

21st Workshop on Crystalline Silicon Solar Cells & Modules: Materials and Processes

Saturday, July 30, 2011

7:00 - 8:00 pm | EARLY CHECK-IN / REGISTRATION

Sunday, July 31, 2011

7:30 - 9:00 am | REGISTRATION & CONTINENTAL BREAKFAST (provided)

WELCOME

8:45 - 9:00 | Bhushan Sopori, National Renewable Energy Laboratory

SESSION 1 | **ADVANCES IN MULTICRYSTALLINE SILICON**

Chair: Adam Lorenz (1366)

9:00 - 9:40 | Roger Clark (AMG Idealcast Solar Corporation): "A Review of novel growth technology for large-grained Mono² cast silicon"

9:40 - 10:20 | Hui Zhang (Tsinghua University, Beijing): "Future Trends for high efficiency and low cost silicon-based solar production"

10:20 - 10:50 | BREAK

10:50 - 11:20 | Kamel Ounadjela (CaliSolar, Inc.): "Advances in Silicon Solar Cells from UMG Material"

11:20 - Noon | DISCUSSION: **Silicon Growth for Wafered Silicon**

Leader: Jeff Binns (MEMC)

Noon - 1:30 pm | LUNCH BUFFET (provided)

SESSION 2 | **STATE-OF-THE-ART FOR MATERIALS CHARACTERIZATION**

Chair: Pete Sheldon (NREL)

1:30 - 2:15 | Martin Schubert (ISE Fraunhofer): "New methods for spatially resolved characterization of defects in silicon"

2:15 - 3:00 | Sebastien Dubois (CEA France): "Studies on compensated and UMG material and solar cells"

3:00 - 3:30 | BREAK

3:30 - 4:00 | Susanne Richter (Fraunhofer CSP): "Trace Elemental and Structural Analysis of Different Types of Si₃N₄ Precipitates Grown in Block-cast Multicrystalline Solar Si"

4:00 - 5:00 | DISCUSSION: **Materials Characterization Issues**

Leader: Tonio Buonassisi (MIT)

6:00 - 6:45 pm | WELCOME RECEPTION & BUFFET DINNER

6:45 - 8:30 pm | RUMP SESSION

Theme: **Thin Film, CPV, and Crystalline-silicon**

Leader: Bhushan Sopori (NREL)

Panel: Vahan Garboushian (Amonix), Doug Rose (SunPower), Harin Ullal (NREL)

Each panelist will talk about:

- a) What is the strength and weakness of each technology?
- b) Competition for the same markets, or opening up new applications to PV?
- c) Investor's view (How are emerging technologies "pitched." Wiping silicon off the map, or complementing it?)

Monday, August 01, 2011

7:00 - 8:00 am	CONTINENTAL BREAKFAST (provided)
8:00 - 8:30	Minh Le (DOE): " DOE programs, including the 'Sunshot' initiative "
SESSION 3	<i>HIGH-EFFICIENCY SILICON: CAN THE INDUSTRY CLOSE THE GAP WITH THE EFFICIENCY LEADERS?</i> Chair: Ethan Good (SolarWorld USA)
8:30 - 9:15	Nils Harder (ISFH Germany): " A review of n-type high-efficiency solar cells "
9:15 - 10:00	Erwin Kessels (TU Eindhoven): " Review on the prospects for the use of Al₂O₃ for high-efficiency solar cells "
10:00 - 10:30	BREAK
10:30 - 11:00	Jihun Oh (NREL): " High-efficiency Black Si Solar Cells with No Antireflection Coating "
11:00 - Noon	DISCUSSION: High-Efficiency Solar Cells Leader: Ron Sinton)
Noon - 1:30 pm	LUNCH BUFFET (provided)
	AFTERNOON BREAK FOR SIDE MEETINGS
6:30 -8:45 pm	RECEPTION
7:00 - 9:00 pm	POSTER SESSION

Tuesday, August 02, 2011

7:00 - 8:00 am	CONTINENTAL BREAKFAST (provided)
SESSION 4	ADVANCES IN METALIZATION TECHNOLOGIES Chair: Alan Carroll (Dupont Electronic Materials)
8:00 - 8:45	Alison Lennon (UNSW): " Metallisation for Silicon Solar Cells: Beyond Silver and Screen Printing "
8:45 - 9:30	Stefanie Riegel (University of Konstanz): " Overview on Screen Printing Metallization on P-type Silicon "
9:30 - 10:00	Yangang Andrew Xi (Despatch Industries): " High Resistive Emitter Metallization for Si Solar Cells "
10:00 - 10:30	BREAK
10:30 - Noon	DISCUSSION: Metalization Technologies Leader: Juris Kalejs (American Solar Technologies)
Noon - 1:30 pm	LUNCH BUFFET (provided)
SESSION 5	WHY USE CONVENTIONAL WAFERS? Chair: Martha Symko-Davies (NREL)
1:30 - 2:00	K.V. Ravi (Crystal Solar, Epi-Lift off Technology): " Poly-less, Ingot-less, Kerf-less Production of Very Thin (< 50 microns) Single Crystal Silicon Wafers, Solar Cells and Modules "
2:00 - 2:30	Leo Mathew (AstroWatt): " A Novel Low Cost Kerfless Exfoliation and Device Architecture for 25 um Thin Crystalline Si Solar Cells "
2:30 - 3:00	Oliver Anspach (PV Silicon): " Understanding the Slurry-based Wafering Process in the Wire Sawing Channel "
3:00 - 3:30	BREAK
3:30 - 4:00	Rommel Noufi (NREL): " The Making of a High Efficiency CIGS Solar Cell "
4:00 - 5:00	DISCUSSION: The "No Question is Too Basic or Obvious" Discussion. A free-wheeling discussion of the questions YOU came to the workshop to understand. Chair: Giso Hahn (University of Konstanz)
6:30 - 8:45 PM	RECEPTION
7:00 - 9:00 pm	POSTER SESSION

Wednesday, August 03, 2011

7:00 - 8:00 am	BREAKFAST BUFFET (provided)
SESSION 6	RELIABILITY, COST, AND ALTERNATIVES TO CRYSTALLINE SILICON
	Chairperson: Sarah Kurtz (NREL)
8:00 - 8:45 am	Peter Hacke (NREL): " Potential-Induced Degradation and Failure of Modules by System Voltage Stress "
8:45 - 9:15	Doug Rose (SunPower): " Levelized Cost of Electricity (LCOE) Issues for Crystalline Silicon Modules "
9:15 - 9:45	John Benner (NREL): " University Research in DOE SETP's Advanced Manufacturing Partnerships "
9:45 - 10:15	BREAK
10:15 - 11:00	DISCUSSION: Wafer Mechanical Properties Leader: George Rozgonyi (North Carolina State University)
SESSION 7	WRAP UP
11:00 - Noon	Moderator: Bill Mulligan (Mulligan Consulting, LLC)
Noon	WORKSHOP ADJOURNS