porous Matter

10:45 D.Bisewski

Estimation of Parameters of GaAs and SiC MESFETs Using Genetic Algorithm

11:00 J.Žilak, T.Knežević, T.Suligoj

Optimization of Stress Distribution in Sub-45 nm CMOS Structures

11:15 V.Jovanović, M.Poljak, T.Suligoj

FinFET Considerations for 0.18 μm Technology

11:30 M.Lany and R.S.Popovic

Single-electron Bipolar Avalanche Transistor Characteristics under Forward and Reverse Bias

11:45 D.Resnik, D.Vrtačnik, U.Aljančič, M.Možek, S.Penič, B.Pečar and S.Amon

Design, Fabrication and Characterization of Microchannel Silicon Platform

12:00 D.Vrtačnik, D.Resnik, U.Aljančič, M.Možek, S.Penič, B.Pečar and S.Amon

Investigation of Black Silicon Fabricated by RIE

12:15 M.Bizjak, A.Hamler

Simplified Simulation of Magnetically Polarized Electromechanical Devices

12:30 LUNCH

13:30 SESSION ON MATERIALS, TECHNOLOGY AND DEVICES

CHAIRPERSON : B. Malič

13:30 A.Drenik, A.Vesel, M.Mozetic

Removal of Carbon Deposits by Weakly Ionised Oxygen Plasma

13:45 S.Bernik, I.Ö.Özer, M.Podlogar, E.Suvaci

Textured ZnO-based Ceramics – Preparation and Characterization

14:00 M.Podlogar, S.Bernik, G.Yilmazoglu, I.Ö.Özer, E.Suvaci

Synthesis of Rod-like ZnO by Hydrothermal Method

14:15 R.Rozman

Gas Discharge Tube as an Overvoltage Protection Element

14:30 COFFEE BREAK

14:45 INVITED PAPER

CHAIRPERSON: D. Vrtačnik

14:45 M.AMorris, J.D.Holmes

Scaling Beyond Lithographic Limits – polymer Self-assembly Mediated Sub-20 nm FET Devices

15:30 SESSION ON ELECTRONICS

CHAIRPERSON: D. Vrtačnik

15:30 A.Bouřa, P.Kulha, M.Husák

Applicability of the Inductive Powering for Enclosed Systems and Data Transfer

15:45 J.Podrřaj, J.Trontelj

Power Module Packaging for Thermal and Electrical Performance Optimization

16:00 P.Mrak, A.Biasizzo, F.Novak

Combined Oscillation Based and Histogram Based Test Structure in ADC BIST

16:15 U.Legat, A.Biasizzo, F.Novak

Fault Simulation with Partial Reconfiguration of FPGA

16:30 P.Markowski, A.Dziedzic

Numerical Simulations of Temperature Distribution Inside Thermopiles

16:45 K.Górecki

Modelling Power LEDs in SPICE with Selfheating Taken into Account

17:00 T.Nahtigal, A.Žemva

Design and Implementation of an Authentication System for Digital Images

17:15 SESSION ON OPTOELECTRONICS

CHAIRPERSON: M. TOPIČ

17:15 B.Lipovšek, A.Jóskowiak, A.Pimentel, A.Čampa, J.Krč, V.Chu, J.P.Conde, M.Topič

Design of Spectrally Selective Filters in Fluorescence Detection of Biomolecules Using Amorphous Silicon Based Detectors

17:30 V.Gradišnik, Ž.Milanović

Effect of Light and Voltage-induced Defects on A-Si:H Three-color Detector Transient Response

17:45 N.Hauptman, M.Klanjšek Gunde, M.Maček

Photolithographical Properties of Carbon Black/Epoxy Conductive Photoresist

18:00 D.Kuščer, M.Kosec, P.Barquinha, A.Villa, E.Fortunato, R.Martins

Ta₂O₅-based Transparent Dielectric for Flexible Electronics

19:15 REUNION IN FRONT OF THE ENTRANCE

19:30 – 21:00 VISIT TO POSTOJNA CAVE

THURSDAY, SEPTEMBER 10

09:00 WORKSHOP ON ADVANCED PHOTOVOLTAIC DEVICES and TECHNOLOGIES-OPENING

09:15 WORKSHOP – INVITED PAPERS

CHAIRPERSON: J. KRČ

09:15 W.C.Sinke

Trends in Wafer-based Silicon Photovoltaic Cell and Module Technology

09:50 S.P.Philipps, W.Guter, M.Steiner, E.Oliva, G.Siefer, E.Welser, B.M.George, M.Hermle, F.Dimroth, A.W.Bett

III-V Multi-junction Solar Cells - Simulation and Experimental Realization

10:25 A.Luque and A.Martí

Progress in Understanding the Intermediate Band Solar Cell

11:00 COFFEE BREAK

11:15 WORKSHOP – INVITED PAPERS

CHAIRPERSON: J. KRČ

11:15 J.Rakovec

Exploiting Solar Energy with Photovoltaics

11:50 H.Fechner

High Penetration of Photovoltaic Systems in Electricity Networks

12:30 LUNCH

13:30 WORKSHOP – INVITED PAPERS

CHAIRPERSON: M. TOPIČ

13:30 J.R.Sites

Impact of Grain Boundaries on Thin-film Photovoltaics

14:05 M.Zeman, G. van Elzaker, P.Sutta, O.Isabella

Thin-film Silicon Solar Cells: Stability and Light Trapping

14:40 A.Feltrin, R.Bartlomé, C.Battaglia, M.Boccard, G.Bugnon, P.Bühlmann, O.Cubero, M.Despeisse, D.Dominé, F.-J.Haug, F.Meillaud, X.Niquille, G.Parascandolo, T.Söderström, B.Strahm, V.Terrazzoni, N.Wyrsh, C.Ballif

An Introduction to the Technology of Thin Film Silicon Photovoltaics

15:15 COFFEE BREAK

15:30 WORKSHOP – REGULAR PAPERS

CHAIRPERSON: J. KRČ

15:30 K.Decock, J.Lauwaert, M.Burgelman

Modelling Thin Film Solar Cells with Graded Band Gap

15:15 M.Berginc, M.Filipič, U.Opara Krašovec, M.Nerat, A.Čampa, M.Hočevar, F.Smole, M.Topič

Electrical Model of Dye-sensitized Solar Cells

15:30 M.Nerat, F.Smole, M.Topič

Simulation Study of the Effects of Grain Boundaries on the Performance of Cu(In,Ga)Se₂ Solar Cells

15:45 T.Andrejašič, M.Jankovec, M.Topič

Evaluating the Influence of ADC Resolution in Maximum Power Point Tracking Algorithms for Solar-powered Stand-alone System

16:00 M.Bokalič, M.Jankovec, M.Topič

Solar Cell Efficiency Mapping by LBIC

16:15 M.Herman, M.Jankovec, M.Topič

I-V Measurement Methods for PV Modules and Arrays

16:30 R.Najjar, E.Quesnel, N.Baclet, V.Muffato, S.Boutami, P.Labeye, C.Cayron, A.Kean, M.Zeman, R.Santbergen, M.Topic, T.Meyer, G.Conibeer

Improvement of Energy Conversion Efficiency of Amorphous Silicon Thin-film Solar Cells through Plasmon Effect

16:45 X.Zhong and U.Cvelbar

Template-assisted Nanofabrication of Dielectric Nanodot Arrays for Solar Cells

17:00 J.Tellier, D.Kuscer, B.Malic and M.Kosec

Ink-jet Printing of In₂O₃-ZnO Structures from Solutions

19:30 DINNER IN JAMSKI DVOREC

FRIDAY, SEPTEMBER 11

09:00 INVITED PAPER

CHAIRPERSON : M. HROVAT

09:00 A.Dziedzic

Modern Thick-film and LTCC Passives and Passive Integrated Components

09:45 COFFEE BREAK

10:00 SESSION ON THIN AND THICK FILMS

CHAIRPERSON: A. DZIEDZIC

10:00 M.Hrovat, D.Belavič, G.Dolanc, P.Fajdiga, M.Santo-Zarnik, J.Holc, M.Jerlah, S.Hočevar, M.Kosec

3D Structures Realised in the LTCC Technology –Ceramic Micro-reactor

10:15 M.Hrovat, D.Belavič, J.Kita, J.Holc, S.Drnovšek, J.Cilenšek

Thick-film Materials for Temperature Sensors on Selected LTCC Substrates

10:30 K.Makarovič, A.Meden, M.Hrovat, M.Kosec, D.Belavič, J.Holc, E.Kranjc

The Structural Development of LTCC Materials During Processing

10:45 K.Kielbasiński, M.Jakubowska, A.Mložniak, M.Hrovat, J.Holc, D.Belavič

Lead-free “Green” Thick-film Resistors: Some Results on the Development of Characteristics During Firing

11:00 S.Glinšek, B.Malič, Z.Kutnjak, H.Wang, J.Krupka and M.Kosec

Radio and Microwave Frequency Range Dielectric Properties of $K(\text{Ta}, \text{Nb})\text{O}_3$ Thin Films

11:15 B.Malič, B.Kužnik, J.Cilenšek, N.Boulay, P.Couderc, C. Val, M.Kosec

Laser Activation of Amorphous Solution-Derived $\text{Pb}(\text{Zr}, \text{Ti})\text{O}_3$ Thin Films

11:30 M.Drev, M.Berginc, M.Japelj Fir, M.Topič

Characterization of Silver Pastes for Flexible Substrates

11:45 L.G.Zamfir, L.Rotariu, A.Arvinde, C.Bala, C.Ionescu, P.Svasta

Thick-film Electrochemical Sensor for Thiocholine Detection

12:00 M.Santo Zarnik, D.Belavič, S.Maček, B.Hudoklin

An LTCC-based Piezoresistive Ceramic Pressure Sensor for Low-pressure Applications

12:15 C.Marghescu, D.Belavič, M.Santo Zarnik, C.Ionescu, P.Svasta, M.Hrovat, S.Kocjan, I.Lipušek

Evaluation of a Ceramic Capacitive Pressure Sensor in Different Media

12:30 B.Perc, D.Kuščer, J.Holc, D.Belavič, M.Jerlah, D.Gregor Svetec, M.Kosec

Thick-film Strain Sensor on Textile

12:45 LUNCH

13:45 SESSION ON INTEGRATED CIRCUITS

CHAIRPERSON: J. TRONTELJ

13:45 B.Šmid, J.Trontelj

Linear Temperature Coefficient Compensation for Sensor Microsystems

14:00 D.Strle

Modeling High Performance Electromechanical Σ - Δ Modulator

14:15 R.Ribnikar, D.Strle

Predicting Metastability in 2nd Order $\Sigma\Delta$ Modulator

14:30 A.Švigelj, J.Trontelj

Integrated Fail-safe Power Driver

14:45 J.Goljevšek, J.Trontelj

High Precision Low Cost IR Signal Processing System Concept with an ASIC and FPGA

15:00 M.Trifković, D.Strle

High Precision Measurements of Resistance

15:15 A.Sešek, J.Trontelj

Battery Supplied Automotive ASIC – EMC Problems

15:30 D.Raič

Automated Digital Netlist Transformation into Low-noise Equivalent

15:45 COFFEE BREAK

16:00 SESSION ON SENSORS AND ACTUATORS

CHAIRPERSON: S. AMON

16:00 B.Đokić, T.B.Šekara, M.Srečković

Fractional Order Model of Resistive Temperature Detector

16:15 P.Kulha, A.Boura, M.Husak

Modeling and Fabrication of Piezoresistive Strain Sensor Based on Diamond Layers

16:30 U.Nahtigal, D.Strle

Precise Measurements of Capacitance

16:45 M.Možek, D.Vrtačnik, D.Resnik, U.Aljančič, S.Penič, B.Pečar, S.Amon

Temperature Compensation of Capacitive Pressure Sensors

17:00 U.Aljancic, S.Penic, R.Bosnjak, M.Makovec, M.Mozek, D.Resnik, D.Vrtacnik, S.Amon

2D Measurement of Retraction Force

17:15 B.Pečar, D.Resnik, M.Možek, D.Vrtačnik, U.Aljančič, S.Penič and S.Amon

Design, Modeling, Fabrication and Characterization of Piezoelectric Cantilever Actuator

17:30 S.Penič, B.Pečar, D.Resnik, D.Vrtačnik, U.Aljančič, M.Možek, and S.Amon

Design and Simulation of Valveless Si/Pyrex Micropump with Piezoelectric Actuator

17:45 CLOSING CEREMONY