32nd Workshop on Crystalline Silicon Solar Cells & Modules: Materials and Processes

July 27th – July 30th, 2025

Breckenridge, Colorado

Sponsorship from:

Sinton instruments

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

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Sunday, July 27th

Registration & Breakfast

Workshop Welcome and Introduction

Session 1: *Characterization of Solar Cells, Modules, and Arrays*

- Thorsten Trupke and Oliver Kunz (BT Imaging) - Drone inspections of PV arrays
- Adrienne Blum Karpen (Sinton Instruments) – Accurate determination of key parameters for high-efficiency silicon solar cells
- Max Liggett (University of Central Florida) - TBD

Session 2: *The Potential for Perovskite on Silicon Solar Cells*

- Stefaan de Wolf (KAUST) – Record Si/PRV tandem with enhanced stability through systematic improvements of contact passivation, bulk, and grain boundaries.
- Kai Zhu (NREL) – Perspectives on the perovskite PV field (with focus on tandems)
- Michael Deceglie (NREL) - Perovskite Field Performance at PACT
- Florent Sahli (CSEM) - Pk/Si tandems

Session 3: *Industrial Innovations and Challenges*

- Markus Beck (Former DOE Program Manager – Manufacturing and Competitiveness) – Opportunities and challenges establishing a domestic c-Si PV manufacturing ecosystem
- Feri Farzad (Hanwha, Q-cells) - TBD
- Udo Romer (ISFH) - Laser ablation for POLO^2 IBC solar cells

Welcome Reception with Dinner

Monday, July 28th

Breakfast

Session 4: *Scaling Silicon Production Towards the TW/year scale*

- Mike Woodhouse (NREL) - Cost of PV around the world
- Yifeng Chen (Trina Solar) -TBD
- Budi Tjahjono (Silfab Solar) - TBD

Session 5: *Discussion: Poly-Silicon production and Cz-Si crystal growth*

- Dennis Seibert (PVA TePla) - Crystal growth for PV applications
- Ugur Kaya (RCT Solutions) - 2 GW ingot and wafer factory in India
- Todd Templeton (Norsun) - TBD

Free Afternoon to Enjoy Local Activities

Evening Poster Session and Reception (Sponsored by Sinton Instruments)

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Tuesday, July 29th

Breakfast

Session 6: *High-Efficiency Cell Development*

- Armin Richter (Fraunhofer-ISE) - High efficiency cell research and development
- Bart Macco (TU Eindhoven) - Spatial ALD of Metal Oxides for Silicon and Perovskite PV
- Lachlan Black (ANU) - Oxide-based dopant-free cells
- Shohei Fukaya (Nagoya University) - An In-Depth Study on Bipolar Carrier Selectivity

Session 7: *Research needs up/down the Silicon value chain*

Panel Discussion

- Brenden Frazier (Solx)
- Jim Wood (SEG Solar)
- Other companies and researchers (TBD)

Session 8: *Present and Future Challenges in Silicon Technology*

Group Discussion

Session 9*: Degradation*

- Archana Sinha (Kiwa PVEL) - Unseen Risks of UV-Induced Degradation and Metastability
- Elizabeth Palmiotti (NREL) - Spontaneous Glass Breakage in Glass-Glass Modules - Glass Physics
- Gergely Zimanyi (University of California - Davis) - Molecular dynamic modeling of SHJ and TOPCon cells revealing optimal [H] and degradation/recovery modes.
- Ajeet Rohatgi (Georgia Tech University) High efficiency TOPCon cells with Cu contacts

Evening poster session and reception

Wednesday, July 30th

Breakfast

Session 10: *Silicon for Space applications*

- Bryon Mazor (Source Energy Company) – Silicon PV Arrays for space applications
- TBD – Silicon for space photovoltaics

Session 11: *Metallization*

- Stefan Lange (Fraunhofer Center for Si PV) – Principle of operation of LECO
- Pirmin Preis (ISC - Konstanz) Ag/Cu and Ag/Al hybrid screen print metallization for TOPCon
- Peter Hacke (NREL) - Cell interconnect/metal reliability project work on cell metallization failure.
- Li Wang (UNSW) - Ultra-lean Silver Screen Printing

Session 13: DISCUSSION & WRAPUP: Conclusions and Open Questions from the Workshop

Noon **Adjourn**