UNIVERSITÄT LEIPZIG

BuildMoNa
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TC 2019

BuildMoNa Symposium 2019

Transparent Conductive Oxides – Fundamentals and Applications

Monday, 23 September to Friday, 27 September 2019
Universität Leipzig, 04103 Leipzig, Linnéstr. 5,
Lecture Hall for Theoretical Physics

Agenda

Monday, 23 September 2019

13:00 Prof. Dr. Marius Grundmann
Universität Leipzig, Germany
Opening

13:05 Dr. Debdeep Jena*
Cornell University, USA
Paul Drude Lecture I: *The Drude Model Lives On: Its Simplicity and Hidden Powers*

13:50 Prof. Vanya Darakchieva*
Linköping University, Sweden
Paul Drude Lecture II: *Optical properties of the electron gas*

14:35 Dr. Robert Karsthof
University of Oslo, Norway
Revisiting the electronic transport in doped nickel oxide

**Invited talk*

14:50 Dr. Petr Novák
University of West Bohemia, Plzeň, Czech Republic
Important factors influencing the electrical properties of sputtered AZO thin films

15:05 *Coffee break (Aula)*

15:35 Dr. Andriy Zakutayev*
National Renewable Energy Laboratory, USA
Wide Band Gap Chalcogenide Semiconductors

16:20 Alexander Koch
Universität Jena, Germany
Ion Beam Doped Transparent Conductive Oxides for Metasurfaces

16:35 Prof. Chris van de Walle*
UC Santa Barbara, USA
Fundamental limits on transparency of transparent conducting oxides

**Invited talk*

Tuesday, 24 September 2019

08:15 *Excursion BMW Group Plant Leipzig*
Departure by bus from Leipzig, Linnéstr. 5

09:15 *Start Excursion BMW Visitor Center*

12:15 *Departure by bus from BMW Visitor Center*

12:45 *Lunch (Aula)*

14:30 Prof. Dr. Pedro Barquinha*
Universidade Nova de Lisboa, Portugal
Towards autonomous flexible electronic systems with zinc-tin oxide thin films and nanostructures

15:15 Dr. Saud Bin Anooz
Leibniz Institute for Crystal Growth, Berlin, Germany
Optimization of β-Ga_2O_3 film growth on miscut (100) β-Ga_2O_3 substrates by MOVPE

15:30 Dr. Piero Mazzolini
Paul-Drude-Institut für Festkörperelektronik, Berlin, Germany
Control over In-incorporation for monoclinic $(In_xGa_{1-x})_2O_3$ alloys on β-Ga_2O_3 substrates via molecular beam epitaxy

15:45 Max Kneiß
Universität Leipzig, Germany
Epitaxial stabilization of κ-$(In_xGa_{1-x})_2O_3$ and κ-$(Al_xGa_{1-x})_2O_3$ layers up to $x_{In} \leq 0.28$ and $x_{Al} \leq 0.65$ by tin-assisted VCCS-PLD

16:00 *Coffee break (Aula)*

**Invited talk*

16:30 Dr. Felix Gunkel*
FZ Jülich, Germany
Thermodynamic control of ionic-electronic structure in oxide thin films, heterostructures, and TCOs

17:15 Melanie Budde
Paul-Drude-Institut für Festkörperelektronik, Berlin, Germany
Application potential of epitaxial, meta-stable p-type SnO: Temperature stability and pn-junction with Ga_2O_3

17:30 Dr. Marcel Himmerlich*
CERN, Geneva, Switzerland
What to learn from surface spectroscopy about oxide layer functionality in electronic devices and particle accelerator components?

18:30 Poster session and finger food (TA307)

**Invited talk*

Wednesday, 25 September 2019

09:00 Lars Grieger*
Malvern Panalytical B.V., Almelo, The Netherlands
To swim or drown in XRD data - Measurement and Evaluation of 200 reciprocal space maps

09:45 Prof. Giuseppe Iannaccone*
University of Pisa, Italy
Quantum Engineering of transistors based on 2D materials heterostructures

10:30 *Coffee break (Aula)*

11:00 Prof. Cristiana Di Valentin*
University of Milan, Italy
Theory of oxide surfaces and interfaces

11:45 Prof. André Schleife*
University of Illinois, Urbana Champaign, USA
Excited electrons in TCOs: Dielectric screening and electron dynamics

12:30 *Lunch (Aula)*

13:30 Prof. Dr. Tobias Voss*
TU Braunschweig, Germany
Controlled formation of hybrid functional ZnO/polymer junctions by oxidative chemical vapor deposition (oCVD)

14:15 Dr. Markus Wagner*
TU Berlin, Germany
Optical and thermal characteristics of Ga_2O_3 polymorphs

15:00 Johannes Feldl
Paul-Drude-Institut für Festkörperelektronik, Berlin, Germany
Cubic $(In,Ga)_2O_3$ films studied by Raman scattering and spectroscopic ellipsometry

**Invited talk*

15:15 *Coffee break (Aula)*

16:00 Prof. Wladek Walukiewicz*
Lawrence Berkeley, USA
Materials Design Principles for Transparent Conductors

16:45 Dr. Chang Yang
Universität Leipzig, Germany
Amorphization of sputtered CuI thin films

17:00 Prof. Hideo Hosono*
Tokyo Institute of Technology, Japan
The Karl Bädeker Lecture: *Novel Transparent Oxide Semiconductors: Design, Property and Application*

17:45 *Group photo shooting (in front of the main entrance)*

20:00 Prize ceremony and conference banquet at Mückenschlösschen

**Invited talk*

Thursday, 26 September 2019

09:45 Prof. Dr. Rebecca L. Peterson
University of Michigan, Ann Arbor, USA
3-D integration of zinc tin oxide electronics

10:10 Dr. Klaus Magnus Håland Johansen
University of Oslo, Norway
Direct observation of Burstein-Moss shift and plasmon excitation in GZO by STEM-EELS

10:30 *Coffee break (Aula)*

11:00 Prof. Silvana Botti*
Universität Jena, Germany
First-principles engineering of CuI by control of Cu vacancies and doping

11:45 Prof. Gertjan Koster*
University of Twente, The Netherlands
Advanced Pulsed Laser Deposition

12:30 *Lunch (Aula)*

13:30 Dr. Andrew Green*
AirForce Res. Lab., Ohio, USA
Scaled β-Ga_2O_3 MOSFET devices for high performance power electronics and radio frequency amplification

14:15 Prof. Leonard J. Brillson*
Ohio State University, USA
Nanoscale Identification and Control of Native Point Defects in TCO Semiconductors

**Invited talk*

15:00 Dr. Anna Reinhardt
Universität Leipzig, Germany
Process optimization for the sputter deposition of amorphous zinc oxynitride thin films

15:15 Dr. Ruslan Muydinov
TU Berlin, Germany
Crystallization of amorphous indium zinc oxide films

15:30 *Coffee break (Aula)*

16:00 Prof. Dr. Martin Allen
University of Canterbury, Christchurch, New Zealand
The surface chemistry and electronic properties of β-Ga_2O_3 surfaces

16:45 Dr. David Caffrey
University of Dublin, Ireland
The importance of local bond order to conduction in amorphous, transparent, conducting oxides: The case of amorphous $ZnSnO_y$

17:00 Dr. Tilo Meister*
TU Dresden, Germany
Bendable Metal Oxide and Printed Electronics for High Frequency Wireless Communications

**Invited talk*

Friday, 27 September 2019

09:30 Akhil Mauze
UC Santa Barbara, USA
Development of β-Ga_2O_3 and β-$(Al_xGa_{1-x})_2O_3$/Ga_2O_3 Heterostructures by Plasma-Assisted MBE

09:45 Alexandra Papadogianni
Paul-Drude-Institut für Festkörperelektronik, Berlin, Germany
Homoepitaxial Growth of In_2O_3 Films by Plasma-Assisted Molecular Beam Epitaxy on (111)-, (011)-, and (001)-oriented bulk substrates

10:00 Raphael Müller
Ulm University, Germany
New CVD based growth method for highly crystalline epitaxial ZnO layers on Si(111) and c-plane sapphire

10:15 *Coffee break (Aula)*

10:45 Dr. Frank Herklotz
TU Dresden, Germany
Photoconductive detection of a hydrogen donor in SnO_2

11:00 Dr. Peter Schlupp
Universität Leipzig, Germany
Influence of the cation ratio on defect formation and properties in zinc-tin-oxide thin films

11:15 Dr. Niko Münzenrieder*
Free University of Bozen-Bolzano, Italy
Thin-film transistors for flexible analog circuits

12:00 Prof. Dr. Marius Grundmann
Universität Leipzig, Germany
Closing

12:15 Prospective end

**Invited talk*