

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

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

Final 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 Anspach¹, Enno Peters¹, Dirk Bösche¹, Patrick Vieth¹, Tobias Kopp¹, Michael Kurrat¹
¹Technische Universität Braunschweig, Germany

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

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

Ralf Methling¹, Diego Gonzalez¹, Sebastian Schmausser², Marco Kellermann², Amd Ehrhardt²
¹Leibniz Institute for Plasma Science and Technology, Germany
²DEHN 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 Mainka¹, Thomas Wielsch¹
¹Weidmüller 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 Pomsel¹, Toni Israel¹, Christian Hildmann¹, Stephan Schlegel¹, Tom Kufner²
¹Technische Universität Dresden, Germany
²Stäubli Electrical Connectors AG, Switzerland

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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^{1,2}, Fabian Bleier², Friedhelm Guenter², Jean Pierre Bergmann¹

¹Technische Universität Ilmenau, Germany,

²Bosch Research, Germany

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

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

Margarita Baeva¹, Martin Hannig², Ralf Methling¹, Gregor Gött¹, Diego Gonzalez¹

¹Leibniz Institute for Plasma Science and Technology, Germany

²DEHN 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 Yoshida¹, Koichiro Sawa¹, Kenji Suzuki²

¹Nippon Institute of Technology, Japan

²Fuji 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 Sawa¹, Kiyoshi Yoshida¹, Kenji Suzuki²

¹Nippon Institute of Technology, Japan

²Fuji 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 shurui¹, Zheng Xin^{1,2,3}

¹Fuzhou University

²Fujian Key Laboratory of New Energy Generation and Power Conversion

³Fujian Province University

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

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

Shanshan Yu¹, Jianning Yin², Xingwen Li¹

¹Xi'an Jiaotong University, P.R.China

²Xi'an University of Technology, P.R.China

(Lunch Break 12:30-14:00)

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

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

Correlation between fretting corrosion and wear under various motion modes

Haomiao Yuan¹, Dirk Hilmert¹, Robin Simonsmeier¹, Jian Song¹

¹OWL University of Applied Sciences and Arts, Germany

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

Self-lubricating coatings for high-current connectors

Toni Israel¹, Marcella Oberst¹, Christian Hildmann¹, Stephan Schlegel¹

¹Technische Universität Dresden, Germany

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

Electrical-thermal operating behavior of aged compression type power connections

Markus Gödicke¹, Christian Hildmann¹, Stephan Schlegel¹, Jérémy Unterfinger²

¹Technische Universität Dresden, Germany

²Amprion 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 Büttner¹, Marcella Oberst¹, Christian Hildmann¹, Stephan Schlegel¹

¹Technische Universität Dresden, Germany

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

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

Stephan Schlegel¹

¹Technische 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 Omlor¹, Ana Maria Racu², Jonas Hensel³, Klaus Dilger⁴

¹Porsche AG, Germany

²Volkswagen AG, Germany

³Chemnitz University of Technology, Germany

⁴Technische 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 Wang¹, Xiaofeng Bai¹, Xingwen Li¹

¹Xi'an Jiaotong University, P.R.China

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

A high durability, reliable, cyanide-free silver finish

Jamie Chen¹, Michael Lipschutz¹, Miguel Rodriguez¹, Patricia Tainter¹, Youngmin Yoon¹,
Kristen Griffin¹

¹DuPont Electronics & Industrial, U.S.A.

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

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

Sihan Joseph Chen¹, Pawlikowski Greg¹, Kim Hai Wong¹, Baisong Cheng², Fengxia Wei²,
Dennis Cheng Cheh Tan²

¹TE Connectivity Singapore., Singapore

²Institute of Materials Research and Engineering, A*STAR, Singapore

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

Study of flame retardant additives in engineering plastics effects on silicone

Dejie Tao¹, Lei Wang¹, Zenggang Wu², Yiliang Wu¹, Chris Yun¹, Ting Gao¹, Jason Chiota¹,
Evan Jiang²

¹TE Connectivity, U.S.A.

²TE Connectivity Suzhou, P.R.China

(Lunch Break 12:30-14:00)

<<Session 7>> -- Surfaces & Contact materials--

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

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

Sachihito Nishide¹, Nobuhito Yanagihara¹

¹Tanaka Kikinzoku Kogyo K.K., Japan

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

Reliable high speed matte tin process for connectors and industrial finishing

Adolphe Foyet¹, Margit Clauss¹, Kristen Griffin², Michael Lipschutz²

¹Specialty Electronic Materials Switzerland GmbH, Switzerland

²DuPont 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 Karam¹, Anthony Franchini¹, Damien Comte¹, Ana Torrealba^{1,2}, Sophie Noel²,
Aurore Brézard-Oudot², Charles Copper³, Jeffrey Toran³

¹Amphenol Communication Solutions, France

²University Paris-Saclay, CentranleSupélec, Sorbonne Université, CNRS, France

³Amphenol Communication Solutions, U.S.A.

(Coffee Break 15:30-16:00)

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

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

Electrical and tribological investigations on silver sulfide layers of different thicknesses

Tobias Dyck¹, Patrick Neufeld¹

¹WAGO 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 Herrle¹, Dieter Volm², Maximilian Kraus²,

¹Panasonic Industrial Devices Europe GmbH, Germany

²Panasonic 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

John W. McBride¹, Kevin J. Cross², Hong Liu³

¹University of Southampton, U.K.

²TaiCaan Technologies Ltd., U.K.

³Jiangsu 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 Shinomura¹, Junya Sekikawa¹

¹Shizuoka University, Japan

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

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

Yoshitaka Kubota¹, Koji Hasegawa², Akio Kamezaki³

¹Railway Technical Research Institute, Japan

²Fine Sinter Co., Ltd., Japan

³CFC Design Inc., Japan

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

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

Chunjie Yin¹, Xiaokang Wang¹, Fengyi Guo¹, Fuhua Li¹, Sheng Zhao¹

¹Wenzhou University, P.R.China

(Lunch Break 12:00-13:00)

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<<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 Wang¹, Silei Chen², Han Zhang³, Yu Meng³, Xingwen Li³

¹Shenzhen Power Supply Bureau, P.R.China

²Xi'an University of Technology, P.R.China

³Xi'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 Chen¹, Kim Hai Wong¹, Eduardo F. Gastaldi², Abe Shocket², Raymond Quek³, Vinh-Tan Nguyen³,

¹TE Connectivity Singapore, Singapore

²TE Connectivity., U.S.A.

³Institute of High Performance Computing, Singapore

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