

CONFERENCE PROGRAMME

Please note, that this Programme may be subject to alteration and the organisers reserve the right to do so without giving prior notice. The current version of the Programme is available at www.photovoltic-conference.com.

(i) = invited

MONDAY, 21 September 2009

PLENARY SESSION 1AP.1

8:30-10:10 Advanced Photovoltaics

Chairpersons:

G. Willeke
Fraunhofer CSP – Center for Silicon Photovoltaics, Halle, Germany

N.N.

- 1AP.1.1** A. W. Bett, F. Dimroth, W. Guter, R. Hoheisel, E. Oliva, S. Philipps, J. Schöne, G. Siefert, M. Steiner, A. Wekkeli & E. Welser
Fraunhofer ISE, Freiburg, Germany
M. Meusel, W. Köstler & G. Strobl
AZUR SPACE Solar Power, Heilbronn, Germany
Highest Efficiency Multi-Junction Solar Cell for Terrestrial and Space Applications
- 1AP.1.2** A. Luque, A. Martí Vega, E. Antolín, E. Cánovas, P.G. Linares, C. Tablero & D. Fuertes Marrón
UPM, Madrid, Spain
C.R. Stanley & C.D. Farmer
University of Glasgow, United Kingdom
R.P. Campion, J. Hall, S.V. Novikov & D.T. Foxon
University of Nottingham, United Kingdom
R. Scheer, B. Marsen & H. W. Schock
Helmholtz Centre Berlin for Materials and Energy, Germany
G. González, I. Martil, J. Olea & D. Pastor
UCM, Madrid, Spain
New Approaches to the Intermediate Band Solar Cell Concept
- 1AP.1.3** M.A. Green, G.J. Conibeer, D. König, I. Perez-Wurfl, A. Gentle, S.J. Huang, D. Song, X.J. Hao, F. Gao, S. Park, C. Flynn, Y.H. So, B. Zhang, D. Di, P. Campbell, Y. Huang & T. Puzzer
University of NSW, Sydney, Australia
Progress with All-Silicon Tandem Cells on Glass Using Silicon Quantum Dots in Silicon-Based Dielectric Matrices
- 1AP.1.4** J. Adams, N.J. Ekins-Daukes & K.W.J. Barnham
Imperial College London, United Kingdom
J.S. Roberts & G. Hill
University of Sheffield, United Kingdom
Efficiency Enhancement in Strain-Balanced Quantum Well Solar Cells via Anisotropic Emission

- 1AP.1.5** S. Gevorgyan & F.C. Krebs
RISOE National Laboratory, Roskilde, Denmark
Production and Stability of Polymer Solar Cells: from Spin Coating and Metal Evaporation to Full Roll-to-Roll Solution Processing

BREAK 10:10 – 10:30

10:30 – 12:10 OPENING SESSION

Chairperson:

W. Sinke
Conference General Chairman
ECN - Energy Research Centre of the Netherlands, Petten, The Netherlands

Opening Programme

- Welcome to the Conference by the Conference General Chairman
- Welcome Addresses by highranking personalities of the host country
- Highranking international personalities present their point of view concerning the role of PV Solar for Research, Industry and Climate Protection
- The Conference Programme Chair introduces the Conference Programme

European Becquerel Prize Ceremony

The Becquerel Prize will be awarded for the 17th time

Laudatio for the Becquerel Prize Awardee

Honorary Lecture by the Becquerel Prize Winner

Key note speech

Official Opening of the Conference

Please visit the Conference website for the newest information about the Conference Opening Event.

LUNCH 12:10 – 13:00

ORAL PRESENTATIONS 2AO.1

**13:00 – 14:30 Mono- and Multicrystalline Silicon Materials and Cells
Characterisation and Modelling**

Chairpersons:

R.A. Sinton
Sinton Consulting, Boulder, USA

N.N.

- 2AO.1.1** P.P. Altermatt, S. Dreissigacker, C. Sprodowski & S. Koc
University of Hannover, Germany
Y. Yang
Sun Yat-Sen University, Guangzhou, China
T. Dezhdar & R. Brendel
ISFH, Emmerthal, Germany
Highly Predictive Modelling of Entire Si Solar Cells for Industrial Applications
- 2AO.1.2** P. Gundel, M. C. Schubert & W. Warta
Fraunhofer ISE, Freiburg, Germany
H. Savin & M. Yli-Koski
Helsinki University of Technology, Espoo, Finland
M. Reiche
Max-Planck-Institut, Halle, Germany
Micro-Luminescence Spectroscopy on Multicrystalline Silicon
- 2AO.1.3** S. Herlufsen, J. Schmidt, D. Hinken, K. Bothe & R. Brendel
ISFH, Emmerthal, Germany
Camera-Based Photoluminescence Lifetime Imaging of Crystalline Silicon
- 2AO.1.4** K. Bothe, D. Hinken, K. Ramspeck, S. Herlufsen, J. Schmidt & R. Brendel
ISFH, Emmerthal, Germany
J. Bauer & O. Breitenstein
Max-Planck-Institut, Halle, Germany
Imaging and Analysis of Pre-Breakdown Sites in Multicrystalline Silicon Solar Cells
- 2AO.1.5** J.-M. Wagner, J. Bauer & O. Breitenstein
Max-Planck-Institut, Halle, Germany
Classification of Pre-Breakdown Phenomena in Multicrystalline Silicon Solar Cells
- 2AO.1.6** A. Sugianto, S. R. Wenham, L. Mai & B.S. Tjahjono
University of NSW, Sydney, Australia
Investigation of Unusual Shunting Behaviour Due to Phototransistor Effect In N-Type Aluminium-Alloyed Rear Junction Solar Cells

ORAL PRESENTATIONS 1AO.4

**13:00 – 14:30 Fundamental Studies
Advanced Characterisation Tools and Methods**

Chairpersons:

W. Warta
Fraunhofer ISE, Freiburg, Germany

O. Breitenstein
Max-Planck-Institut, Halle, Germany

- 1AO.4.1** J.A. Giesecke & W. Warta
Fraunhofer ISE, Freiburg, Germany
M. Kasemann
University of Freiburg, Germany
Separation of Recombination Properties of Silicon Solar Cells and Wafers Via Luminescence Imaging
- 1AO.4.2** Y. Augarten & T. Trupke
University of NSW, Sydney, Australia
J. Bauer & O. Breitenstein
Max-Planck-Institut, Halle, Germany
Luminescence Shunt Imaging: Qualitative and Quantitative Shunt Images Using Photoluminescence Imaging with Current Extraction
- 1AO.4.3** H. Kampwerth, T. Trupke, R. Bardos, J. Weber & B. Tjahjono
University of NSW, Sydney, Australia
Quantitative Extraction of Emitter Sheet Resistance From Luminescence Series Resistance Imaging of Solar Cells
- 1AO.4.4** M. C. Schubert, M.J. Kerler & W. Warta
Fraunhofer ISE, Freiburg, Germany
Influence of Depth Dependent Profiles on Carrier Density Measurements
- 1AO.4.5** A. Schütt, J. Carstensen, G. Popkirov & H. Föll
University of Kiel, Germany
CELLO FFT Impedance Analysis as a Routine Tool for Identifying Various Defect Types on Crystalline Silicon Solar Cells
- 1AO.4.6** G. Micard, S. Seren & G. Hahn
University of Konstanz, Germany
Quantitative Interpretation of Light Beam Induced Current Contrast Profiles: Evaluating the Influence of a Nearby Grain Boundary

ORAL PRESENTATIONS 5AO.7**13:00 – 14:30 PV Power Plants****Grid Integration Issues****Chairpersons:**

N.M. Pearsall
University of Northumbria, Newcastle upon Tyne, United Kingdom

D. Mayer
Ecole des Mines de Paris, Sophia Antipolis, France

- 5AO.7.1** V. Wachenfeld, B. Engel & D. Hermeling
SMA Solar Technology, Niestetal, Germany
Implementation of New European Grid Codes for Large Scale PV Systems
- 5AO.7.2** Y. Ueda, T. Kanayama, K. Tsuyuki & T. Ito
Meidensha, Tokyo, Japan
N. Matsuno & S. Miwa
Hokkaido Electric, Japan
R. Hara & H. Kita
Hokkaido University, Japan
Grid Stabilization for Large-Scale PV Generation Plant by Use of Multiple Energy Storage Systems
- 5AO.7.3** M.P. Campbell, P. Aschenbrenner & J. Blunden
SunPower, San José, United States
E. Smeloff & S. Hanawalt
SunPower, Richmond, United States
The Drivers of the Levelized Cost of Electricity for Utility-Scale PV Power Plants
- 5AO.7.4** J.C. Marcel, G. Olivier & M. Robert
Tenesol, La Tour de Salvagny, France
J. F. Cousseau & M. Lippert
SAFT, Bordeaux, France
A. Vial-Collet
Tenesol, Baie-Mahault, France
Grid Connected PV Systems with Lithium-Ion Batteries Energy Storage for Daily Guaranteed Energy during Peak Power Time: Results and Conclusions from Guadeloupe Field Tests
- 5AO.7.5** M. Braun & T. Stetz
ISET, Kassel, Germany
Optimal Reactive Power Supply in Distribution Networks - Technological and Economic Assessment for PV Systems
- 5AO.7.6** K. Sato & S. Wakao
Waseda University, Tokyo, Japan
Operation Design and Data Mining of Battery System in Photovoltaics

VISUAL PRESENTATIONS 3AV.1**13:00 – 14:30 Thin Film Crystalline Silicon Solar Cells and Wafer Equivalents**

Detailed information on Session 3AV.1 is presented in the section entitled 'Visual Presentations'.

BREAK 14:30 – 14:45**ORAL PRESENTATIONS 2AO.2****14:45 – 16:15 Mono- and Multicrystalline Silicon Materials and Cells
Advanced Devices****Chairpersons:**

P. Wyers
ECN, Petten, The Netherlands

A. Metz
SCHOTT Solar, Alzenau, Germany

- 2AO.2.1** V. Mertens, N.-P. Harder, Y. Larionova & R. Brendel
ISFH, Emmerthal, Germany
The Buried Emitter Solar Cell : Interdigitated Back Junction Structure with Virtually 100% Emitter Coverage of the Cell Area
- 2AO.2.2** C. Ulzhöfer, S. Hermann, N.-P. Harder & R. Brendel
ISFH, Emmerthal, Germany
P.P. Altermatt
University of Hannover, Germany
The Origin of Reduced Fill Factors of Emitter-Wrap-Through-Solar Cells
- 2AO.2.3** A. Van Der Heide, D.M. Gribenski & J. Szlufcik
Photovoltech, Tienen, Belgium
Industrial Fabrication of Multi-Crystalline MWT Cells with Interconnection Flexibility of 16.5% Efficiency
- 2AO.2.4** A.A. Mewe, M.W. Lamers, I.J. Bennett, E.J. Kossen, I.G. Romijn & A.W. Weeber
ECN, Petten, The Netherlands
Reaching 16% Module Efficiency with Back-Contacted MC-SI Solar Cells
- 2AO.2.5** S. Kluska, F. Granek, M. Hermle & S.W. Glunz
Fraunhofer ISE, Freiburg, Germany
Characterization and Modeling of Back-Contact Back-Junction Silicon Solar Cells
- 2AO.2.6** T. Schutz-Kuchly, V. Sanzone, R. Cabal & Y. Veschetti
CEA-INES, Le Bourget du Lac, France
Large Area n-Type Silicon Solar Cells with Screen-Printed Aluminium-Alloyed Rear Emitter: Improvement In Efficiency with the Selective Front Surface Field Concept for a Wide Range of Resistivity

ORAL PRESENTATIONS 1AO.514:45 – 16:15 **Fundamental Studies****Novel Insights in Advanced Materials and Cell Design****Chairpersons:**J. Poortmans
IMEC, Leuven, BelgiumA. Piontek
European Commission, DG RTD, Brussels, Belgium

- 1AO.5.1** D. König, G.J. Conibeer & M.A. Green
University of NSW, Sydney, Australia
Si-rich Si₃N₄ for Si QD Formation and Simultaneous Donor Modulation Doping of Adjacent Barrier Material
- 1AO.5.2** R. King, A. Boca, W. Hong, D. Larrabee, K.M. Edmondson, D.C. Law, C.M. Fetzer, S. Mesropian & N.H. Karam
Spectrolab, Sylmar, United States
Band-Gap-Engineered Architectures for High-Efficiency Multijunction Concentrator Solar Cells
- 1AO.5.3** J. Mitchell
The Australian National University, Canberra, Australia
New Insight into the Hydrogen Surface Passivation Mechanism at Low Temperatures
- 1AO.5.4** B. Bouzazi, H. Suzuki, N. Kojima, Y. Ohshita & M. Yamaguchi
Toyota Technological Institute, Nagoya, Japan
A High Capture Cross Section's Recombination Center in p-Type GaAsN Grown by Chemical Beam Epitaxy
- 1AO.5.5** K.J. Weber, H. Jin & Y. Ren
The Australian National University, Canberra, Australia
Low Si Surface Recombination through Negatively Charged Si₃N₄ Films
- 1AO.5.6** M. Peters, J.C. Goldschmidt & B. Bläsi
Fraunhofer ISE, Freiburg, Germany
How Angular Confinement Increases the Efficiency of Photovoltaic Systems

ORAL PRESENTATIONS 5AO.814:45 – 16:15 **PV Power Plants****Operation and Performance****Chairpersons:**A. Berni
ETA-Renewable Energies, Florence, ItalyS. Tselepis
CRES, Athens, Greece

- 5AO.8.1** B. Müller, W. Heydenreich, K. Kiefer & C. Reise
Fraunhofer ISE, Freiburg, Germany
More Insights from the Monitoring of Real World PV Power Plants
- 5AO.8.2** E. Llarena, C. Montes, A. Linares Mena, M. Cendagorta & M. Friend Monasterio
ITER, Santa Cruz de Tenerife, Spain
Lessons Learned while Installing Multi-MW PV Grid-Connected Facilities in Canary Islands (Spain)
- 5AO.8.3** N.M. Pearsall
University of Northumbria, Newcastle upon Tyne, United Kingdom
B. Atanasiu
European Commission DG JRC, Ispra, Italy
Assessment of PV System Monitoring Requirements by Consideration of Failure Mode Probability
- 5AO.8.4** G. Makrides, M. Norton & G.E. Georghiou
University of Cyprus, Nicosia, Cyprus
B. Zinsser, M. Schubert & J.H. Werner
University of Stuttgart, Germany
Error Sources in Outdoor Performance Evaluation of Photovoltaic Systems
- 5AO.8.5** U. Rindelhardt
FZD, Dresden, Germany
A. Dietrich
Solar Asset Management, Berlin, Germany
C. Rösner
G&L Green Management, Leipzig, Germany
Tracked Megawatt PV Plants: Operation Results 2008 in Germany and Spain
- 5AO.8.6** H. Konishi, T. Iwato, M. Kudou & R. Tanaka
NTT Facilities, Tokyo, Japan
Outlines and Some Results in the First Stage of Hokuto Mega-Solar Project

VISUAL PRESENTATIONS 3AV.2**14:45 – 16:15 Amorphous and Microcrystalline Silicon Solar Cells***Detailed information on Session 3AV.2 is presented in the section entitled 'Visual Presentations'.***BREAK 16:15 – 16:30****ORAL PRESENTATIONS 2AO.3****16:30 – 18:00 Mono- and Multicrystalline Silicon Materials and Cells****Defects****Chairpersons:**R. Brendel
ISFH, Emmerthal, GermanyG. Hahn
University of Konstanz, Germany**2AO.3.1** A.F. Thomson & K.R. McIntosh
The Australian National University, Canberra, Australia
Degradation of Oxide-passivated Boron-diffusion and its Relevance to n-Type Silicon Solar Cells**2AO.3.2** R. Krain, S. Herlufsen & J. Schmidt
ISFH, Emmerthal, Germany
Low-Temperature Gettering of Iron in Multicrystalline Silicon**2AO.3.3** G. Sarau
IPHT, Jena, Germany
M. Becker & S. Christiansen
Max-Planck-Institut, Halle, Germany
Correlation between Residual Stresses and Grain Boundary Type/Structure in Multicrystalline Silicon Solar Cells**2AO.3.4** A. Herguth & G. Hahn
University of Konstanz, Germany
Boron-Oxygen Related Defects in Cz-Silicon Solar Cells: Degradation, Regeneration and Beyond**2AO.3.5** S. Schönfelder
Fraunhofer CSP, Halle, Germany
B. Pope, A. Sampson, C. Colin, M. Bertoni & T. Buonassisi
MIT, Cambridge, United States
Quantitative Stress Measurements of Bulk Microdefects in Multicrystalline Silicon**2AO.3.6** B.B. Paudyal, K.R. McIntosh & D.H. Macdonald
The Australian National University, Canberra, Australia
G. Coletti
ECN, Petten, The Netherlands
Temperature Dependent Capture Cross Sections of Molybdenum-Contaminated Crystalline Silicon**ORAL PRESENTATIONS 1AO.6****16:30 – 18:00 Organic-Based PV****Materials and Stability****Chairpersons:**C.J. Brabec
Konarka, Nürnberg, GermanyP. Murray (i)
Dyesol, Queanbeyan, Australia

- 1AO.6.1** C.-Y. Yu, C.-P. Chen, T.-C. Chao, G.-W. Hwan & C. Ting
Industrial Technology Research Institute, Hsin Chu, Taiwan
B.-T. Ko
Chung-Yuan Christian University, Chung-Li, Taiwan
Thiophene-Phenylene-Thiophene based Low Bandgap Conjugated Polymers for Efficient Near-Infrared Photovoltaic Applications
- 1AO.6.2** J.S. Huang, C.Y. Chou, K.H. Tsai, C.H. Wu, M.Y. Liu, Y.H. Lin, W.H. Lin & C.F. Lin
National Taiwan University, Taipei, Taiwan
Performance Enhancement of Organic/Inorganic Hybrid Solar Cells on Flexible Substrates
- 1AO.6.3** S.C. Veenstra, L. H. Slooff, W.J.H. Verhees & J.M. Kroon
ECN, Petten, The Netherlands
Unconventional Device Concepts for Polymer Solar Cells - Metal-Oxide Layers Applied in Polymer Solar Cells
- 1AO.6.4** R. Timmreck, J. Meiss, A. Merten, R. Schueppel, M. Riede & K. Leo
Dresden University of Technology, Germany
Realization and Characterization of Small Molecule Tandem Organic Solar Cells
- 1AO.6.5** M.I. Asghar, J. Halme, M. Toivola, K. Miettunen, K. Aitola, T. Peltola, P. Vahermaa & P. Lund
Helsinki University of Technology, Espoo, Finland
Stability Issues of Improved Dye Sensitized Solar Cells
- 1AO.6.6** C. Cornaro, A. Spina, T.M. Brown, A. Reale, A. Di Carlo & S. Martella
University of Rome Tor Vergata, Italy
Outdoor Characterization of Dye Solar Cells

ORAL PRESENTATIONS 5AO.9

16:30 – 18:00 PV and Architecture

Chairpersons:

T. Nordmann
TNC Consulting, Erlenbach, Switzerland
N.N.

- 5AO.9.1** S.A. Krawietz
University of Catania, Italy
New Possibilities for Thin Films in Building Integrated PV
- 5AO.9.2** A. Scognamiglio
ENEA, Portici, Italy
E. Di Munno, M.L. Palumbo & V. Temporin
InArch, Rome, Italy
Use of Photovoltaics in Residential Historical Buildings: An Architectural Approach
- 5AO.9.3** K.F. Jensen & B. Bentzen
FAKTOR 3, Copenhagen, Denmark
P. Poulsen & C. Dam-Hansen
Technical University of Denmark, Roskilde, Denmark
The CO2 Neutral Work Space - A Platform for Reducing the Standby Consumption
- 5AO.9.4** J.C. Jol
Ecofys Netherlands BV, Utrecht, The Netherlands
B. Van Kampen
TNO, Delft, The Netherlands
B.J. De Boer
ECN, Petten, The Netherlands
New Test Methods for BIPV: Results from IP Performance
- 5AO.9.5** H. de Wit, A.H.M.E. Reinders & A. de Boer
University of Twente, Enschede, The Netherlands
Design of Fibre Reinforced PV Concepts for Building Integrated Applications
- 5AO.9.6** invited

VISUAL PRESENTATIONS 4AV.3

16:30 – 18:00 PV Modules

Detailed information on Session 4AV.3 is presented in the section entitled 'Visual Presentations'.

18:00 WELCOME RECEPTION