

- tandemPV -

INTERNATIONAL WORKSHOP

May 13-15, 2025 | Hasselt, Belgium & Online

Program

of the tandemPV 2025 international workshop

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Workshop Information

tandemPV Workshop

The fifth tandemPV Workshop takes place in Hasselt, Belgium from May 13-15, 2025, hosted by imec, and chaired by Ivan Gordon and Gizem Birant of imec.

The tandemPV workshop series serves as a unique platform bringing together leading experts and researchers from the silicon and thin-film photovoltaic communities fostering collaboration and innovation. Furthermore, by bringing together material scientists and device specialists, the workshop aims to forge interdisciplinary collaborations that will drive the future of photovoltaic technology.

Workshop Highlights

- Interdisciplinary Collaboration
- Silicon and Thin-Film Integration: Engage with experts from both silicon and thin-film sectors, exploring the latest advancements and synergies in photovoltaic technology. This unique integration aims to harness the strengths of both materials, pushing the boundaries of efficiency and performance in solar cells.
- Material Scientists and Device Specialists: Connect with professionals across the material science and device engineering spectrum. This is an opportunity to share insights and breakthroughs, fostering a collaborative environment where ideas can be exchanged, and new collaborations can be formed

In 2024, almost 300 participants from more than 20 countries attended the workshop.

Committees

tandemPV Workshop Chairpersons

Gizem Birant, imec

Ivan Gordon, imec

tandemPV Scientific Committee

Erkan Aydin, LMU

Solenn Berson, CEA

Gianluca Coletti, UNSW

Stefaan De Wolf, KAUST

Kaining Ding, FZ Juelich

Stefan Glunz , Fraunhofer ISE

Quentin Jeangros, CSEM

Lejo Joseph Koduvelikulathu , ISC Konstanz

Lars Korte, Helmholtz Berlin

Delfina Munoz, CEA

Ulrich Paetzold, KIT

Robby Peibst, ISFH

Pere Roca, IPVF

Daniel Tune, ISC Konstanz

Valerio Zardetto, TNO

Scientific Topics

- Innovative materials and fundamental research for bottom and top devices (Perovskite-based)
- Innovative materials and fundamental research for bottom and top devices (Alternative materials)
- Tandem Solar Cell and Modules research (Perovskite-Silicon)
- Tandem Solar Cell and Modules research (Chalcogenide and alternatives to Perovskite/Silicon)
- Characterization and modelling, new protocols and procedures
- Upscaling and Industrialization, pilot line
- Reliability, stability, accelerated testing
- Outdoor testing, energy yield and bankability
- Sustainability and circular economy

Conference Program

Program Overview

Program Overview

*as of March 28, subject to change

CEST Hasselt (GMT+1)	Monday May 12, 2025	Tuesday May 13, 2025	Wednesday May 14, 2025	Thursday May 15, 2025	CEST Hasselt (GMT+1)
8:00		Check-In	Check-In	Check-In	8:00
8:30					8:30
9:00		Opening Session	Session 4: Tandems	Session 7: Reliability and outdoor testing	9:00
9:30		Session 1: Innovative materials and fundamentals (I)			9:30
10:20			Coffee Break	Coffee Break	10:20
10:30					10:30
10:50		Coffee Break	Session 5: Alternative tandems	Session 8: Sustainability	10:50
11:00					11:00
11:30		Session 2: Innovative materials and accelerated research (I)			11:30
12:20			Lunch Break	Lunch Break	12:20
12:40		Lunch Break			12:40
12:50					12:50
13:20			Poster Session 2	Session 9: Characterization and modelling	13:20
13:40		Poster Session 1			13:40
14:00			Coffee Break	Closing Session	14:00
15:10		Coffee Break	Session 6: Upscaling and Industrialization II		15:10
15:20					15:20
15:30					15:30
15:40					15:40
16:00	Technical Tour: EnergyVille	Session 3: Upscaling and Industrialization (I)	Session 6: Upscaling and Industrialization II		16:00
17:00			Panel Discussion		17:00
17:30					17:30
18:00					18:00
18:30					18:30
19:00			Workshop Dinner		19:00

Detailed Program

Monday, 12 May 2025

13:00 - 18:00 **Technical Tour: EnergyVille**

tandemPV 2025 will feature a technical tour the day before the workshop on Monday, May 12, 2025.

Departure from Hasselt: 13:00 CEST

Tour Start: 13:30 CEST. The tour will take approximately 2 hours.

Important: Please note that the attendees need to bring an ID on the tour.

Tuesday, 13 May 2025

09:00 - 09:30 **Opening Session**

09:30 - 11:00 **Session 1: Innovative materials and fundamentals (I)**

09:30 - 09:48

Optimized Performance of Fully Textured Perovskite Silicon Tandems with Thermally Evaporated Hole Transporting Materials

[ID 129](#)

Bushan Kore¹

¹Fraunhofer ISE

09:48 - 10:06

Wide-Bandgap Perovskite Materials in All-Perovskite Multijunction Solar Cells

[ID 43](#)

Junke Wang¹, Shuaifeng Hu¹, Henry Snaith¹

¹University of Oxford

10:06 - 10:24

Tailored PEDOT:PSS Phase Segregation for High-performance Flexible All-Perovskite Tandem Solar Cells and Mini-Modules

[ID 44](#)

Huagui Lai², Jingwei Zhu³, Rui-Tung Kuo¹, Radha Kothandaraman², Severin Siegrist², Cong Chen³, Ayodhya Tiwari², Tzu-Ying Lin¹, Dewei Zhao³, Fan Fu²

¹National Tsing Hua University, ²Empa, ³Sichuan University

10:24 - 10:42

Influence of Pb(SCN)₂ additive on migration of Br-2PACz HTL molecules in Sn/Pb perovskites probed by photoemission spectroscopy

[ID 41](#)

Dorothee Menzel¹, Isabella Taupitz¹, Florian Scheler¹, Philipp Tockhorn¹, Steve Albrecht¹, Lars Korte¹

¹Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Department Perovskite Tandem Solar Cells

10:42 - 11:00

Enhancement of optoelectronic properties of Ag alloyed widegap CuInGaS₂ absorbers on transparent back contact

[ID 9](#)

Kulwinder Kaur¹, Arivazhagan Valluvar Oli¹, Trong Tien Le¹, Michele Melchiorre¹, Susanne Siebentritt¹

¹University of Luxembourg

11:00 - 11:30 **Coffee Break**

11:30 - 12:50	Session 2: Innovative materials and accelerated research (I)
11:30 - 11:48	Ion-Charged Dielectric Doped Graphene as a Transparent Conducting Electrode for Perovskite/Silicon Tandem Cells. ID 113
	<u>John O'Sullivan</u> ¹ ¹ University of Oxford
11:48 - 12:06	Targeted materials discovery of functional materials for perovskite solar cells with materials acceleration platforms. ID 136
	<u>Jens Hauch</u> ¹ ¹ FZ Jülich
12:06 - 12:24	Cosmos Innovation: An AI-first company building next generation solar and semiconductor technologies. ID 143
	<u>Joel Li</u> ¹ ¹ Cosmos Innovation
12:24 - 12:42	High-Throughput Characterization and Accelerated Aging of Inorganic Halide Perovskite Absorbers ID 77
	<u>Hilal Aybike Can</u> ¹ , Christian Wolff ¹ , Christophe Ballif ^{1, 2} ¹ EPFL, ² CSEM
12:50 - 14:00	Lunch Break
14:00 - 15:30	Poster Session 1
	Poster Category: Characterization and modelling, new protocols and procedures
	Computational multi-objective grey box optimization of the contact design for tandem solar cells ID 4 TUE-A-1
	<u>Noor Titan Putri Hartono</u> ¹ ¹ Solarlab Aiko Europe GmbH
	Optoelectronic Modelling of Charge Extraction Losses in Perovskite-Silicon Tandem Solar Cells ID 39 TUE-A-5
	<u>Sandheep Ravishankar</u> ¹ ¹ Forschungszentrum Jülich
	Modelling the impact of spatial inhomogeneities on performance and characterization of 2T tandem solar cells ID 56 TUE-A-7
	<u>Ivanol Jaurece Djeukey</u> ¹ ¹ halm elektronik gmbh

Impact of Ion Migration on the Performance and Stability of Perovskite-Based Tandem Solar Cells Sahil Shah ¹ ² University of Potsdam	<u>ID 107</u>	TUE-A-13
Challenges and solutions for measuring tandem modules Michael Fuss ¹ ¹ MBJ Solutions	<u>ID 119</u>	TUE-A-15
Poster Category: Innovative materials and fundamental research or bottom and top devices (Alternative materials)		
Transport Properties of Hole Transport Layer Passivated Back-Contact for efficient 1.0 eV CISE Bottom Cells for Tandem Applications: Cu and Na Doping Francesco Lodola ¹ ¹ University of Luxembourg	<u>ID 15</u>	TUE-B-1
Understanding and improving Voc in wide bandgap ACIGS solar cells Ceren Mitmit ^{1, 2} ¹ Laboratory for Thin Films and Photovoltaics, Empa - Swiss Federal Laboratories for Materials Science and Technology ² Institute of Materials Science and Engineering, Ecole Polytechnique Fédérale de Lausanne (EPFL), Station 12	<u>ID 58</u>	TUE-B-7
Poster Category: Innovative materials and fundamental research for bottom and top devices (Perovskite-based)		
Enabling ultrasonic spray coating of uniform and compact 1.6 eV CsFAPbI ₂ Br films for efficient perovskite solar cells by controlling wet-to-dry film transition Joost Caeyers ^{1, 2, 3} ¹ Hasselt University, imo-imomec ² Imec, imo-imomec ³ EnergyVille, imo-imomec	<u>ID 17</u>	TUE-B-13
Cesium chloride additive for enhanced perovskite illumination stability: mechanisms and tandem integration Thomas Gomes ² ¹ Univ. Grenoble Alpes, CEA, LITEN	<u>ID 16</u>	TUE-B-15
Perovskite/Silicon Tandem Solar Cells via Sequential Evaporation Mohamed A. A. Mahmoud ¹ ¹ Fraunhofer Institute for Solar Energy Systems ISE	<u>ID 35</u>	TUE-B-19
Understanding the Link Between Band Alignment and Charge Transport at ZnOx-based TCE Interfaces for Tandem Solar Cells Theodore D C Hobson ¹ ¹ University of Oxford	<u>ID 42</u>	TUE-B-21
Top passivation and spatial separation: A new strategy to improve the efficiency of narrow-bandgap single-junction and all-perovskite tandem	<u>ID 55</u>	TUE-B-23

solar cells

VISHNU Vijayakumar¹

¹Technical University of Eindhoven

ALD layers and interfaces in metal halide perovskite-based photovoltaics

Mariadriana Creatore¹

¹Eindhoven University of Technology

[ID 63](#) TUE-B-25

Development of hybrid perovskite solar cells with novel surface passivation strategy on FTO substrates for two terminal tandem applications based on CIGS bottom cells

Zohair Abbas¹

¹C.H.O.S.E. (Center for Hybrid and Organic Solar Energy), Electronic Engineering Department, University of Rome Tor Vergata

[ID 74](#) TUE-B-27

Optimization of Perovskite/ACIGS Tandem Solar Cells Using Silvaco TCAD Tools

Nour Boukourt^{1, 2}

¹University of Santiago de Compostela

²Ghent University

[ID 97](#) TUE-B-31

Tuning the film properties of tin oxide in spatial atomic layer deposition

Hindrik de Vries¹

¹SALD B.V.

[ID 101](#) TUE-B-33

Periodic Inverted Micropyramids for Optically Optimized Fully Textured Solution-Processed Perovskite Solar Cells

Hanifah Winarto¹

¹Helmholtz-Zentrum Berlin für Materialien und Energie

[ID 114](#) TUE-B-35

Poster Category: Outdoor testing, energy yield and bankability

Powering Sustainable Tomato Production in the Mediterranean: The Role of Photovoltaic Canarian Greenhouses

Kabira EZZAERI¹

¹Ibn zohr university

[ID 7](#) TUE-C-1

Combining physical- and scenario-based modelling to identify tolerable degradation rates for perovskite cells in perovskite/silicon tandem modules

Yuri Blom¹

¹Delft University of Technology

[ID 12](#) TUE-C-3

Poster Category: Reliability, stability, accelerated testing

An open-source accelerated aging setup for perovskite-based singlejunction and tandem solar cells

Deniz Turkay1

¹EPFL/PVLAB

[ID 115](#) TUE-D-2

Encapsulant material choice affects stability of laminated single-junction perovskite solar cells

[ID 64](#) TUE-D-3

Freya Leyland¹

¹Helmholtz-Zentrum Berlin

Poster Category: Tandem Solar Cell and Modules research (Chalcogenide and alternatives to Perovskite/Silicon)

Overcoming optical losses in thin metal-based recombination layers for efficient n-i-p perovskite-organic tandem solar cells

Jingjing Tian¹

¹Institute of Materials for Electronics and Energy Technology (i-MEET), Department of Materials Science and Engineering, Friedrich-Alexander-Universität Erlangen-Nürnberg, Erlangen, Germany; Erlangen Graduate School in Advanced Optical Technologies (SAOT), Erlangen, Germany

[ID 3](#) TUE-E-1

Four-Step Laser-Patterned Monolithically Interconnected Perovskite-CIGSe Tandem Solar Mini-Module

Nicolas Otto¹

¹HTW Berlin - University of Applied Sciences

[ID 46](#) TUE-E-3

Ga-gradient engineering for Cu(In,Ga)Se₂ bottom cells for Perovskite/Cu(In,Ga)Se₂ tandem solar cells

Damilola Adeleye¹

¹Helmholtz-Zentrum Berlin für Materialien und Energie

[ID 59](#) TUE-E-5

Enhancing the output power of ACIGSe/Si tandem solar cells by bifacial operation

Julia Horstmann¹

¹Institute of Physics, Martin-Luther-University Halle-Wittenberg

[ID 72](#) TUE-E-7

Poster Category: Tandem Solar Cell and Modules research (Perovskite-Silicon)

Stack optimization for low-cost large area bifacial 4 terminal perovskite silicon tandem with efficiencies up to 30%

Elisa Nonni¹

¹Solertix s.r.l.

[ID 19](#) TUE-E-11

Efficient and Stable Semi-Transparent and 4T Tandem Perovskite-Silicon Solar Cells: From Small-Area Devices to Scalable Mini-Modules via Strategic Doping and Interface Passivation

YASSINE RAOUJ¹

¹Institut Photovoltaïque d'Ile-de-France (IPVF)

[ID 31](#) TUE-E-13

Dual Texturing Approach for Enhanced Optical Performance in Perovskite Silicon Tandem Solar Cells

Vahdet Özyahni^{1, 2}

¹IMD3-Photovoltaic, Forschungszentrum Jülich GmbH
²Jülich Aachen Research Alliance (JARA-Energy) and Faculty of Electrical Engineering and Information Technology, RWTH Aachen University

[ID 75](#) TUE-E-19

Development of selective contact of C60 for perovskite/silicon tandem solar cells

Gaosheng Huang¹

¹Forschungszentrum Jülich GmbH

[ID 85](#) TUE-E-21

The impact of nanotexture on perovskite-silicon tandem solar cells
Nan Sun¹ [ID 104](#) TUE-E-25
¹IMD-3 Photovoltaics, Forschungszentrum Jülich GmbH

Poster Category: Upscaling and Industrialization, pilot line

Upscaling perovskite-Si tandem solar cells via slot-die coating
Xuan Li¹ [ID 22](#) TUE-F-1
¹Helmholtz Zentrum Berlin

Scaling TCO Deposition for Industrial Production of Perovskite/Silicon Tandem Solar Cells
Yashika Gupta¹ [ID 32](#) TUE-F-3
¹Fraunhofer Institute for Solar Energy Systems ISE

Unprecedented throughput S2S Spatial Atomic Layer Deposition of SnO₂ in perovskite solar cells
Jons Bolding¹ [ID 49](#) TUE-F-5
¹SALD B.V.

Swift Solar: Unlocking the full potential of solar energy
Laura Crowe¹ [ID 71](#) TUE-F-7
¹Swift Solar

Design options for industrial tandem modules and their implications for cost, reliability and performance
Daniel Tune¹ [ID 118](#) TUE-F-9
¹ISC Konstanz

15:30 - 16:00 **Coffee Break**

16:00 - 17:30 **Session 3: Upscaling and Industrialization (I)**

16:00 - 16:18
 Design of High-Efficiency Perovskite/Silicon Tandem: Interface Modification and Optical Management [ID 133](#)
Liu Jiang¹
¹College of Energy Soochow University

16:18 - 16:36
 Unlocking Industrialization of Perovskite/HJT Tandem PV: Efficiency Optimization, Cost Reduction Pathways, and Stability Solutions [ID 122](#)
Zijia Li¹
¹Chint New Energy Technology Co., Ltd

16:36 - 16:54
 Towards inline IV characterization of commercial perovskite-silicon tandem PV modules [ID 148](#)
Peter Pasmans¹
¹Eternal Sun

16:54 - 17:12

Qcells tandem technology

Fabian Fertig¹

¹Q CELLS GmbH

[ID 121](#)

17:12 - 17:30

Development of perovskite/Si tandem solar module and its application to
BIPV and VIPV

Ryota Mishima¹, Hisashi Uzu¹, Daisuke Adachi¹, Kenji Yamamoto¹

¹Kaneka Corporation

[ID 89](#)

17:30 - 18:00

Stability contest and end of day 1

Wednesday, 14 May 2025

08:30 - 10:20	Session 4: Pero-Si Tandems
08:30 - 08:48	Vapor phase deposition processes for perovskite-based tandem photovoltaics ID 126
	Paul Fassi ¹ ¹ Karlsruhe Institute of Technology
08:48 - 09:06	UP-SCALING PEROVSKITE GROWTH USING HYBRID METHODS FOR SILICON/PEROVSKITE TANDEM SOLAR CELLS ID 68
	Kristell Carreric ¹ , Polyxeni Tsoulka ¹ , Louis Grenet ² , Solenn Berson ¹ , Frédéric Roux ² , Elodie Gerente ² ¹ Univ. Grenoble Alpes, CEA, Liten, INES, 73375 Le Bourget du Lac, France, ² Univ. Grenoble Alpes, CEA, Liten, DTNM, 38000 Grenoble, France
09:06 - 09:24	Impact of c-Si bottom cell nanoroughness on the performance of perovskite/c-Si tandem solar cells ID 92
	Yifeng Zhao ¹ ¹ Delft University of Technology
09:24 - 09:42	Towards the Working Mechanisms of Tin Oxide as Buffer Layer in Perovskite/Silicon Tandem Solar Cells ID 91
	Qing Yang ¹ , Karsten Bittkau ¹ , Benjamin Klingebiel ¹ , Thomas Kirchartz ¹ , Uwe Rau ¹ , Kaining Ding ¹ ¹ IMD-3 Photovoltaics, Forschungszentrum Jülich GmbH
09:42 - 10:00	Perovskite-silicon-based triple junction solar cells with enhanced optoelectronic design ID 96
	Kerem Artuk ¹ , Austin Kuba ¹ , Deniz Turkey ¹ , Michele De Bastiani ³ , Mostafa Othman ¹ , Julian Steele ^{5, 6} , Julien Hurni ¹ , Huagui Lai ⁴ , Mounir Mensi ² , Felipe Saenz ³ , Mohammadreza Golobostanfard ¹ , Fan Fu ⁴ , Aicha Hessler-Wyser ¹ , Quentin Jeangros ³ , Christophe Ballif ^{1, 3} , Christian Wolff ¹ ¹ EPFL PV-Lab, ² EPFL, ³ CSEM, ⁴ Empa, ⁵ University of Queensland, ⁶ AIBN

10:00 - 10:18

An experimental comparison between 2-, 3- and 4-terminal perovskite/silicon tandem architectures

Quentin Jeangros², Lisa Champault², Laurie-Lou Senaud², Adriana Paracchino², Daniel Jacobs², Michele De Bastiani², Florent Sahli², Jean-David Decoppet², Adrien Theytaz², Kerem Artuk¹, Christian Wolff¹, Miha Kikelj³, Marko Topic³, Antoine Descoedres², Jonas Geissbühler², Bertrand Paviet-Salomon², Christophe Ballif^{1, 2}

¹EPFL PVLAB, ²CSEM, ³UL-FE

[ID 106](#)

10:20 - 10:50

Coffee Break

10:50 - 12:40

Session 5: Alternative tandems

10:50 - 11:08

From tandem and triple junction Pk/Si cells to modules: Where are we today?

Valerie Depauw¹

¹IMEC

[ID 134](#)

11:08 - 11:26

Tandem Solar Cells made from Perovskite and Organic materials

Felix Lang¹

¹Potsdam University

[ID 138](#)

11:26 - 11:44

CIGS tandem on Silicon: an approach to stick around

Thomas Bidaud¹

¹C2N/IPVF/C2N

[ID 47](#)

11:44 - 12:02

A new CIGS-Perovskite tandem solar cell record

Guillermo Farias-Basulto¹, Thede Mehlhop¹, Nicolas Otto¹, Tobias Bertram¹, Christian A. Kaufmann¹, Iver Lauermaun¹, Reiner Klenk¹, Stefan Gall¹, Emil List-Kratochvil², Rutger Schlatmann³

¹Helmholtz-Zentrum Berlin für Materialien und Energie, ²Humboldt-Universität zu Berlin, Institut für Physik, Institut für Chemie, ³HTW Berlin - University of Applied Sciences

[ID 5](#)

12:02 - 12:20

Scalable Two-terminal Perovskite-CIGS Tandem Solar Cells and Modules with Record Efficiencies

Radha Krishnan Kothandaraman¹, Huagui Lai¹, Shiro Nishiwaki¹, Johnpaul

Kurisinkal Pious¹, André Muller¹, Romain Carron¹, Ayodhya Nath Tiwari², Fan Fu¹
¹Empa, ²SOLTIWA

[ID 45](#)

12:20 - 12:38

Flexible and lightweight perovskite/CIGS tandem solar cells

[ID 142](#)

[Inyoung Jeong](#)¹

¹KIER

12:40 - 13:40

Lunch Break

13:40 - 15:10

Poster Session 2

Poster Category: Characterization and modelling, new protocols and procedures

Current-Voltage Simulation and Characterization of Perovskite/Silicon Tandem Cells at Different Illumination Intensities and Spectral Content

[ID 14](#) WED-A-2

[Jonathan Parion](#)^{1, 2, 3, 5}

¹UHasselt, ²imec, ³EnergyVille, ⁴KU Leuven, ⁵UGent

Unraveling Sub-Cell Characteristics for Comprehensive 2T Perovskite/Silicon Tandem Device Analysis

[ID 30](#) WED-A-4

[Federico Ventosinos](#)¹

¹University of Valencia

2-Dimensional TCAD Simulation of Tandem Perovskite-Silicon Solar Cells

[ID 70](#) WED-A-8

[Pierre Lottigier](#)¹

¹CEA INES, LITEN

New bandgap mapping method for tandem cells, based on standard luminescence imagery

[ID 95](#) WED-A-10

[Joël Wyttenbach](#)¹

¹CEA-INES

“Artifact-Induced Ion Gradients During 3D Molecular Analysis with Time-of-Flight Secondary Ion Mass Spectrometry in Multilayered Material Stacks of Perovskite Solar Cells”

[ID 110](#) WED-A-14

[Aslihan H. Babayigit](#)^{1, 2, 3, 4}

¹Institute for Materials Research (IMO-IMOMEC), Hasselt University

²Faculty of Engineering Sciences, Hasselt University

³Department of Physics, Faculty of Natural Sciences, Hasselt University,

⁴EnergyVille

Poster Category: Innovative materials and fundamental research or bottom and top devices (Alternative materials)

Challenges to develop wide-bandgap top cells and modules on transparent back contacts with an industry-relevant Cu(In,Ga)Se₂ process

[ID 20](#) WED-B-2

[Wolfram Witte](#)²

²ZSW

Scalable, Non-fullerene Electron Transport Layer for Perovskite/Silicon Tandem Solar Cells

[ID 21](#) WED-B-4

Lea Zimmermann¹

¹Solar Energy Division, Helmholtz-Zentrum Berlin

Indium-free Low-Temperature Transparent Front Electrodes for Efficient Perovskite Tandem Solar Cells

[ID 53](#) WED-B-6

Marlene Härtel¹

¹Photovoltaics Competence Center Berlin, Helmholtz-Zentrum Berlin

Ligand-modified SnO₂ as an efficient scalable and Non-Fullerene electron transport layer for inverted perovskite solar cells

Mattia Della Monaca^{1, 2}

¹Solertix s.r.l.

²C.H.O.S.E. (Center for Hybrid and Organic Solar Energy), Electronic Engineering Department, University of Rome Tor Vergata

[ID 62](#) WED-B-8

High-Efficiency Tandem Solar Cells Integrating III-V Materials with Advanced c-Si Technologies for Enhanced Photovoltaic Performance

Hasnain Yousuf¹

¹Sungkyunkwan University

[ID 93](#) WED-B-10

Poster Category: Innovative materials and fundamental research for bottom and top devices (Perovskite-based)

NiTiO₃-NiO heterostructure for highly stable all oxide perovskite solar with a Fill factor of 83%

[ID 1](#) WED-B-12

Nikita Chaudhary¹

¹Institute of Nanoscience and Technology

Towards the Understanding of Post-Deposition Treatment Processes of Self-Assembling Molecules as Hole Transport Layers for Perovskite/Silicon Tandem Solar Cells

Jann Landgraf¹

¹Albert-Ludwigs-University Freiburg, Fraunhofer Institute for Solar Energy Systems (ISE)

[ID 11](#) WED-B-14

Stable wide-bandgap perovskite for tandem application using scalable deposition method

Laxmi Narasimha Raju Pusapati^{1, 2, 3}

¹IMEC, ²University of Hasselt, ³Energy ville

[ID 28](#) WED-B-18

Buried interface and additive driven performance losses in narrow bandgap perovskite photovoltaics

Imalka Jayawardena¹

¹University of Surrey

[ID 37](#) WED-B-20

OPTIMIZING THE HYBRID DEPOSITION METHOD FOR ULTRA WIDE BANDGAP PEROVSKITE DESIGNED FOR TRIPLE-JUNCTION PURPOSES

Selin Seyrek^{1, 2, 3}

¹Hasselt University, ²Imec, ³Energyville, imo-imomec

[ID 29](#) WED-B-22

Scalable and Reproducible Fabrication of Perovskite-CIGS Tandem Solar Cells

[ID 60](#) WED-B-24

Ayman Maqsood¹

¹HZB

Improving all-perovskite solar cells with textures - a numerical study

Klaus Jäger¹

¹Helmholtz-Zentrum Berlin für Materialien und Energie

[ID 66](#) WED-B-26

Electron and hole selective self-assembling monolayers for perovskite solar cells

Tadas Malinauskas¹

¹Kaunas University of Technology

[ID 84](#) WED-B-28

Indium-free Materials in the Tunnel Recombination Junction for Perovskite/Silicon Tandem Solar Cells

Angelika Harter¹

¹HZB

[ID 94](#) WED-B-30

Accelerate Thermal Evaporation: A Scalable Two-Step Route to Multi-Cation Halide Perovskite-Silicon Tandem Solar Cells

Suresh Podapangi¹

¹Institute for Structure of Matter, National Research Council (CNR-ISM)

[ID 100](#) WED-B-32

Optimizing Co-Evaporated Perovskite Absorbers for Textured Monolithic Silicon Tandem Solar Cells by Composition Analysis

Marcel Roß¹

¹Helmholtz-Zentrum Berlin (HZB)

[ID 102](#) WED-B-34

Poster Category: Outdoor testing, energy yield and bankability

Techno-economic assessment of perovskite/silicon tandem PV modules - finding optimal trade-off between efficiency and stability

Dmitry Bogachuk¹

¹Solarlab Aiko Europe GmbH

[ID 10](#) WED-C-2

High-accuracy models of spectral variation effect on tandem PV yield

Shilpi Shital¹

¹Technology Innovation Institute

[ID 23](#) WED-C-4

Poster Category: Tandem Solar Cell and Modules research (Chalcogenide and alternatives to Perovskite/Silicon)

Identifying the character of growth-related morphological defects in CIGS bottom-cells in CIGS/Perovskite tandems using microcells

Oliver Klement²

²Universität Innsbruck

[ID 54](#) WED-E-4

Optimization and Characterization of Hole-Transporting Layers for CIGS-Perovskite Tandem Solar Cells

Marcel Handke¹

¹Helmholtz-Zentrum Berlin für Materialien und Energie GmbH

[ID 67](#) WED-E-6

Development and Characterization of a GaAs/Si Tandem Solar Cell in 4T Configuration ID 86 WED-E-8
William Bazilio²
²Pontificia Universidade Católica do Rio de Janeiro

Poster Category: Tandem Solar Cell and Modules research (Perovskite-Silicon)

Exploring the potential of perovskite/perovskite/ silicon triple junction PV modules in two- and four-terminal configuration ID 13 WED-E-10
Yuri Blom²
²Delft University of Technology

Encapsulant Selection and Performance for High-Efficiency c-Si/Perovskite Tandem Modules ID 26 WED-E-12
Petra Christöfl³
³Polymer Competence Center Leoben GmbH (PCCL)

Perovskite-Silicon Tandem Solar Cells: Hybrid Perovskite Fabrication Process Suitable For Textured Bottom Cells ID 53 WED-E-16
Sandra Glocker¹
¹Zentrum für Sonnenenergie und Wasserstoffforschung Baden-Württemberg

Investigation of interlayers electronic properties for shunts reduction in Pk/Si tandem solar cells ID 65 WED-E-18
Julci Ditsougou^{1, 2}
¹Univ. Grenoble Alpes, CEA, Liten
²Université Grenoble Alpes, CNRS, Université Savoie Mont Blanc, Grenoble INP, CROMA

A Comprehensive Research Scheme of Optimizing Interfaces in Perovskite/Silicon Tandem Solar Cells ID 78 WED-E-20
Lingyi Fang¹
¹Karlsruhe Institute of Technology

Optimization of TOPCon-based Bottom Cells for High Open-Circuit Voltage (>2V) Perovskite/Silicon Tandems ID 87 WED-E-22
Julien Hurni¹
¹EPFL PV-Lab

3-terminal tandems with medium band gap top cells: more favorable in the real world than expected? ID 103 WED-E-24
Robby Peibst¹
¹Institute for Solar Energy Research Hamelin (ISFH)

Buried interface modification for efficiency monolithic perovskite/silicon tandem solar cells ID 105 WED-E-26
Bingbing Chen¹
¹Forschungszentrum Jülich

Back-contact 2T tandem solar cells by metal wrap-through technology ID 109 WED-E-28
Melvin ten Kate¹
¹TNO

Bifacial 2T large area hybrid tandem devices: from Processing to Modules and Outdoor Measurements

Riley Ratnasingham¹

¹TNO

[ID 120](#) WED-E-30

Poster Category: Upscaling and Industrialization, pilot line

Inkjet-Printed Perovskites for Tandem Photovoltaic

Johannes Sutter¹

¹Karlsruher Institut für Technologie

[ID 27](#) WED-F-2

Green Solvent Engineering for Scalable Fabrication of Perovskite Solar Devices by Slot-Die Coating Process in Open Air

Muhammed Salim Kunnummal Mangott¹

¹Institut Photovoltaïque d'Ile-de-France

[ID 69](#) WED-F-6

Air-Processed Slot-Die Coating for Semi-Transparent Perovskite Submodules Designed for Four-Terminal Perovskite/Silicon Tandem Applications

Van-Son Nguyen²

²IPVF

[ID 83](#) WED-F-8

15:10 - 15:40

Coffee Break

15:40 - 17:00

Session 6: Upscaling and Industrialization II

15:40 - 15:58

Perovskite/Si tandem cell design for improved reliability of Oxford PV devices and modules

Tom Baines¹

¹Oxford PV

[ID 82](#)

15:58 - 16:16

Influence and Optimization of Environmental Control on the Quality of Slot-Die Coated Perovskite Layers

Yiran Shi¹

¹Helmholtz-Zentrum Berlin für Materialien und Energy GmbH

[ID 111](#)

16:16 - 16:34

Coating Dynamics in Two-Step Hybrid Evaporated/Blade-coated Perovskites for Scalable Fully-Textured Perovskite/Silicon Tandem Solar Cells

Oussama Er-raji^{2, 3}, Ahmed A. Said¹, Anand Subbiah¹, Badri Vishal¹, Vladyslav Hnapovskyy¹, Anil R. Pininti¹, Martin Bivour², Markus Kohlstadt², Juliane Borchert²,

³, Patricia S. C. Schulze², Stefaan De Wolf¹, Stefan W. Glunz^{2, 3}

¹KAUST, ²Fraunhofer ISE, ³University of Freiburg

[ID 24](#)

16:34 - 16:52

ID 76

Scalable Coating of Wide-Bandgap Perovskites for Flexible All-perovskite Tandems

Jincheng Luo¹, Johnpaul Kurisinkal Pious¹, Severin Siegrist¹, Radha Krishnan Kothandaraman¹, Huagui Lai¹, Ioanna Vareli¹, Fan Fu¹

¹Empa-Swiss Federal Laboratories for Materials Science and Technology

17:00 - 18:00

Panel Discussion: “The Tandem Transition: Research, Reliability, and Real-World Readiness”

Moderators:

Erkan Aydin, *LMU Munich*

Michele De Bastiani, *CSEM*

Panelists:

Michael D. Irwin, *DirectH2*

Jens Hauch, *Forschungszentrum Jülich*

Laura Crowe, *Swift Solar*

Joel Li, *Cosmos Innovation*

19:00 - 22:00

Workshop Dinner

Thursday, 15 May 2025

08:30 - 10:30	Session 7: Reliability and outdoor testing	
08:30 - 08:48	Perovskite/Silicon Tandems: Indoor and Outdoor Stability <u>Helen Bristow</u> ¹ ¹ CEA	<u>ID 131</u>
08:48 - 09:06	Straightforward Diagnosis of Shunts in Perovskite/Silicon Tandem Solar Cells Using Accessible Laboratory Tools. <u>Sofia Chozas Barrientos</u> ¹ ¹ NREL	<u>ID 18</u>
09:06 - 09:24	Degradation Mechanisms in Perovskite Solar Cells Observed in Outdoor Conditions <u>Mark Khenkin</u> ¹ ¹ Helmholtz-Zentrum Berlin	<u>ID 127</u>
09:24 - 09:42	Perovskite Silicon Tandems in Winter Hibernation: Dormant or Done For? <u>Atse Louwen</u> ¹ ¹ the Institute for Renewable Energy at Eurac Research	<u>ID 123</u>
09:42 - 10:00	Real-Time Photoluminescence Measurements for Evaluation of Perovskite-Silicon Tandem Long-Term Stability <u>Miha Kikelj</u> ^{1, 2} , Gašper Matič ¹ , Žan Ajdič ¹ , Fernando Solorio Soto ¹ , Lisa Champault ² , Quentin Jeangros ² , Christophe Ballif ² , Kristijan Brecl ¹ , Marko Jošt ¹ , Marko Topič ¹ ¹ University of Ljubljana, ² CSEM	<u>ID 90</u>
10:00 - 10:18	Physico-Chemical Characterization and Stability Analysis of Perovskite Solar Cells <u>Dounya Barrit</u> ^{1, 2} , Juan Pablo MEDINA FLECHAS ^{1, 2} , Paul Lin ² , Carlos Chaparro ^{1, 2} , Mirella Al Katrib ¹ , Pilar López-Varo ¹ , Philip Schulz ³ ¹ IPVF, ² totalenergies, ³ CNRS	<u>ID 117</u>

10:30 - 11:00

Coffee Break

11:00 - 12:20

Session 8: Sustainability

11:00 - 11:18

[ID 125](#)

Sustainability pathways for perovskite photovoltaics

Kevin Prince¹

¹Helmholtz-Zentrum Berlin

11:18 - 11:36

[ID 145](#)

Sustainability of c-Si-Based Tandem Solar Cells for Emerging Applications

Junsin Yi

11:36 - 11:54

[ID 135](#)

Green Energy, Green Processes: Aqueous Recycling of Perovskite

Materials

Sebastian Hedwig¹

¹FHNW

11:54 - 12:12

[ID 6](#)

Indium-free recombination layer for all-perovskite multijunction solar cells

Georgios Loukeris^{1, 2, 4}, Maryamsadat Heydarian¹, Minasadat Heydarian^{1, 3},
Audrey Gillen^{1, 4}, Muhammad Fareed U Din Masood¹, Oliver Fischer^{1, 3}, Alexander
Bett¹, Florian Schindler¹, Martin Bivour¹, Patricia Schulze¹, Markus Kohlstädt^{1, 4},
Martin Schubert¹, Juliane Borchert^{1, 3}, Uli Würfel^{1, 2, 4}, Stefan Glunz^{1, 3}, Andreas
Bett^{1, 2}

¹Fraunhofer ISE, ²Faculty of Mathematics and Physics, University of Freiburg,

³Department of Sustainable Systems Engineering INATECH, University of Freiburg,

⁴Freiburg Materials Research Center FMF

12:20 - 13:20

Lunch Break

13:20 - 15:20

Session 9: Characterization and modelling

13:20 - 13:38

[ID 80](#)

Two-Terminal Perovskite/Perovskite/Silicon Triple-Junction Solar Cells:

Sustainability and Characterization Aspects

Maryamsadat Heydarian¹, Martin Bivour¹, Alexander J. Bett¹, Georgios Loukeris¹,
Minasadat Heydarian¹, Oliver Fischer¹, Christoph Messmer¹, Markus Kohlstädt¹,
Florian Schindler¹, Martin C. Schubert¹, Juliane Borchert¹, Patricia S. C. Schulze¹,

Stefan W. Glunz¹

¹Fraunhofer Institute for Solar Energy Systems

13:38 - 13:56

[ID 141](#)

Toward the practical efficiency potential of perovskite silicon tandem solar cells

Christoph Messmer^{1, 2}, Jonas Schön^{1, 2}, Andreas Fell², Oussama Er-Raji^{1, 2}, Oliver Fischer², Martin Schubert², Stefan Glunz^{1, 2}

¹INATECH, University of Freiburg, Germany, ²Fraunhofer ISE, Germany

13:56 - 14:14

[ID 128](#)

Stability of Perovskite Solar Cells: Disentangling the Roles of Traps and Ions

Welmoed Veerman¹

¹Institute for Solar Energy Research

14:14 - 14:32

[ID 140](#)

Modeling the interconnections in monolithic tandem solar cells

Johan Lauwaert¹

¹University of Ghent

14:32 - 14:50

[ID 61](#)

Electro-Thermal Energy Yield Simulation for Bifacial All-Perovskite Tandem Solar Cells & Modules

Urs Aeberhard¹, Vasileios Georgakopoulos-Paltidis¹, Andreas Schiller¹, Roman Hiestand¹, Balthasar Blülle¹, Mehrdad Najafi², Sjoerd Veenstra², Beat Ruhstaller¹

¹Fluxim AG, ²TNO

14:50 - 15:08

[ID 99](#)

Novel method for measuring carrier diffusion lengths in metal-halide perovskites

Benjamin Grimm¹, Verena Steckenreiter¹, Annika Raugewitz¹, Felix Haase¹, Rolf Brendel¹, Jan Schmidt¹, Robby Peibst¹

¹ISFH

15:20 - 16:00

Closing Session

**Thank you for your
contributions and
participation**