BuildMoNa Minisymposium

**Transparent Conductive Oxides – Fundamentals and Applications**

**Monday, 18 September to Friday, 22 September 2017**
Universität Leipzig, 04103 Leipzig, Linnéstr. 5,
Lecture Hall for Theoretical Physics

**Agenda**

**Monday, 18 September 2017**

13:30 Prof. Dr. Marius Grundmann
Universität Leipzig, Germany
*Opening*

14:00 Dr. Klaus Ellmer*
Helmholtz-Zentrum Berlin, Germany
*Electronic transport in heavily doped oxides: Effect of ionized impurities, grain boundaries, secondary phases and dopant clustering*

14:45 Gentnet Deyu
TU Darmstadt, Germany
*Defect modulation doping of transparent conducting oxides*

15:05 Jasper Westphalen
TU Ilmenau/ Fraunhofer FEP Dresden, Germany
*Flash lamp annealing of ITO thin films on large area ultra-thin glass*

15:25 *Coffee break (Aula)*

*Invited talk
*Keynote talk
16:00  Dr. Joel B. Varley*
Lawrence Livermore National Laboratory, Livermore, CA, USA
*Insights into the conductivity of TCOs through hybrid functional calculations

16:45  Prof. Dr. Peter Deák*
University of Bremen, Germany
*Beyond-standard DFT defect calculations in the prospective TCO materials TiO₂ and Ga₂O₃
Tuesday, 19 September 2017

09:00  Prof. Dr. Takahisa Omata*
       IMRAM, Tohoku University, Japan
       Wurtzite-type ternary I-III-O₂ oxide semiconductors; new materials expanding the energy band gap range covered by oxide semiconductors

09:45  Dr. Chang Yang
       Universität Leipzig, Germany
       Towards high-performance p-type transparent conductive thin films with copper iodide

10:05  Mohammed M. Gomaa
       Linköping University, Sweden/ National Research Center Giza, Egypt
       Effect of spray pyrolysis parameters on the structural and optical properties of NiO films as a p-type-TCO

10:25  Coffee break (Aula)

11:00  Dr. Encarnación G. Villora*
       National Institute for Materials Science, Tsukuba, Japan
       Halide vapor phase epitaxy of metastable α- and ε-Ga₂O₃

11:45  Prof. Dr. Armin Dadgar*
       Otto-von-Guericke-Universität Magdeburg, Germany
       GaN, a transparent conductive nitride

12:30  Lunch (Aula)

14:00  Dr. Geoffroy Hautier*
       Université catholique de Louvain, Belgium
       High-throughput computational search for new high mobility transparent (semi)conducting oxides

14:45  Prof. Dr.-Ing. Paul Erhart°
       Chalmers University of Technology, Gothenburg, Sweden
       A unifying perspective on oxygen vacancies in wide band gap oxides

15:30  Coffee break (Aula)

*Invited talk
°Keynote talk
16:00  Prof. Dr. Lasse Vines*
University of Oslo, Norway
*Self-compensation and the vacancy-dopant pair in highly Al- and Ga-
doped ZnO

16:45  Dr. Shengqiang Zhou
Helmholtz-Zentrum Dresden-Rossendorf, Germany
Ion implantation and sub-second annealing for oxide and
semiconductor processing

17:05  Dr. Magdalena Nistor
National Institute for Lasers, Plasma and Radiation Physics, Bucharest-
Magurele, Romania
Tuning electrical and optical properties of Nd:ZnO films grown by PLD
or PED

17:25  Jack Swallow
University of Liverpool, United Kingdom
Self-compensation in F-doped SnO$_2$

18:00  Poster session and finger food (TA307)

*Invited talk
*Keynote talk
**Wednesday, 20 September 2017**

09:00  Lars Grieger  
PANalytical B.V., Almelo, The Netherlands  
*Fully automated measurement and analysis of reciprocal space maps*

09:20  Dr. Jesús Zúñiga-Pérez*  
UCA, CRHEA-CNRS, Valbonne, France  
*ZnO-based polariton lasers: From heteroepitaxial to homoepitaxial optical microcavities*

10:05  Marcel Wille  
Universität Leipzig, Germany  
*Demonstration of lasing in cuprous iodide microwires*

10:25  *Coffee break (Aula)*

11:00  Dr. Chris Sturm*  
Universität Leipzig, Germany  
*Optics and tensor properties of anisotropic TCOs*

11:45  Andreas Fiedler  
Leibniz-Institute for Crystal Growth, Berlin, Germany  
*Photo- and electroluminescence of chromium doped \( \beta \)-Ga\(_2\)O\(_3\)*

12:05  Theresa Berthold  
TU Ilmenau, Germany  
*On the interaction of oxygen, ozone and water with In\(_2\)O\(_3\)(111) surfaces*

12:30  *Lunch (Aula)*

14:00  Dr. Oliver Bierwagen*  
Paul-Drude-Institut für Festkörperelektronik, Berlin, Germany  
*Bulk and surface charge transport in semiconducting oxides*

14:45  Alana Hyland°  
University of Canterbury, Christchurch/ The MacDiarmid Institute for Advanced Materials and Nanotechnology, Wellington, New Zealand  
*Persistent photoconductivity in ZnO-based ultraviolet photodetectors*

15:30  *Coffee break (Aula)*

*Invited talk  
°Keynote talk
16.00  Dr. Kevin D. Leedy*
Air Force Research Laboratory, Ohio, USA
Conductivity control in homoepitaxial Si-doped β-Ga$_2$O$_3$ thin films by pulsed laser deposition

16:45  Jonas Michel
TU Ilmenau, Germany
Mechanism of Schottky contact formation on indium oxide semiconducting films

17:05  Philipp Wendel
TU Darmstadt, Germany
Polarization dependence of ZnO Schottky barrier heights

17:25  Peter Schlupp
Universität Leipzig, Germany
Room temperature fabricated fully oxide junction field-effect transistors and inverters on rigid and flexible substrates

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

20:00  Prize ceremony and conference banquet at Bayerischer Bahnhof

*Invited talk
*Keynote talk
Thursday, 21 September 2017

09:00  Prof. Dr. Judith L. MacManus-Driscoll*
University of Cambridge, United Kingdom
A new paradigm for defect, strain and coupling in oxide epitaxial nanocomposite thin films for realising unprecedented functional properties

09:45  Max Kneiß
Universität Leipzig, Germany
A new pulsed laser deposition technique to control the composition of ternary thin films in growth direction demonstrated on the transparent Mg$_x$Zn$_{1-x}$O alloy

10:05  Dr. Vikas Sharma
Indian Institute of Technology Delhi/ Malaviya National Institute of Technology Jaipur, India
Tuning of optical and electrical properties of SnO$_x$-Ag-SnO$_x$ stacked structure using noble ion irradiation for TCO application

10:25  Coffee break (Aula)

11:00  Prof. Dr. Marjorie Olmstead*
University of Washington, Seattle, USA
Aluminum gallium oxide: A tunable solar-blind conductor

11:45  Prof. Dr. Andreas Klein
TU Darmstadt, Germany
Interfaces and grain boundaries of Cu$_2$O

12:05  Viet-Anh Ha
Université catholique de Louvain, Belgium
Structural design principles for low hole effective mass s-orbital-based p-type oxides

12:30  Lunch (Aula)

14:00  Prof. Dr. Chris McConville*
RMIT University Melbourne, Australia/ University of Warwick, UK
Transparent conducting oxide semiconductors: Exploring their electronic structure

*Invited talk
*Keynote talk
14:45 Magda Barecka (INREP)
Lodz University of Technology, Poland
Towards more sustainable TCO layers: Environmental effects of replacement of ITO by alternative materials

15:05 Dr. Daniel Fritsch (INREP)
University of Bath, United Kingdom
Optical properties of amorphous Zn-Sn-Ti oxides: A combined molecular dynamics and density functional theory study

15:30 Coffee break (Aula)
Friday, 22 September 2017

09:00 Dr. Janne-Petteri Niemelä (INREP)
Eindhoven University of Technology, The Netherlands
*Invited talk*
Atomic layer deposition of MoO₅ and Al-doped ZnO for Si heterojunction solar cells

09:20 Dr. Margaret A. Hopkins (INREP)
University of Bath, United Kingdom
*Keynote talk*
Indium-free transparent ohmic contacts to N-polar n-type GaN

09:40 Dr. Simon Rushworth (INFINITY)
EpiValence Limited, The Wilton Centre, Cleveland, United Kingdom
Introduction to INFINITY - Indium-free transparent conductive oxides for glass and plastic substrates
Stabilisation of active ingredients in novel low temperature transparent conducting oxide printing process to improve performance

10:10 Prof. Dr. Alan Taylor (INFINITY)
TWI Ltd., Cambridge, United Kingdom
*Invited talk*
Development of novel active binders for indium-free transparent conductive oxides

10:30 Coffee break (Aula)

11:00 Cristina Salazar (INFINITY)
Centro Tecnológico Lurederra, Spain
Industrial production of tailored nanoparticles by advanced, high-output, high-versatility Flame Spray Pyrolysis

11:20 Dr. Thiago M. Amaral (INFINITY)
INM-Leibniz Institute for New Materials, Saarbrücken, Germany
Improvement of the conductivity of wet chemical deposited Al doped ZnO coatings by thermal treatment of the nanoparticles under forming gas

11:40 Dr. Thiago M. Amaral (INFINITY)
INM-Leibniz Institute for New Materials, Saarbrücken, Germany
Effect of different atmospheres during UV treatment on the conductive properties of In-free TCO coatings

12:00 Dr. Anton Serkov (INFINITY)
University of Hull, United Kingdom
Laser treatment of gravure-printed ITO films on PET

*Invited talk
*Keynote talk
12:20  Prof. Dr. Marius Grundmann  
Universität Leipzig, Germany  
*Closing*

12:35  Prospective end

*Invited talk  
*Keynote talk