

# ICEC2022 Sapporo ( <https://www.ieice.org/es/icec2022/> )

31<sup>st</sup> International Conference on Electrical Contacts  
June 13-16, 2022, Hotel Emisia Sapporo, Hokkaido, Japan.

## Advanced Program

- (1) The conference is conducted in hybrid-style with Zoom. For online speakers and participants, meeting ID and passcode for each session will be informed later.
- (2) Each time is expressed in Japanese Standard Time (JST = UTC+0900).
- (3) Although 30 minutes time slot is allocated for each paper, presentation time is expected to be 15 minutes plus 5 minutes discussion. Each presentation will be started exactly at the scheduled time.

Monday, June 13, 2022

<<Opening remarks>> (13:30-14:00)

<<Session 1>> -- Hybrid & New Trends --

1-1. (14:00-14:30)

**Electrical investigation of the time development of the recovery voltage of a closed model arrangement after current loads in the operating range of an LVDC hybrid switch**

Frederik Anspach<sup>1</sup>, Enno Peters<sup>1</sup>, Dirk Bösche<sup>1</sup>, Patrick Vieth<sup>1</sup>, Tobias Kopp<sup>1</sup>, Michael Kurrat<sup>1</sup>  
<sup>1</sup>Technische Universität Braunschweig, Germany

1-2. (14:30-15:00)

**Investigation of post arc radiating behaviour of a spark gap for DC protection**

Ralf Methling<sup>1</sup>, Diego Gonzalez<sup>1</sup>, Sebastian Schmausser<sup>2</sup>, Marco Kellermann<sup>2</sup>, Amd Ehrhardt<sup>2</sup>  
<sup>1</sup>Leibniz Institute for Plasma Science and Technology, Germany  
<sup>2</sup>DEHN SE + Co KG, Germany

1-3. (15:00-15:30)

**From the bronze age to the iron age - is the substitution of copper in electrical connectivity imaginable?**

Marcel Mainka<sup>1</sup>, Thomas Wielsch<sup>1</sup>  
<sup>1</sup>Weidmüller Group, Germany

*(Coffee Break 15:30-16:00)*

<<Session 2>> -- Modeling --

2-1. (16:00-16:30)

**Electromagnetic modelling of current density distribution in power plug-in connectors**

Michelle Pomsel<sup>1</sup>, Toni Israel<sup>1</sup>, Christian Hildmann<sup>1</sup>, Stephan Schlegel<sup>1</sup>, Tom Kufner<sup>2</sup>  
<sup>1</sup>Technische Universität Dresden, Germany  
<sup>2</sup>Stäubli Electrical Connectors AG, Switzerland

2-2. (16:30-17:00)

**One-dimensional numerical model for thermal domain analysis with respect to process fluctuations in ultrasonic metal welding**

Elisabeth Birgit Schwarz<sup>1,2</sup>, Fabian Bleier<sup>2</sup>, Friedhelm Guenter<sup>2</sup>, Jean Pierre Bergmann<sup>1</sup>  
<sup>1</sup>Technische Universität Ilmenau, Germany,  
<sup>2</sup>Bosch Research, Germany

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2-3. (17:00-17:30)

## **Predictive capability and efficiency of 2D planar against 3D models of LV interrupters**

Margarita Baeva<sup>1</sup>, Martin Hannig<sup>2</sup>, Ralf Methling<sup>1</sup>, Gregor Gött<sup>1</sup>, Diego Gonzalez<sup>1</sup>

<sup>1</sup>Leibniz Institute for Plasma Science and Technology, Germany

<sup>2</sup>DEHN SE + Co KG, Germany

## **Tuesday, June 14, 2022**

### **<<Session 3>> -- Arcing --**

3-1. (10:30-11:00)

#### **Influence of ambient gas on various characteristics of electromagnetic contactor in AC power supply**

Kiyoshi Yoshida<sup>1</sup>, Koichiro Sawa<sup>1</sup>, Kenji Suzuki<sup>2</sup>

<sup>1</sup>Nippon Institute of Technology, Japan

<sup>2</sup>Fuji Electric FA Components & Systems Co., Ltd., Japan

3-2. (11:00-11:30)

#### **Effect of inductive load on critical load current at switching device with magnetic blow-out**

Koichiro Sawa<sup>1</sup>, Kiyoshi Yoshida<sup>1</sup>, Kenji Suzuki<sup>2</sup>

<sup>1</sup>Nippon Institute of Technology, Japan

<sup>2</sup>Fuji Electric FA Components & Systems Co., Ltd., Japan

3-3. (11:30-12:00)

#### **Simulation study on electron density characteristics and its characterization methods of low voltage AC arc**

He shurui<sup>1</sup>, Zheng Xin<sup>1,2,3</sup>

<sup>1</sup>Fuzhou University

<sup>2</sup>Fujian Key Laboratory of New Energy Generation and Power Conversion

<sup>3</sup>Fujian Province University

3-4. (12:00-12:30)

#### **Study of arc motion characteristics of double-break molded case circuit breakers**

Shanshan Yu<sup>1</sup>, Jianning Yin<sup>2</sup>, Xingwen Li<sup>1</sup>

<sup>1</sup>Xi'an Jiaotong University, P.R.China

<sup>2</sup>Xi'an University of Technology, P.R.China

*(Lunch Break 12:30-14:00)*

### **<<Session 4>> -- Sliding & Connection --**

4-1. (14:00-14:30)

#### **Correlation between fretting corrosion and wear under various motion modes**

Haomiao Yuan<sup>1</sup>, Dirk Hilmert<sup>1</sup>, Robin Simonsmeier<sup>1</sup>, Jian Song<sup>1</sup>

<sup>1</sup>OWL University of Applied Sciences and Arts, Germany

4-2. (14:30-15:00)

#### **Self-lubricating coatings for high-current connectors**

Toni Israel<sup>1</sup>, Marcella Oberst<sup>1</sup>, Christian Hildmann<sup>1</sup>, Stephan Schlegel<sup>1</sup>

<sup>1</sup>Technische Universität Dresden, Germany

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4-3. (15:00-15:30)

## **Electrical-thermal operating behavior of aged compression type power connections**

Markus Gödicke<sup>1</sup>, Christian Hildmann<sup>1</sup>, Stephan Schlegel<sup>1</sup>, Jérémy Unterfinger<sup>2</sup>

<sup>1</sup>Technische Universität Dresden, Germany

<sup>2</sup>Amprion GmbH, Germany

*(Coffee Break 15:30-16:00)*

## <<Session 5>> -- Components --

5-1. (16:00-16:30)

### **Influences of geometry, solder position and volume on the fusing time of silver fuse elements with tin solder at low overcurrents in low-voltage power fuses**

Lukas Büttner<sup>1</sup>, Marcella Oberst<sup>1</sup>, Christian Hildmann<sup>1</sup>, Stephan Schlegel<sup>1</sup>

<sup>1</sup>Technische Universität Dresden, Germany

5-2. (16:30-17:00)

### **Design criteria and long-term behavior of current-carrying bolted joints**

Stephan Schlegel<sup>1</sup>

<sup>1</sup>Technische Universität Dresden, Germany

5-3. (17:00-17:30)

### **Quality analysis of stripped wire contacts in the production of hairpin windings for electric drives**

Markus Omlor<sup>1</sup>, Ana Maria Racu<sup>2</sup>, Jonas Hensel<sup>3</sup>, Klaus Dilger<sup>4</sup>

<sup>1</sup>Porsche AG, Germany

<sup>2</sup>Volkswagen AG, Germany

<sup>3</sup>Chemnitz University of Technology, Germany

<sup>3</sup>Technische Universität Braunschweig, Germany

## Wednesday, June 15, 2022

## <<Session 6>> -- Design & Materials --

6-1. (10:30-11:00)

### **Simulation of dynamic closing process of DC relay considering the contact bounce**

Huiduo Wang<sup>1</sup>, Xiaofeng Bai<sup>1</sup>, Xingwen Li<sup>1</sup>

<sup>1</sup>Xi'an Jiaotong University, P.R.China

6-2. (11:00-11:30)

### **Performance investigation of contact materials in DC high-voltage contactors and relays**

Sachihito Nishide<sup>1</sup>, Nobuhito Yanagihara<sup>1</sup>

<sup>1</sup>Tanaka Kikinzoku Kogyo K.K., Japan

6-3. (11:30-12:00)

### **Effects of intermediate heat treatment on properties of additively manufactured CuNiSi parts**

Sihan Joseph Chen<sup>1</sup>, Pawlikowski Greg<sup>1</sup>, Kim Hai Wong<sup>1</sup>, Baisong Cheng<sup>2</sup>, Fengxia Wei<sup>2</sup>,

Dennis Cheng Cheh Tan<sup>2</sup>

<sup>1</sup>TE Connectivity Singapore., Singapore

<sup>2</sup>Institute of Materials Research and Engineering, A\*STAR, Singapore

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6-4. (12:00-12:30)

## **Study of flame retardant additives in engineering plastics effects on silicone**

Dejie Tao<sup>1</sup>, Lei Wang<sup>1</sup>, Zenggang Wu<sup>2</sup>, Yiliang Wu<sup>1</sup>, Chris Yun<sup>1</sup>, Ting Gao<sup>1</sup>, Jason Chiota<sup>1</sup>,  
Evan Jiang<sup>2</sup>

<sup>1</sup>TE Connectivity, U.S.A.

<sup>2</sup>TE Connectivity Suzhou, P.R.China

*(Lunch Break 12:30-14:00)*

## **<<Session 7>> -- Surfaces --**

7-1. (14:00-14:30)

### **A high durability, reliable, cyanide-free silver finish**

Jamie Chen<sup>1</sup>, Michael Lipschutz<sup>1</sup>, Miguel Rodriguez<sup>1</sup>, Patricia Tainter<sup>1</sup>, Youngmin Yoon<sup>1</sup>,  
Kristen Griffin<sup>1</sup>

<sup>1</sup>DuPont Electronics & Industrial, U.S.A.

7-2. (14:30-15:00)

### **Reliable high speed matte tin process for connectors and industrial finishing**

Adolphe Foyet<sup>1</sup>, Margit Clauss<sup>1</sup>, Kristen Griffin<sup>2</sup>, Michael Lipschutz<sup>2</sup>

<sup>1</sup>Specialty Electronic Materials Switzerland GmbH, Switzerland

<sup>2</sup>DuPont Electronics & Industrial, U.S.A.

7-3. (15:00-15:30)

### **Comparative performance study of different conventional silver and hard silver-plating processes for connectors applications**

Antoine Fares Karam<sup>1</sup>, Anthony Franchini<sup>1</sup>, Damien Comte<sup>1</sup>, Ana Torrealba<sup>1,2</sup>, Sophie Noel<sup>2</sup>,  
Aurore Brézard-Oudot<sup>2</sup>, Charles Copper<sup>3</sup>, Jeffrey Toran<sup>3</sup>

<sup>1</sup>Amphenol Communication Solutions, France

<sup>2</sup>University Paris-Saclay, CentranleSupélec, Sorbonne Université, CNRS, France

<sup>3</sup>Amphenol Communication Solutions, U.S.A.

*(Coffee Break 15:30-16:00)*

## **<<Session 8>> -- Corrosion & Contact Resistance --**

8-1. (16:00-16:30)

### **Electrical and tribological investigations on silver sulfide layers of different thicknesses**

Tobias Dyck<sup>1</sup>, Patrick Neufeld<sup>1</sup>

<sup>1</sup>WAGO GmbH & Co. KG, Germany

8-2. (16:30-17:00)

### **Relay corrosion effects due to the generation of nitric acid and their impacts under high inductive load condition**

Thomas Herrle<sup>1</sup>, Dieter Volm<sup>2</sup>, Maximilian Kraus<sup>2</sup>,

<sup>1</sup>Panasonic Industrial Devices Europe GmbH, Germany

<sup>2</sup>Panasonic Electric Works Europe AG, Germany

8-3. (17:00-17:30)

### **Determination of contact resistance from a finite element analysis of a rough surface : using the peak summit density method**

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John W. McBride<sup>1</sup>, Kevin J. Cross<sup>2</sup>, Hong Liu<sup>3</sup>

<sup>1</sup>University of Southampton, U.K.

<sup>2</sup>TaiCaan Technologies Ltd., U.K.

<sup>3</sup>Jiangsu University, P.R.China

## Thursday, June 16, 2022

### <<Session 9>> -- Sliding & Surfaces--

9-1. (10:30-11:00)

#### **Dependence of contact resistance and surface deformation on surface roughness in silver contacts**

Kosuke Shinomura<sup>1</sup>, Junya Sekikawa<sup>1</sup>

<sup>1</sup>Shizuoka University, Japan

9-2. (11:00-11:30)

#### **Development of metalized carbon-carbon(C/C) composite pantograph contact strip**

Yoshitaka Kubota<sup>1</sup>, Koji Hasegawa<sup>2</sup>, Akio Kamezaki<sup>3</sup>

<sup>1</sup>Railway Technical Research Institute, Japan

<sup>2</sup>Fine Sinter Co., Ltd., Japan

<sup>3</sup>CFC Design Inc., Japan

9-3. (11:30-12:00)

#### **Research on temperature rise characteristics of rough surface of sliding friction pair**

Chunjie Yin<sup>1</sup>, Xiaokang Wang<sup>1</sup>, Fengyi Guo<sup>1</sup>, Fuhua Li<sup>1</sup>, Sheng Zhao<sup>1</sup>

<sup>1</sup>Wenzhou University, P.R.China

*(Lunch Break 12:00-13:00)*

### <<Session 10>> -- Arc fault & Arrester --

10-1. (13:00-13:30)

#### **DC arc fault detection and location based on multi-signal analysis in photovoltaic arrays**

Jing Wang<sup>1</sup>, Silei Chen<sup>2</sup>, Han Zhang<sup>3</sup>, Yu Meng<sup>3</sup>, Xingwen Li<sup>3</sup>

<sup>1</sup>Shenzhen Power Supply Bureau, P.R.China

<sup>2</sup>Xi'an University of Technology, P.R.China

<sup>3</sup>Xi'an Jiaotong University, P.R.China

10-2. (13:30-14:00)

#### **Simulation of external gas dynamics and pressure release vent for high voltage surge arrester**

Charles Chen<sup>1</sup>, Kim Hai Wong<sup>1</sup>, Eduardo F. Gastaldi<sup>2</sup>, Abe Shocket<sup>2</sup>, Raymond Quek<sup>3</sup>, Vinh-Tan Nguyen<sup>3</sup>,

<sup>1</sup>TE Connectivity Singapore, Singapore

<sup>2</sup>TE Connectivity., U.S.A.

<sup>3</sup>Institute of High Performance Computing, Singapore

<<Closing remarks>> (14:00-14:30)