EPFL Valais, ChE 602 Seminar, 27.04.2017

Title: Challenges in perovskite photovoltaics: towards a stable and efficient technology

Abstract:
Semiconducting perovskites and their corresponding opto-electronic applications have evolved at an impressive speed over the last years. Given the maturity of this technology in terms of performance, a surprisingly number of scientifically challenging questions are still under discussion. The nature of the bandgap transition and the unusual long carrier lifetime is one of these questions, the origin of hysteresis, the nature of the junction and the corresponding field distribution as well as the ultimate mobility of that class of soft ionic semiconductors are other fascinating aspects. In this seminar we will take a closer look to some of these ongoing challenges and finally suggest a surprisingly simple device model to rationalize the origin of hysteresis.

Bio:

Prof. Dr. Christoph J. Brabec

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Date of Birth: 07.09.1966

Birthplace: Linz, AT

Family status: married, 3 children

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Academic & industrial development

1995 -1998: Appointment to the position of an assistant professor at the Kepler University of Linz, Austria, (rheological, optical, electrical and magnetic characterization of polymers.

1996:	Sabbatical at the Institute for Polymers & Organic Solids at the University of California, Santa Barbara (Prof. Alan J. HEEGER, Nobel laureate 2000 for Chemistry)
1998 - 2001:	Principal Investigator (PI) at the CD Laboratory for Plastic Solar Cells, Linz, Austria
2001 - 2004	Principal research scientist & project leader at Siemens Corporate Technology, Department Microsystems and Materials, Erlangen, Germany
2004 - 2009:	Various positions at Konarka Technologies after a successful outsourcing of the organic photovoltaics activities from Siemens
08/2004:	Appointment to Director of OPV at Konarka Technologies, Lowell, USA
2005:	Appointment to the CEO for Konarka Austria and Konarka Nuremberg
04/2006	Appointment to the CTO and Vice President at Konarka Technologies, Lowell, USA
2009 - aktuell	W3 Professor at FAU University Erlangen-Nuremberg (Institute Materials for Electronics and Energy Technology – I.MEET)
2009	Appointment to the scientific director of the ZAE Bayern, Erlangen
2009	Appointment as Executive Board Member of the ZAE Bayern
2010	Appointment as Board Member of the Energy Campus Nürnberg (EnCN) eV
2013	Appointed as Speaker of the International Center for Nanostructured Films (IZNF) at FAU Erlangen-Nürnberg
2013	Appointed as Head of Board of ZAE Bayern eV
2015 - 2016:	Appointment as the Head of the Department of Material Science at the Friedrich Alexander University Erlangen Nürnberg

Research Interests

- Renewable Energies
- Photovoltaics & Solar Energy
- Production of Semiconductor Devices by Printing / Coating Methods
- Combinatorial & High Throughput Research: Methods, Materials, Processes

Scientific Research Interest:

- Research and development on organic and hybrid semiconductors, with a strong focus on the photophysics and transport properties of disordered semiconductors.
- Development and investigation of organic and/or printed solar cells, with a strong focus on the development of novel materials, investigation of microstructure & morphology formation in organic semiconductor composites and on fundamentals of thin film solar cells.
- Development of low cost production technologies for semiconductor devices, with a strong focus on printing and coating technologies.

- Development of optoelectronic devices for renewable energy applications like (i) 3rd generation solar cell technologies (ii) lighting and (iii) light management.
- Development and application of non-destructive imaging methods for optoelectronic devices, like EL or IR imaging.
- Development of combinatorial & high throughput methods for the discovery of energy materials and energy devices.
- Renewable energy systems and components for energy generation and storage

Awards / Functions (selection):

2005	"Inventor of the year" with the highest number of patents in the field of organic PV
2007	Rated among the top ten cited researchers in the field of organic electronics / solar cells
2009	Chairman of the Board of Advanced Energy Materials – Wiley-VCH
2010	Member of the Advisory Board of Progress in Photovoltaics – Wiley-VCH
2010	Member of the Advisory Board of the Journal of Photonics for Energy – SPIE
2011	Ranked as #12 among the top 100 material scientists for the last decade (by ISI)
2013	Ranked among the Top 1% materials researchers worldwide (Thompson Reuters)
2013	Member of the Advisory Board of PEC, Imperial College, London, UK.
2014	Ranked among the Top 1% materials researchers worldwide (Thompson Reuters)
2015	Member of the Advisory Board of AMBER (Trinity College, Dublin, Ireland)
2015	Ranked among the Top 1% materials researchers worldwide (Thompson Reuters)
2016	Member of the Advisory Board of Energy Technology, Wiley VCH

- **Scientific track record:**
  - > 450 publications in ISI rated journals,
  - h factor > 80
  - > 90 patents

- **Educational track record:**
  - Supervision of PhD candidates: Supervised more than 20 PhD students
  - 3 PhD students from i-MEET already professors (Wuhan Univeristy, Gunagzhou University, China & KAUST, Saudi Arabia)
  - Current Supervision of > 30 PhD students