

PREFACE

A topical workshop with focus on industrialization and commercialization of ALD for current and emerging markets.

Atomic Layer Deposition (ALD) is used to deposit ultra-conformal thin films with sub-nm film thickness control. The method is unique in the sense that it employs sequential self-limiting surface reactions for growth in the monolayer thickness regime. Today, ALD is a key technology in leading edge semiconductor technology and the field of application in other industries is increasing rapidly. According to market estimates the equipment market alone is currently at an annual revenue of US\$ 1.8-1.9 billion (2018) and it is expected to double in the next 4-5 years.

In a European context ALD was invented independently twice in Europe (Russia & Finland) and since the last 15 years Germany has grown to become one of the strongest European markets for ALD in R&D, chemicals, equipment and end users.

This year we will organize the 4th EFDS “ALD For Industry Workshop” – digital. ALD for Industry provides the opportunity to get in contact with industrial and academic partners, to learn more about fundamentals of ALD technology and to get informed about recent progress in the field.

The Event will focus on the current markets for ALD and addresses the applications in Semiconductor industry, MEMS & Sensors, Battery Technology, Medical, Display, Lightning, Barriers and Photovoltaics.

PROGRAM COMMITTEE

Dr. Jonas Sundqvist	BALD Engineering AB, Dresden, Germany
Dr. Christoph Hossbach	Picosun Oy and Picosun Europe GmbH, Dresden, Germany
Dr. Katrin Ferse	European Society of Thin Films (EFDS), Dresden, Germany
Dr. Henry Bernhardt	Infineon Technologies Dresden GmbH, Dresden, Germany
Dr. Lukas Mayr	BASF SE, Ludwigshafen, Germany
Bernd Hintze	Research Fab Microelectronics Germany (FMD), Dresden, Germany

Program - Wednesday, December 2, 2020

12:00 – 13:00 Warm-Up

Registration, technical support & networking

🏠 **Opening of Market Place**



Break Room – Who is Who?

13:00 Opening & Tutorials

13:10 **Current and Emerging ALD Processes, Precursors, IP Trends and Applications in High Volume Production**

Jonas Sundqvist, BALD Engineering AB, Värmdö, Sweden

13:30 **ALE for Nanopatterning**

Dmitry Suyatin, Lund University, Lund, Sweden

13:50 **Precursor Chemistry for the ALD of Functional Thin Films: Synthesis, Evaluation and Applications**

Nils Boysen, Ruhr-Universität, Bochum, Germany

14:10 Break

14:20 – 14:40 Market Place & Meeting Rooms

Networking and topical discussion

🏠 **Market Place**



Tutorial – Talk | Q & A

14:40 Workshop Session

14:40 Keynote Lecture

When Time-Resolved CVD Outperforms Continuous CVD-ALD as the Enabler for InN Based Electronics

Henrik Pedersen, Linköping University, Sweden

15:10 **ALD of Noble Metals – Challenges & Perspectives for Ru and Pt ALD Precursors**

Nicolas Blasco, Air Liquide, Paris, France

15:30 **ALD for Challenging 3D Structures: Industrial Applications**

Christoph Hossbach, Picosun Oy and Picosun Europe GmbH, Dresden, Germany

15:45 Break

15:55 – 16:15 Market Place & Company Tour

Tour, networking & topical discussion

🏠 **Market Place**

🏭 **insights into production at FHR Anlagenbau GmbH**
“Company Introduction & 1st Spatial ALD Machine”

Hannes Klumbies, FHR Anlagenbau GmbH, Dresden

16:15 Workshop Session

16:15 **Batch ALD for 5G High Volume Applications**
Ganesh Sundaram, Veeco Instruments, Waltham, USA

16:30 **Industrial Production of Moisture Barrier Coatings by Atomic Layer Deposition**
Kalle Niiranen, Beneq Oy, Espoo, Finland

16:45 **Conformal Thick Dielectric Deposition on 3D Structures at CVD Speed**
Veronique De Jonghe, Plasma-Therm, St. Petersburg, USA

17:00 **End of official program – day 1**

17:00 – 18:00 **AFTER WORK Meeting & ALD Quiz**

SPECIAL | ALD Quiz
You are an ALD Specialist?
Answer the questions and
win the PRIZE!

Sponsored by  **picosun**
AGILE ALD



Bose Noise Cancelling
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Program - Thursday, December 3, 2020

08:30 – 09:00 Warm-Up

Networking & Tour

🏠 **Market Place**

🕒 **Insights into Production at Trumpf Hüttinger | 08:40 – 09:00**

„Production-Tour Video & RF- and MW- Power Generators for PEALD applications”

Carsten Winnewisser, Trumpf Hüttinger GmbH + Co. KG, Freiburg, Germany

09:00 Tutorials Session

09:00 **In Situ Metrology for ALD Processes**
Martin Knaut, TU Dresden, Dresden, Germany

09:20 **Optimization of Atomic Layer Deposition Processes Using Simulation: an Overview**
Linda Jäckel, Fraunhofer ENAS, Chemnitz, Germany

09:40 **ALD for Photovoltaic Applications**
Tobias Törndahl, Uppsala University, Uppsala, Sweden

10:00 **Break**

10:10 – 10:30 Market Place & Meeting Rooms

Networking and topical discussion

🏠 **Market Place**

🗣️ **Tutorial – Talk | Q & A**

10:30 Workshop Session

10:30 **Elevator Pitch:** MKS Instruments Deutschland GmbH, Gencoa Ltd., VAT Deutschland GmbH, Pegasus Chemicals Ltd.

11:00 **ALD at CEA-Leti: From Research to Applications**
Remy Gassilloud, CEA Leti, Grenoble, France

11:20 **Innovative ALD Industrial Services**
Joël Matthey, Positive Coating, La Chaux-de-Fonds, Switzerland

11:40 **ALD of Titanium Nitride as Ultra-Thin-Lithium-Ion Diffusion Barrier**
Sascha Böhnhardt, Fraunhofer IPMS CNT, Dresden, Germany

12:00 Break

12:10 – 12:30 Market Place & Meeting Rooms

Networking & topical discussion

🏠 **Market Place**

ALD Talk | Panel Discussion

Moderated by Jonas Sundqvist, BALD Engineering, Värmdö, Sweden

“How fast can ALD become” | Jacques Kools, Encapsulix SAS, Simiane-Collongue, France

“Future of ALD – Emerging Markets” | Nicolas Blasco, Air Liquide, Paris, France

12:30 Workshop Session

12:30 **Direct Atomic Pattern Printing**
Maksym Plakhotnyuk, ATLANT 3D Nanosystems, Kgs. Lyngby, Denmark

12:45 **Large Area ALD Coatings for Health, Environment and Energy Applications**
Jacques Kools, Encapsulix SAS, Simiane-Collongue, France

13:00 **Aspects of ALD Work within the FMD and Potential Extensions**
Bernd Hintze, Research Fab Microelectronics Germany (FMD), Dresden, Germany

13:15 **In-Situ-Real-Time and Ex-Situ Spectroscopic Analysis of Al₂O₃ Films Prepared by Plasma Enhanced Atomic Layer Deposition**
Paul Plate, SENTECH Instruments GmbH, Berlin, Germany

13:30 **Plasma ALD Processing of GaN Power and RF Devices for High Volume Manufacturing**
Aileen O’Mahony, Oxford Instruments, Bristol, United Kingdom

13:45 End of the official program – day 2

All rooms are open also after the event for longer discussions.

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General Information

Fees

ALD for Industry, Workshop & Tutorial:

Standard: 790,00 EUR

Students: 395,00 EUR

Workshop fees are free of VAT according to §4 (22a) UStG (German value-added tax law).

Terms

The general terms and conditions of sale of the EFDS apply (www.efds.org/agb). Cancellations must be made in written form. In case of the cancellation of your registration before November 18, 2020, a cancellation fee of 50,00 EUR will be charged. After this date, a refund is not possible. The EFDS processes your data according to the data privacy statement of EFDS. You can find all information at www.efds.org/datenschutz.

Online Registration

Please use the online registration: <https://www.efds.org/event/ald2020/>

Organization

European Society of Thin Films
Gostritzer Straße 63
01217 Dresden
Germany

Contact

Tel: +49 351 8718372
info@efds.org
www.efds.org