

Publications

**36th European Photovoltaic Solar Energy Conference and Exhibition,
September 9-13, 2019 • Marseille, France**

Fraunhofer Institute for Solar Energy Systems ISE

Division Photovoltaics

Heidenhofstrasse 2
79110 Freiburg
Germany

Beinert_4BO.11.1

A. J. Beinert, P. Romer, M. Heinrich, M. Mittag, J. Aktaa, H. Neuhaus

Thermomechanical Evaluation of New PV Module Designs by FEM Simulations

Clement_2DO.5.1

F. Clement, M. Linse, S. Tepner, N. Wengenmeyr, L. Ney, K. Krieg, A. Lorenz, M. Pospischil, S. Bechmann, K. Oehrle, S. Steckemetz, R. Preu

Project "FINALE" - Screen and Printing Process Development for Ultra-Fine-Line Contacts below 20µm Finger Width

De Rose_2CO.11.4

A. De Rose, T. Geipel, D. Eberlein, A. Kraft, M. Nowottnick

Interconnection of Silicon Heterojunction Solar Cells by Infrared Soldering - Solder Joint Analysis and Temperature Study

Dost_2DO.6.4I

G. Dost, H. Höffler, J. Greulich

Vignetting in Luminescence Imaging Setups

Drießen_2AO.6.2

M. Drießen, T. Fehrenbach, L. Kirste, C. Weiss, S. Janz

Correlating Template Properties with the Quality of Epitaxially Grown Silicon Wafers

Feldmann_2EO.1.4

F. Feldmann, T. Fellmeth, B. Steinhauser, H. Nagel, D. Ourinson, S. Mack, E. Lohmüller, J. Polzin, J. Benick, A. Richter, A. Moldovan, M. Bivour, F. Clement, J. Rentsch, M. Hermle, S. W. Glunz

Large Area TOPCon Cells Realized by a PECVD Tube Process

Fischer_2DV.1.51

A. Fischer, I. V. Vulcanean, A. Moldovan, J. Rentsch

Approach to Clarify the Cause of Handling Defects in SHJ Cell Production through the Interplay of Different Imaging Techniques

Fokuhl_4BO.12.2

E. Fokuhl, T. Naeem, A. Schmid, P. Gebhardt, T. Geipel, D. Philipp

LeTID - A Comparison of Test Methods on Module Level

Gebhardt_4AV.1.28

P. Gebhardt, P. Hülsmann, D. Philipp

Qualification of Polyolefin Backsheet for PV Modules

Gebhardt_4AV.1.29

F. Rummens, P. Gebhardt, D. Philipp

Impact of Highly Breathable Polyolefin Backsheet on EVA Yellowing

Geipel_4CO.3.3

T. Geipel, V. Nikitina, L. Pitta Bauermann, E. Fokuhl, E. Schnabel, D. Erath, A. Krieg, A. Kraft, T. Fischer, R. Lorenz, D. Breitenbücher

Industrialization of Ribbon Interconnection of Silicon Heterojunction Solar Cells with Electrically Conductive Adhesives

Gensowski_2DO.5.5

K. Gensowski, M. Kamp, R. Efinger, G. Mikolasch, J. Eckert, S. Bechmann, R. Weber, J. Bartsch

Selective Seed Layer Patterning of PVD-Metal Stacks by Electrochemical Screen Printing for Solar Cell Applications

Grübel_2BO.2.3

B. Grübel, G. Cimiotti, V. Arya, T. Fellmeth, F. Feldmann, B. Steinhauser, S. Kluska, M. Glatthaar

Plated Ni/Cu/Ag for TOPCon Solar Cell Metallization

Guzman Razo_5CV.3.1

D. E. Guzman Razo, S. Killinger, B. Müller, C. Wittwer

A Comparison of Two Models for the separation of Direct and Diffuse Irradiance in Plane Array

Hauser_3BV.2.46

H. Hauser, O. Höhn, R. Müller, N. Tucher, K. Mühlbach, R. M. da Silva Freitas, J. Benick, M. Hermle, B. Bläsi

Polymer-Based Rear Side Light Trapping Structures for Silicon-Based Tandem Solar Cells

Herzog_4AV.1.15

C. Herzog, T. Müller, M. Heinrich, H. Neuhaus

Differential Scanning Calorimetry for Simulation and Optimization of PV Module Lamination

Huyeng_2DV.1.3

J. D. Huyeng, A. Spribille, M. Garcia Prince, L. C. Rendler, C. Ebert, E. Eitner, F. Clement

Simultaneous Contacting of Boron and Phosphorus Doped Surfaces with a Single Screen Printing Paste

Issa_2CV.2.94

E. Issa, H. Nagel, L. Guzik, H. Javanbakht, E. Coron, E. Rädlein, M. Glatthaar, S. W. Glunz

Plated Front Side Metallization on Transparent Conduction Oxide Utilizing Low-Cost APCVD SiO₂ Insulating Layer

Kang_5CV.3.30

J. Kang, J. Jang, C. Reise, K. Lee

Practical Comparison between View Factor Method and Ray-Tracing Method for Bifacial PV System Yield Prediction

Kiaee_2BO.3.4

Z. Kiaee, C. Reichel, R. Keding, M. Nazarzadeh, R. Lohmann, M. Jahn, F. Feldmann, J. D. Huyeng, M. Hermle, F. Clement

Inkjet-Printing of Phosphorus and Boron Dopant Sources for Tunnel Oxide Passivating Contacts

Kiefer_5BO.7.5

K. Kiefer, B. Farnung, B. Müller

Degradation in PV Power Plants: Theory and Practice

Kuruganti_2CV.2.44

V. Kuruganti, J. Haunschild, A. Brand, S. Al-Hajjawi, S. Rein

Non-Destructive Approach for Measuring Base Resistivity of Emitter Diffused, Partially-Processed Wafers Using Temperature Stage QSSPC

Luderer_2DV.1.48

C. Luderer, C. Messmer, M. Biour, M. Hermle

Contact Resistivity of the TCO/a-Si:H/c-Si Heterojunction

Martinez Sanchez_5DP.2.4

J. F. Martinez-Sanchez, M. Steiner, M. Wiesenfarth, T. Fellmeth, T. Dörsam, M. Wiese, S.W. Glunz, F. Dimroth

Development and Outdoor Characterization of a Hybrid Bifacial HCPV Module

Maus_2BO.1.3

S. Maus, S. Lohmüller, D. Mu, J. Schön, T. Niewelt, A. Wolf, R. Preu

Impact of POCl₃ Diffusion Process Parameters on Oxygen Precipitation in Czochralski-Grown Silicon

Messmer_2CO.12.5

C. Messmer, A. Fell, F. Feldmann, N. Wöhrle, J. Schön, M. Hermle

Upgrade PERC with TOPCon: Efficiency Potential by Taking into Account the Electrical Gains and Optical Losses

Mittag_4AV.1.20

M. Mittag, A. Pfreundt, J. Shahid, N. Wöhrle, D. H. Neuhaus

Techno-Economic Analysis Of Half Cell Modules - The Impact Of Half Cells On Module Power And Costs

Mittag_4CO.2.4

M. Mittag, L. Vogt, C. Herzog, A. Pfreundt, J. Shahid, D. H. Neuhaus, H. Wirth

Thermal Modelling of Photovoltaic Modules in Operation and Production

Mohamed OkashaMohamed Okasha_2CV.2.87

A. M. O. M. Okasha, B. Kafle, B. Torda, C. Teßmann, A. Moldovan, M. Hofmann

Plasma Oxidation for the Front Side Passivation of PERC Solar Cells

Nagel_2CV.2.86

H. Nagel, E. Issa, T. Nagel, M. Glatthaar, S. W. Glunz

Hydrosilane-Free Low-Cost APCVD of SiO₂ Films for Crystalline Si Solar Cell Applications

Ourinson_2BO.1.1

D. Ourinson, T. Fellmeth, S. Tepner, T. Javaid, M. Dhamrin, C. Turney, G. Emanuel, S. W. Glunz,

M. Pospischil, F. Clement

Optimization of Al Fire-Through Contacts for AlO_x-SiN_x Rear Passivated Bifacial p-PERC

Paschen_2CV.2.93

J. Paschen, G. Emanuel, A. A. Brand, T. Fellmeth, O. John, A. De Rose, J. F. Nekarda

FoilMet® - Connect: a New Rear Metallization Upgrade for PERC and Other Cell Concepts

Pfreundt_4CO.4.3

A. Pfreundt, A. Beinert, D. Yucebas, L. Verissimo Mesquita, L. Pitta Bauermann, P. Romer, M. Mittag

Post-Processing Thickness Variation of PV Module Materials and its Impact on Temperature, Mechanical Stress and Power

Pitta Bauermann_4BO.13.4

L. Pitta Bauermann, D. E. Mansour, L. Verissimo Mesquita, P. Christoeffl, D. Philipp

Measurement of Elastic Properties of Polymeric Layers in PV Modules Using Scanning Acoustic Microscopy and Nanoindentation

Rachdi_2CV.2.88

L. Rachdi, M. Hofmann

Multivariate Statistical Modelling to Correlate PECVD Layer Properties with Plasma Chemistry During Silicon Nitride Deposition

Rauer_2CO.12.1

M. Rauer, F. Guo, J. Hohl-Ebinger

Accurate Measurement of Bifacial Solar Cells with Single- and Both-Sided Illumination

Reise_4AV.2.15

C. Reise, U. Kräling, E. Schnabel, K. Kiefer

First Results from a High Precision Indoor & Outdoor PV Module Monitoring Campaign

Richter_2BP.1.3

A. Richter, J. Benick, F. Feldmann, A. Fell, B. Steinhäuser, J.-I. Polzin, N. Tucher, J. N. Murthy, M. Hermle, S. W. Glunz

Both Sides Contacted Silicon Solar Cells: Options for Approaching 26% Efficiency

Ridoy_2DV.1.1

A. I. Ridoy, B. Kafle, N. W. Khan, M. Klitzke, S. Lohmüller, L. Clochard, E. Duffy, A. Wolf, M. Hofmann

Surface Passivation of Atmospheric Pressure Dry Etched Multicrystalline Silicon Surfaces

Riepe_2AO.5.3

S. Riepe, P. Krenckel, Y. Hayama, A. Hess, T. Trötschler,, K. Kutsukake, S. Maus, F. Schindler, N. Usami
Enhanced Material Quality in SMART Mono-Si Block Cast Ingots by Introduction of Functional Defects

Roder_2CV.2.100

S. Roder, V. Arya, H. Mir, B. Grübel, S. Kluska, N. Bay, D. Pysch, K. Krauß, A. Brand, J. Nekarda
New Approach for a Combined Process of an Ultrafast Boron-Oxygen Defect Regeneration and Thermal Contact Treatment of Ni/Cu/Ag Plated Solar Cells

Saint-Cast_2DO.6.2

P. Saint-Cast, D. Herrmann, P. Baliozian, H. Stolzenburg, H. Höffler, A. Fell
Extracting Metal and Edges Recombination Parameters which are Compatible with Multi-Dimensional Cell Simulations

Schiller_4AV.1.8

C. H. Schiller*, L. C. Rendler, D. Eberlein, G. Mülhöfer, A. Kraft, D. H. Neuhaus
Accelerated TC Test in Comparison with Standard TC Test for PV Modules with Ribbon, Wire and Shingle Interconnection

Spribille_2BO.4.2

A. Spribille, J. D. Huyeng, T. Schweigstill, I. Franzetti, L. C. Rendler, F. Clement
Electrode Design for Wire Interconnected Back Contact Solar Cells

Steinhauser_2CV.2.56

B. Steinhauser, T. Niewelt, A. Richter, R. Eberle, J. Polzin, F. Feldmann, M. Schubert, M. Hermle
Life(Time) at the Limits – Very High Lifetimes in Crystalline Silicon Measured by Photoconductance and Photoluminescence

Stevens_1AO.3.1

L. Stevens, H. Hauser, O. Höhn, N. Tucher, C. Wellens, C. Stauch, R. Jahn, C. Müller, B. Bläsi
Front Side Structures in TiO₂ for Crystalline Silicon Solar Cells: Which Effects can they Achieve?

Temmler_2CO.10.3

J. Temmler, L. Bodlak, M. Bivour, A. Moldovan, J. Rentsch
Passivation and Microstructure of Dual Intrinsic a-Si:H Layers for SHJ Solar Cells

Tepner_2CV.2.103

S. Tepner, M. Linse, A. Lorenz, M. Pospischil, K. Masuri, F. Clement
Knotless Screens for Ultra-Fine Line Screen Printing of Si-Solar Cells – Towards Front-Side Silver Electrode Widths Below 20µm

Wöhrle_2CV.2.98

N. Wöhrle, A. Alapont Sabater, A. Krieg, K. Ramspeck, T. Fellmeth, A. Schmidt, S. Rein
Sorting Criteria for Bifacial PERC Cells for Improved Module Classification