

Climatic reliability of Electronics: Challenges and Perspectives

Seminar Program

Day 1 Thursday – 16th March 2023

08.30 – 09.00

Registration and coffee

Session 1

Environmental issues of high power/low power systems, failure mechanisms, and Testing

09.00 – 09.30

Introduction to the seminar and Importance of Environmental Effects on Electronics as a robustness and reliability issue

Rajan Ambat
Center for Electronic Corrosion, Technical University of Denmark

09.30 – 10.00

High Humidity High Temperature and High Voltage Reverse Bias - A Required Test for Power Semiconductors in Industrial Applications

Joonas Lappanen
ABB, Finland

10.00 – 10.30

Accelerated Corrosive Gas Testing under High Voltage for Power Semiconductor Modules

Michael Hanf
University of Bremen, Germany

10.30 – 11.00

Coffee break

Session 1 (Continued)

Environmental issues of high power/low power systems, failure mechanisms, and Testing

11.00 - 11.30

Risk Prediction of Electrochemical Migration on Electronic Control Units – A Practical Approach

Lothar Henneken
Robert Bosch, Germany

11.30 – 12.00

Paradigm shift in cooling systems: Reliability challenge in condensing application giving high RH for electronic components – a field case

John B. Jacobsen and Preben Jakobsen
Grundfos, Denmark

12.00 – 13.00

Lunch Break

Session 1 (Continued)

Environmental issues of high power/low power systems, failure mechanisms, and Testing

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| 13.00 – 13.30 | Insights into the microclimate in IGBT modules during lab-based wind-energy converter system tests | Christian Zorn IWES, Fraunhofer Institute, Germany |
| 13.30 – 14.00 | Improvements on film capacitor performance under climatic stress | Azahara Albendiz TDK Electronics Components, S.A.U., Spain |
| 14.00 – 14.30 | Corrosion investigations on SAC-1Bi-xMn lead-free solder alloys | Medgyes Bálint Károly BME Budapest, Hungary |
| 14.30 – 15.00 | Passivity of tin solder alloys | Michael Schneider Fraunhofer-Institut für Keramische Technologien und System IKTS, Germany |
| 15.00 – 15.30 | Coffee break | |

Session 1 (Continued)

Environmental issues of high power/low power systems, failure mechanisms, and Testing

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| 15.30 – 16.00 | CAF Failures & High Voltage Applications | Angus Brunton Isola GmbH, Germany |
| 16.00 – 16.30 | Overcoming corrosion-related challenges of passive component integration into overmolded packages | Amar Mavinkurve NXP Semiconductors, Netherlands |
| 16:30 – 17:00 | Development of a SIR test below 5V to Characterize ECM | Graham Naisbitt Gen3systems, UK |
| 17.00 – 17.15 | Corrosion-related activities in the European Power Electronics Network ECPE | Thomas Harder European Center for Power Electronics, Germany |
| 17:15 – 17:30 | Frist day summary and bus transport to the dinner location | |
| 18.15 – 21.15 | Seminar Dinner | |

Day 2 | Friday – 17th March 2023

08.15 – 08.30

Arrival and coffee

Session 2

Process cleanliness effect on corrosion reliability and optimization

08.30 – 09.00

Process cleanliness and safe boundaries for PCBA humidity robustness

Rajan Ambat
CELCORR, DTU,
Denmark

09.00 – 09.30

Electronic Soldering Material Reliability when exposed to Harsh Climatic Conditions

Mike Bixenman
Magnalytix, USA

09.30 – 10.00

Optical inspection and SIR measuring under the component bodies using SIR Glass Test Vehicle

Vladimír Sítko
PBT Works, Czech Republic
Mike Bixenman
Magnalytix, USA

10.00 – 10.30

Investigation of the effect of ionic contamination in thin gaps on assemblies close to reality with new miniaturized devices

Helge Schimanski
ISIT, Fraunhofer-Institut für Siliziumtechnologie
ISIT
Thorsten Fladung
Fraunhofer Institute for Manufacturing Technology and Advanced Materials
IFAM, Germany

10.30 – 11:00

Coffee break

Session 2 (Continued)

Process cleanliness effect on corrosion reliability and optimization

11.00 – 11.30

Rust particles, are they able to cause shorts

Lutz Mueller, Robert Bosch, Germany

11.30 – 12.00

An Efficient and Innovative Cleaning Solution with Low Environmental Impact

Laura LECOMTE
Inventec Performance Chemical, France

12.00 – 13.00

Lunch Break

Session 3

Proper packaging and conformal coating for better protection from environmental effects

13:00 – 13.30

Integrated climate and CFD models for humidity effects verification on electronic packaging

Max Peter Spooner,
DTU-Compute &
Sankhya Mohanty
DTU-Construct, Denmark

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| 13.30 – 14:00 | Humidity robustness of thermally stressed coatings | Stefan Strixner Zestron, Germany |
| 14.00 – 14.30 | UV LED conformal coating technologies | Marie Kaing ABChimie, France |
| 14.30 – 15.00 | Coffee break | |
| 15.00 – 15.30 | Plasma deposited thin halogen free conformal coating for corrosion protection of PCB | Nicolas Vandencastele Europlasma NV, Belgium |
| 15.30 – 16.00 | Flux residue compatibility with conformal coating: Parametric study and data modelling | Ioannis Mantis CELCORR, DTU, Denmark |
| 16:00 – 16:30 | A sustainable Nanocoating technology for corrosion protection of electronics and medical devices | Rakesh Kumar Specialty Coating Systems, USA |
| 16.30 – 16.40 | Conclusion and summary | Rajan Ambat CELCORR, DTU Denmark |