

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 AM | Bhushan Sopori, National Renewable Energy Laboratory

SESSION 1 | **ADVANCES IN MULTICRYSTALLINE SILICON**

Chair: TBD

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: TBD

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

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

Chair: TBD

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 SiC and Si3N4 Precipitates in Multicrystalline Silicon"

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

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

6:45 - 8:30 pm | RUMP SESSION

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

Leader: TBD

Panel: TBD (Representatives of key industrial breakthroughs)

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

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| 7:00 - 8:00 am | CONTINENTAL BREAKFAST (provided) |
| 8:00 - 8:30 | Minh Li (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: TBD |
| 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 $A1_2O_3$ " |
| 10:00 - 10:30 | BREAK |
| 10:30 - Noon | Howard Branz (NREL): " High Efficiency Cells with Black Silicon " (tentative title) |
| 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

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| 7:00 - 8:00 am | CONTINENTAL BREAKFAST (provided) |
| SESSION 4 | ADVANCES IN METALIZATION TECHNOLOGIES Chair: TBD |
| 8:00 - 8:50 am | TBD |
| 8:50 - 9:30 | Alison Lennon (UNSW): " Metallisation for Silicon Solar Cells: Beyond Silver and Screen Printing " |
| 9:30 - 10:10 | Stefanie Riegel (University of Konstanz): " Overview on screen printing metallization on p-type silicon " |
| 10:10 - 10:40 | Yangang Andrew Xi (Despatch Industries): " High resistive emitter metallization for Si solar cells " |
| 10:40 - 11:10 | BREAK |
| 10:50 - Noon | DISCUSSION: Metalization Technologies Leader: TBD |
| 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 offTechnology): " Poly less, ingot less, kerfless production of very thin (< 50 microns) single crystal silicon wafers, solar cells and modules " |
| 2:00 - 2:30 | TBD |
| 2:30 - 3:00 | Rommel Noufi (NREL): " The Making of a High Efficiency CIGS Solar Cell " |
| 3:00 - 3:30 | BREAK |
| 3:30 - 4:15 | DISCUSSION: Disruptive Technologies for Crystalline Silicon Leader: TBD |
| 4:15 - 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: TBD |
| 6:30 - 8:30 PM | RECEPTION |
| 7:00 - 9:00 pm | POSTER SESSION |

Wednesday, August 03, 2011

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| 7:00 - 8:00 am | BREAKFAST BUFFET (provided) |
| SESSION 6 | RELIABILITY, COST, AND ALTERNATIVES TO CRYSTALLINE SILICON |
| | Chairperson: TBD |
| 8:00 - 8:45 am | Peter Hacke (NREL): "Issues in Module Reliability" |
| 8:45 - 9:15 | Doug Rose (SunPower): "Levelized Cost of Electricity (LCOE) Issues for Crystalline Silicon Modules" |
| 9:15 - 9:35 | TBD |
| 9:35 - 10:00 | BREAK |
| 10:00 - 11:00 | DISCUSSION: TBD |
| | Leader: TBD |
| SESSION 7 | WRAP UP |
| 11:00 - Noon | Moderator: Bill Mulligan |
| Noon | WORKSHOP ADJOURNS |