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FRAUNHOFER INSTITUTE FOR
MACHINE TOOLS AND
FORMING TECHNOLOGY IWU

November 24–25, 2020, Fraunhofer IWU, Chemnitz, Germany

INSECT 2020

16th International Symposium on Electrochemical Machining Technology

Virtual Conference
FINAL PROGRAM

Together with:

TECHNISCHE UNIVERSITÄT
CHEMNITZ

Dear ladies and gentlemen,
dear colleagues,

It is our great pleasure to welcome you to the 16th International Symposium on Electrochemical Machining Technology INSECT 2020, which is the first INSECT held online.

The virtual symposium would like to build on the successful events of the last years. Besides the lectures, INSECT 2020 offers a virtual tour and presentation of the topic related testing facilities of Fraunhofer IWU and the Chemnitz University of Technology, and enough time and opportunities for questions and expert dialogues via the conference system.

In order to ensure a smooth conference, we kindly ask you to please follow our technical advice at the end of this brochure and to check your technical devices and internet connection to the communication system Microsoft Teams before the conference starts.

If you have any questions or difficulties, please use the contact information also given at the end of this brochure.

We look forward to welcoming you online!

Prof. Andreas Schubert
Chemnitz University of Technology and Fraunhofer IWU, Germany

PROGRAM

TUESDAY, NOVEMBER 24, 2020

WELCOME AND INTRODUCTION

9.00 **Welcome and Introduction**
A. Schubert, Chemnitz University of Technology and Fraunhofer IWU, Germany

SESSION 1: FUNDAMENTALS

CHAIR: M. SCHNEIDER
FRAUNHOFER IKTS, GERMANY

9.15 **Surface Modification by Cathodic Hydrogenation with Electrochemical Jet**
Y. Zhao[1], G. Zhang[1], J. Xue[1], S. Kakudo[2], M. Kunieda[2]
[1] Southern University of Science and Technology, China
[2] University of Tokyo, Japan

9.35 **Features of the Discharge Between a Metal Anode and a Hollow Current Supply**
A. Popov[1], V. I. Novikov[2], M. M. Radkevich[1], M. V. Novoselov[1], S. V. Zakharov[1], V. G. Teplukhin[1]
[1] Peter the Great Saint-Petersburg Polytechnic University, Russia
[2] Saint-Petersburg State University of Architecture and Civil Engineering, Russia

PROGRAM

TUESDAY, NOVEMBER 24, 2020

SESSION 1: FUNDAMENTALS

CHAIR: M. SCHNEIDER
FRAUNHOFER IKTS, GERMANY

9.55 **Detection of Hydrogen in Cathode Tool During Pulse Electrochemical Machining**
M. Ghasemiansafaei, M. Güner, F. Schäfer, M. Zeiner, D. Bähre
Saarland University, Germany

10.15 **Formation of Flow-Grooves during Electrochemical Machining**
B. Rommes, A. Klink, T. Herrig, J. Vorspohl, L. Ehle, T. Bergs
RWTH Aachen University, Germany

10.45 Coffee Break

SESSION 2: PROCESSING / PROCESS CONTROL

CHAIR: M. HACKERT-OSCHÄTZCHEN
OTTO VON GUERICKE UNIVERSITY, GERMANY

11.15 **Investigation of Single Pulse Smoothing Characteristics During PECM**
A. Klink, B. Rommes, L. Heidemanns, T. Herrig
RWTH Aachen University, Germany

11.35 **Process Source Analysis of the Regulation Parameters for Simultaneous Hole Widening**
H.-P. Schulze, O. Kröning, M. Herzig
Leukhardt Schaltanlagen Systemtechnik GmbH, Germany

11.55 **New Potentials for Precise ECM Achieved by Orbiting-Kinematics**
R. Schoesau[1], F. Böttcher[1], T. Petzold[2], H. Rentzsch[1], J. Edelmann[1]
[1] Fraunhofer IWU, Germany
[2] Chemnitz University of Technology, Germany

12.25 Lunch Break

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SESSION 3: MATERIALS

CHAIR: D. REYNAERTS
KATHOLIEKE UNIVERSITEIT LEUVEN, BELGIUM

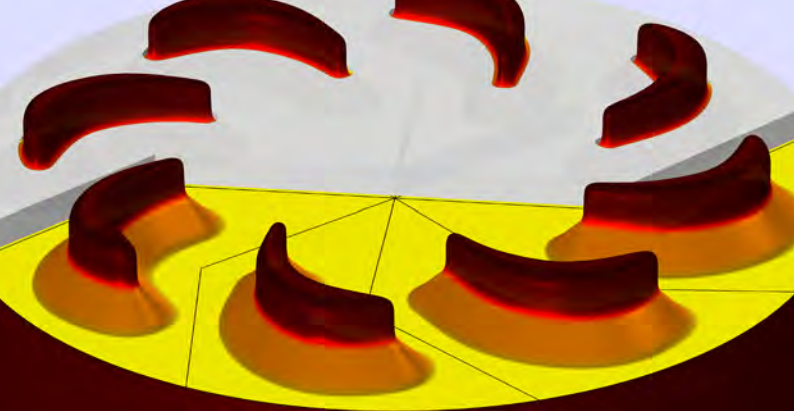
13.25 **Electrochemical Machining of Molybdenum**
M. Schneider[1], L. Šimůnková[2], A. Michaelis[1,2], W. Hoogsteen[3]
[1] Fraunhofer IKTS, Germany
[2] Technische Universität Dresden, Germany
[3] Philips Consumer Lifestyle, The Netherlands

13.45 **Experimental Study of Electrochemical Machining of Selective Laser Melted Inconel 718**
F. Herter[1], A. Ernst[1], A. Bergmann[2], D. Bähre[1]
[1] Saarland University, Germany
[2] Fraunhofer IPK, Germany

14.05 **Statistical Analysis of Jet Electrochemical Post-Processing of Additively Manufactured Workpieces**
M. Y. Zanjani[1], A. Martin[1], M. Zinecker[1], A. Schubert[1,2]
[1] Chemnitz University of Technology, Germany
[2] Fraunhofer IWU, Germany

14.25 **Pulsed Electrochemical Machining of 1.2709 Additive Manufactured Steel**
S. Schröder, T. Petzold, A. Martin, A. Schubert
Chemnitz University of Technology, Germany

14.55 Coffee Break



SESSION 4: SIMULATION AND MODELLING

CHAIR: H. ZEIDLER
TU BERGAKADEMIE FREIBERG, GERMANY

15.25 **Multiphysics Simulation Enabled 'Virtual Sensing' Approach for Monitoring the Parameters in the Interelectrode Gap During Tool-Based Hybrid Laser Electrochemical Micromachining**
K. K. Saxena[1], M. Wu[1,2], X. Chen[1,2], J. Qian[1], D. Reynaerts[1]
[1] Katholieke Universiteit Leuven, Belgium
[2] Guangdong University of Technology, China

15.45 **Transient Removal Simulation of the Jet Electrochemical Machining Process Based on a Finite Area Element Grid**
T. Wienand, G. Meichsner, M. Hackert-Oschätzchen
Otto von Guericke University Magdeburg, Germany

16.05 **Order Reduction of Simulation Models for the Precise Electrochemical Machining of Centrifugal Impellers**
S. Loebel[1], T. Petzold[1], P. Steinert[1], M. Zinecker[1], A. Schubert[1,2]
[1] Chemnitz University of Technology, Germany
[2] Fraunhofer IWU, Germany

PROGRAM
WEDNESDAY, NOVEMBER 25, 2020

SESSION 5: APPLICATIONS

CHAIR: A. KLINK
RWTH AACHEN UNIVERSITY, GERMANY

9.30 **Antibacterial Surfaces Textured by Electrolyte Jet Machining**
H. Jing[1], M. Kunieda[1], L. Romoli[2]
[1] University of Tokyo, Japan, [2] University of Parma, Italy

9.50 **Precise Processing of Multiple Actuator Elements by Pulsed Electrochemical Machining**
J. Schneider[1], T. Petzold[2], M. Uhlmann[1], A. Boehm[1], J. Edelmann[1], A. Martin[2], A. Schubert[2]
[1] Fraunhofer IWU, Germany
[2] Chemnitz University of Technology, Germany

10.10 **Pulse Electrochemical Machining (PECM) of Micro-structured Functional Surfaces**
T. Hall[1], A. Ernst[1], D. Durneata[1], H. Natter[1], M. Saumer[2], D. Bähre[1]
[1] Saarland University, Germany
[2] University of Applied Sciences Kaiserslautern, Germany

10.30 **Process Design for the Precise Electrochemical Machining of Internal Blind Hole Gears**
I. Schaarschmidt[1], P. Steinert[1], M. Zinecker[1], A. Schubert[1,2]
[1] Chemnitz University of Technology, Germany
[2] Fraunhofer IWU, Germany

11.00 Coffee Break

VIRTUAL LAB TOUR

11.30 **Current Research and Innovations in Electrochemical Machining**

11.50 **Dialogue with Experts**
J. Edelmann, Fraunhofer IWU, Germany
A. Martin, Chemnitz University of Technology, Germany
I. Danilov, Chemnitz University of Technology, Germany

12.00 Lunch Break

PROGRAM

WEDNESDAY, NOVEMBER 25, 2020

SESSION 6: HYBRID EC-PROCESSES

CHAIR: D. BÄHRE

SAARLAND UNIVERSITY, GERMANY

13.00 **Electrolytic Plasma Micropatterning of Plasma Sprayed Ceramic Coatings**

N. Laugel[1], D. Bogachov[1,2], A. Yerokhin[1]

[1] University of Manchester, United Kingdom

[2] Sandon Global, United Kingdom

13.20 **Hybrid Electrochemical Machining Processes**

A. Ruszaj[1,2], M. Cygnar[1], K. Furyk-Grabowska[1], M. Grabowski[2]

[1] State University of Applied Sciences, Poland

[2] Cracow University of Technology, Poland

13.40 **Workpiece Temperature during Plasma-Electrolytic Polishing**

H. Zeidler[1,2], F. Böttger-Hiller[2], M. Penzel[2,] T. Böttger[1]

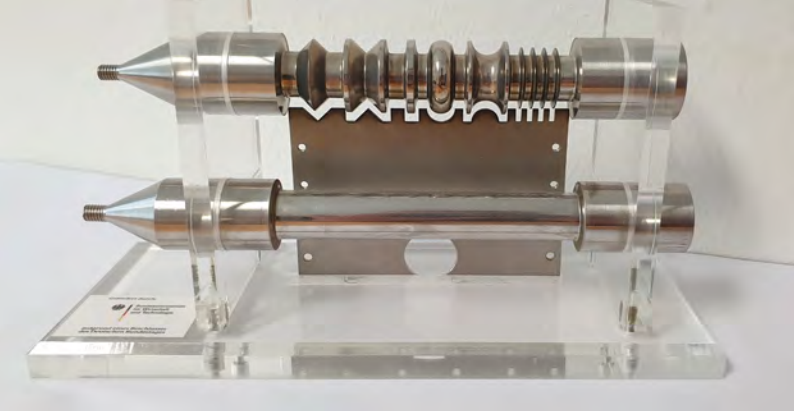
[1] TU Bergakademie Freiberg, Germany

[2] Beckmann-Institute for Technology Development, Germany

14.00 **Correlation between Current Density and Ablation Rate of Jet-PeP**

S. Quitzke, A. Martin, A. Schubert

Chemnitz University of Technology, Germany



14.20 **Electrolyte Flow in Plasma-Electrolytic Polishing**
H. Zeidler[1,2], F. Böttger-Hiller[2], M. Penzel[2], T. Böttger[1], H. Leihkauf[1]
[1] TU Bergakademie Freiberg, Germany
[2] Beckmann-Institute for Technology Development, Germany

14.40 **Announcement INSECT 2021**

14.50 **Closing Remarks INSECT 2020**
A. Schubert, Chemnitz University of Technology and Fraunhofer IWU, Germany

GENERAL INFORMATION

Conference Contact
Phone +49 371 5397-1880
insect2020@iwu.fraunhofer.de
www.insect-symposium.de

Technical Advice
For the best possible transfer connection of the conference, we recommend you to use the Microsoft Teams App and to connect your computer/laptop to the internet by using a LAN cable. Furthermore we recommend you to log in to the conference before it starts to check if there are any unforseen complications.
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