



42nd International Spring Seminar on Electronics Technology

Wrocław, Poland, May 15-19, 2019

CONFERENCE PROGRAMME



Wrocław University
of Science and Technology

Honorary patronage



Ministry of Science
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Republic of Poland



42nd International Spring Seminar on Electronics Technology
Wrocław, Poland, May 15-19, 2019

Wednesday, May 15th

20:00 Welcome Dinner

20:30 Steering Committee Meeting

Thursday, May 16th

07:00 Breakfast

08:25 Opening Speech

08:40 Oral session 1 Chaired by: Piotr Markowski, Heinz Wohlrabe

KN01 Design-for-Reliability of IC Packages Employing Ceramics: Roles of Predictive Modeling and Failure-Oriented-Accelerated-Testing

E. Suhir

Portland State University

A03 Application of Iron Manganite Thick Films for Humidity Sensing

M. Nikolic, M. Lukovic, M. Dojcinovic, Z. Vasiljevic, N. Labus

University of Belgrade

A04 Towards a Smart Electronics Production Using Machine Learning for Data Analytics

R. Seidel, F. Häußler, A. Mayr, D. Kißkalt, J. Franke

Friedrich-Alexander University Erlangen-Nuremberg

A08 Soldering of Sensitive Components by Screen Method and Surface Mounting

V. Videkov, V. Tsenev

Technical University of Sofia

10:40 Coffee Break

11:00 Poster Session 1 Chaired by: David Busek, Nelu Blaz

A01 Refined approach on controlling heat transfer in a Vapour Phase Soldering oven

A. Géczy, B. Kiss, A. Mohamed Alaya, Z. Illyefalvi-Vitéz

Budapest University of Technology and Economics

A05 Properties of Thick Printed Copper Films on Alumina Substrates

J. Hlina, J. Reboun, A. Hamacek

University of West Bohemia (UWB)

A07 Electrical Properties of Biopolymers

H. Kettwig, D. Firzlaß, P. Otto, G. Naumann, K. Harre, Y. Joseph

University of Applied Science Dresden

A09 Thermoelectric Properties of Thin-Film Germanium-Antimony Alloys

D. Nowak, M. Turkiewicz, A. Chudzyńska

Wrocław University of Science and Technology



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- A11 Thermal Investigations on Modules Realized Using Solderless Assembly for Electronics Technology**
C. Ionescu, M. Branzei, N. Codreanu, G. Varzaru
University Politehnica of Bucharest
- A12 Dielectric Characterisation of 3D Printed Ceramics**
W. Nawrot, K. Szostak, P. Słobodzian, K. Malecha
Wrocław University of Science and Technology
- A15 Development of a New Fabrication Method of Thermoelectric Microgenerators**
M. Gierczak, P. Markowski, A. Dziedzic
Wrocław University of Science and Technology
- G01 Sheet Resistance Measurement of Inkjet Printed Layers**
E. Gieva, G. Nikolov, B. Nikolova
Technical University of Sofia - NIS
- G03 White Light AC Electroluminescent Displays**
M. Hrabal, I. Zhivkov, P. Guricova, G. Dobrikov, R. Yordanov, M. Vala
Technical University of Sofia
- G04 Synthesis of Silver Nanoparticles in Resin for 3D Printing**
O. Rac-Rumijowska, H. Teterycz
Wrocław University of Science and Technology
- G05 Defects Investigation in Low-Temperature and Low-Pressure Sintered Silver Thermal Joints for Non-Metalized Semiconductors**
K. Stojek, J. Felba, D. Lizanets, M. Kiliszkievicz, T. Fałat, K. Gorzka
Wrocław University of Science and Technology
- 12:20 Coffee Break**
- 12:40 Oral session 2 Chaired by: Johann Nicolics, Ryszard Kiesiel**
- D02 Reliability of Molded Interconnect Devices regarding Crack Initiation and Overmolding**
P. Braeuer, T. Kuhn, J. Franke
Friedrich-Alexander University Erlangen-Nuremberg, FAPS
- D04 Stress Characterization of Ceramic Substrates by Laser Speckle Photometry**
L. Chen, U. Cikalova, S. Muench, M. Roellig, B. Bendjus
Fraunhofer Institute for Ceramic Technologies and Systems IKTS



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- D10** **Impact of Warpage Effects on Quality and Reliability of Solder Joints**
O. Albrecht, H. Wohlrabe, K. Meier
Technische Universität Dresden
- D12** **Impact of Atmospheric Discharges on Thick-films under Various Conditions**
T. Matusiak, A. Dąbrowski, L. Golonka
Wrocław University of Science and Technology
- 14:20** **Lunch**
- 15:20** **Poster Session 2 Chaired by: Karel Dušek, Johann Nicolics**
- D13** **Study of Solder Spreadability at Different Soldering Conditions Using Factorial Experiments**
M. Molhanec
Czech Technical University in Prague
- D14** **Evaluation of Oxide Thin Film Layers Prepared by Sputtering**
E. Horynova, I. Beshajova Pelikanova
Czech Technical University in Prague
- D15** **Computer Controlled System for Impedance Measurements**
I. Zhivkov, G. Dobrikov, R. Yordanov, I. Yordanova, M. Weiter
Technical University of Sofia
- D16** **New Way for Brazing on Thick Film Cermet Conductors**
A. Otáhal, J. Skácel, I. Szendiuch
Brno University of Technology
- D17** **Influence of Electric Current at Solidification of Solder**
J. Skácel, A. Otáhal, I. Szendiuch
Brno University of Technology
- D18** **Thermal Tomography in Electronic Technology**
A. Stoyanova, B. Bonev
Technical University of Sofia
- D19** **Manufacturing and Reliability Issues of Highly Integrated Packages for Power Electronic Applications**
S. Bickel, K. Meier, M. Roellig, K. Bock
Technische Universität Dresden
- D20** **Current-Carrying Capacity of Thick-Film Metallization Paths**
A. Dąbrowski, R. Wilkosz
Wrocław University of Science and Technology



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- D21** **Large Area Temperature Measurement in Smart Textiles**
J. Kalcik, R. Soukup
University of West Bohemia
- D22** **Relationship of Soldering Profile, Voids Formation and Strength of Soldered Joints**
F. Steiner, V. Wirth, M. Hirman
University of West Bohemia
- D24** **Effect of PCB Height and Thickness During Heat Level Type Vapour Phase Reflow Soldering**
A. Mohamed Amine, A. Mohamed Alaya, A. Géczy
Budapest University of Technology and Economics
- 16:40** **Coffee Break**
- 17:00** **Oral Session 3 Chaired by: Leszek Golonka, Ivan Szendiuch**
- KN02** **Silicon Systems for Wireless Communications: Design, Modeling, Verification, Implementation, Integration, and Test**
Z. Stamenkovic
IHP GmbH, Frankfurt (Oder)
- A10** **Thermocouples, Thermopiles and Thermoelectric Generators on Rigid and Flexible Substrates**
M. Turkiewicz, M. Gierczak, D. Nowak, P. Markowski, E. Prociów, A. Dzedzic
Wrocław University of Science and Technology
- A14** **Fully Printed IoT Antenna for Drone-Deployed Autonomous Sensor Unit**
M. Pavec, J. Navratil, R. Soukup, A. Hamacek
University of West Bohemia
- F05** **Usability of Bio-based Polymers as a Wiring Board**
C. Henning, A. Schmid, S. Hecht, C. Rückmar, K. Harre, R. Bauer
University of Applied Sciences Dresden
- 20:00** **Dinner**
- 20:30** **Steering Committee Meeting on Demand**



Friday, May 17th

- 07:00 Breakfast**
- 08:30 Poster Session 3 Chaired by: Attila Geczy**
- I04 Planar Capacitive Liquid Level Sensors**
A. Pietrikova, S. Zuk, P. Lukacs, I. Vehec
Technical University of Kosice
- I06 Electronic Sensor System for Monitoring the Temperature Status of Rolling Stock in Motion**
A. Stoyanova, N. Nenov, B. Bonev, D. Yosifova
Technical University of Sofia
- I07 Application of Stretchable Membrane with Ferrite Flaky Fillers in Inductive Displacement Sensor**
N. Blaž, M. Kisic, L. Živanov, C. Žlebic, S. Aleksic, M. Damnjanovic
University of Novi Sad
- I08 Uniaxial Heat Loss Anemometer in Power Save Regime**
S. Aleksic, N. Mitrovic, M. Lukovic, B. Nelu, S. Lukovic, L. Živanov
University of Kragujevac
- I09 Optimization of Deep Reactive Ion Etching Process for on Chip Energy Storage**
J. Prášek, D. Houška, R. Hrdý, J. Hubálek, U. Schmid
Brno University of Technology
- I10 Data Acquisition System for Solar Panels**
V. Voicu, D. Petreus, R. Etz
Technical University of Cluj-Napoca
- I11 Capacitive Force Sensor Fabricated in Additive Technology**
M. Kisic, N. Blaž, L. Živanov, M. Damnjanovic
University of Novi Sad
- I13 Development of HfO₂/Al₂O₃ Stack for On-Chip Capacitor Applications**
R. Hrdý, J. Prášek, P. Fillner, S. Vancík, J. Hubálek, U. Schmid
Brno University of Technology



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- I14** **LTCC-based Microfluidic Module for Heating and Detection of Fluids Using Microwaves**
L. Jasińska, W. Wróblewski, K. Malecha
Wrocław University of Science and Technology
- J01** **Application of Neural Network for Smart Control of a Buck DC/DC Converter**
G. Vacheva, N. Hinov, H. Kanchev, B. Gilev
Technical University of Sofia
- J02** **Modelling of DC/DC Bidirectional Converter for Electric Vehicles Application**
G. Vacheva, N. Hinov, V. Dimitrov
Technical University of Sofia
- J03** **The Use of Ceramic Multichip Micromodules in the Learning Process**
E. Gieva
Technical University of Sofia
- 10:00** **Coffee Break**
- 10:20** **Oral Session 4 Chaired by: Alena Pietrikova, Tomas Blecha**
- KN03** **Advances in Printed Electronics and Ceramic Microsystems at Wrocław University of Science and Technology**
Jan Felba, Leszek Golonka
Wrocław University of Science and Technology
- C01** **Combination of Thick-Film Hybrid Technology and Polymer Additive Manufacturing for High-Performance Mechatronic Integrated Devices**
T. Ackstaller, L. Lorenz, K. Niewęglowski, K. Bock
Technische Universität Dresden
- C02** **Development of SLID Bonding Technology for GaN Assembly Based on Ag Microflakes**
M. Myśliwiec, R. Kisiel
Warsaw University of Technology
- C08** **Process Optimization of Foil-Based Transient Liquid Phase Bonding for Die Attachment**
M. Feisst, J. Kustermann, J. Wilde
University of Freiburg - IMTEK
- 12:20** **Coffee Break**



- 12:40** **Poster Session 4 Chaired by: Reinhard Bauer, Ljiljana Zivanov**
- C03** **Reliability of Glued Joints on the Flexible Substrates during Accelerated Current Ageing**
M. Hirman, J. Navratil, F. Steiner, A. Hamacek
University of West Bohemia
- C04** **Bend Testing of SMD Chip Resistors Glued on Flexible Substrates**
M. Hirman, T. Neuhöfer, F. Steiner
University of West Bohemia
- C05** **Resistance Welding in Smart Textile**
D. Michal, S. Suchý, J. Šlauf, J. Reboun, R. Soukup
University of West Bohemia
- C06** **Double Sided Printed Pattern Interconnected by Aerosol Jet and NCA Technologies**
J. Navratil, T. Rericha, A. Hamacek
University of West Bohemia
- C07** **Sustainable and Secure Soldering of Complex Components with Package BGA, LGA, Flip Chip, FI WLCSP, FO WLCSP to Star Flex PCB Using Hybrid Printing**
V. Tsenev
Technical University of Sofia
- C09** **The Testing of Brass Solderability for Hybrid Sewing Thread**
M. Pavec, M. Hirman, R. Soukup, A. Hamacek
University of West Bohemia
- D01** **Wetting of Lead Free Solder Alloys on Different PCBs during Vapour Phase Soldering**
M. Alaya, L. Gál, A. Géczy, T. Hurtony, B. Medgyes, D. Straubinger, T. Al-Ma'aiteh, B. Illés
Budapest University of Technology and Economics
- D03** **Thermo-Mechanical Test of SAC Solder Joints on Different Surface Finishes**
D. Bušek, K. Dušek, T. Beran, P. Veselý
Czech Technical University in Prague



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- D05 Released of latent heat from solder joints to surrounding during solidification of solder alloy – experimental study**
K. Dušek, V. Zahradník, P. Veselý, D. Bušek, M. Placek
Czech Technical University in Prague
- D06 Early Stage Whisker Development from Sn Thin Film on Cu Substrate**
B. Illés, T. Hurtony, O. Krammer, R. Bátorfi, B. Medgyes, G. Harsányi
Budapest University of Technology and Economics
- D07 Application Possibilities of FFF-printed Structures for HV and MV Insulation Systems**
T. Tichý, O. Šefl, P. Veselý, T. Cápál
Czech Technical University in Prague
- D08 Evaluation of Bismuth/Tin Solder Intermetallic Layers Based on Heating Factor**
P. Veselý, K. Dušek, A. Stanková
Czech Technical University in Prague
- D09 Multi-Sensor High-Frequency Eddy Current Depth Detection in Carbon Fiber Reinforced Polymers**
N. Matvieieva, I. Kharabet, M. Schulze, K. Mizukami, H. Heuer
Technical University of Dresden
- D11 Mechanical Properties of Conductive Adhesive Bonds as Function of Working Temperature**
M. Branzei, P. Svasa, M. Vladescu, I. Plotog, B. Mihailescu, G. Varzaru
University Politehnica of Bucharest

Trip information

14:10 Lunch

15:30 Trip 1

20:15 Gala Dinner



Saturday, May 18th

- 07:00** **Breakfast**
- 09:00** **Poster Session 5 Chaired by: Oliver Krammer, Heinz Wohlrabe**
- B01** **Measurement of Gas Flow in Reflow Oven**
M. Hurban, I. Szendiuch
Brno University of Technology
- B02** **Optimizations for Heat Dissipation Strategies on PC Motherboards**
R. Jano, A. Fodor
Technical University of Cluj-Napoca
- B03** **Temperature Distribution Optimization of Multichannel Sensor System for Thermal Testing of Protective Gloves**
D. Kalas, K. Sima, S. Pretl, J. Reboun, R. Soukup, A. Hamacek
University of West Bohemia
- F01** **Ecolabeling of Electronic Products - What is New and What Next?**
I. Szendiuch, E. Hejatkova, J. Skácel, M. Hurban
Brno University of Technology
- F02** **Loss Factor and Nonlinearity of Volt-ampere Characteristic of Capacitors from Metalized PP Film**
P. Mach, M. Horák
Czech Technical University in Prague
- F03** **Influence of Temperature Shocks on Climatic Aging of Conductive Adhesive Joints**
F. Závora, P. Mach
Czech Technical University in Prague
- F04** **Methods for Reusing Li-ion Cells from Discarded Battery Packs**
A. Ilies, I. Ciascaj, D. Pitica
Technical University of Cluj-Napoca
- F06** **Cost Optimization and Day-Ahead Scheduling for a Renewable Energy Microgrid**
A. Ignat, D. Petreus
Technical University of Cluj-Napoca
- F07** **Greenhouse Gas Emissions of Printed Circuit Board Manufacturing of Different Technologies**
M. Franz, T. Kupka, G. Schmid
TU Wien



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- K01** **Planar Resonance Circuits for Identity Documents or Banknotes Authentication**
T. Blecha, J. Cengery, S. Pretl
University of West Bohemia
- K03** **3D Micro-Transformers Fabricated Inside Ferrite-Dielectric LTCC Substrate**
A. Maric, L. Živanov
University of Novi Sad
- K04** **AC Coupled Instrumentation Amplifier with Gytrators**
M. Ilie, E. Stetco, L. Viman, D. Pitica
Technical University of Cluj-Napoca
- K05** **Tuning the Inductance of Magnetic Inductor with DC Current**
C. Žlebic, L. Živanov, N. Blaž, M. Damnjanovic
University of Novi Sad
- 10:30** **Coffee Break**
- 10:50** **Poster Session 6 Chaired by: Mihai Branzei, Pavel Mach**
- E01** **Particle Level Modelling of Solder Pastes Rheological Behaviour in Viscosity Measurement**
T. Al-Ma'aiteh, O. Krammer
Budapest University of Technology and Economics
- E02** **Current mode control of a Solar Inverter with MPPT Algorithm**
I. Ferencz, D. Petreus
Tehcnical University of Cluj-Napoca
- E03** **Investigating the Effect of Viscosity Models on the Stencil Printing by Numerical Modelling**
O. Krammer, T. Al-Ma'aiteh, P. Martinek
Budapest University of Technology and Economics
- E04** **Analysis of Parameter Variability Depending on FinFET Wafer Location**
G. Angelov, D. Nikolov, M. Spasova, R. Radonov
Technical University Sofia
- E05** **Analytical Considerations of the TRL Calibration Procedure for General De-Embedding Purposes**
U. Schumann, A. Jöstingmeier, A. Omar
Otto-von-Guericke University



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- E06** **Frequency Independent Lumped Parameter Model of Ferrite Core**
M. Milutinov, L. Živanov, N. Blaž
University of Novi Sad
- E07** **Analytical Solution of Heat Distribution Inside a PCB During Vapour Phase Soldering**
D. Straubinger, I. Bozsóki, A. Géczy
Budapest University of Technology and Economics
- E09** **Measuring Component Self-alignment by Automatic Image Processing Method**
P. Martinek, B. Villanyi, O. Krammer
Budapest University of Technology and Economics
- E10** **Design of Microstrip Antennas for 2.45 GHz on Different Substrates**
P. Cech, A. Pietrikova
Technical University of Kosice
- E11** **3D Thermal Modelling and Verification of Power Electronic Modules**
N. Vakrilov, A. Stoyanova, B. Bonev
Technical University of Sofia
- E12** **Research of Acceleration and Braking Modes of Electric Vehicles in MATLAB/Simulink**
G. Vacheva, N. Hinov, V. Dimitrov
Technical University of Sofia
- E13** **Thermal Modelling and Simulation Techniques for Multicore Processors**
A. Fodor, G. Chindris, R. Jano, D. Pitica
Technical University of Cluj-Napoca
- E14** **Real-Time System with Integrated PID Algorithm Used for DC Motor Control**
M. Taut, G. Chindris, D. Pitica
Technical University of Cluj-Napoca
- 12:20** **Coffee Break**
- 12:40** **Oral Session 5 Chaired by: Andrzej Dzedzic, Jan Felba**
- A13** **Microstructure of Zinc Oxide and Concentration of Oxygen Vacancies**
M. Fiedot-Tobola, O. Rac-Rumijowska, H. Teterycz
Wrocław University of Science and Technology



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G02 Measurement of Thermal Properties and Interface Thermal Resistance of Thin Films by Thermoreflectance

E. Badine, M. Bardaux, N. Abboud, Z. Herro, A. Hadj Saharaoui

Université du Littoral Côte d'Opale

I03 Wireless Sensor Nodes Optimized for Industrial Soldering Equipment

A. Neiser, M. Abb, D. Seehase, A. Reinhardt

SEHO Systems GmbH

Trip information

14:00 Lunch

15:15 Trip 2 and Outside Dinner

14:45 Steering Committee Meeting

Sunday, May 19th

07:00 Breakfast

09:00 Departure