

NA PV/PV Materials Committees Meeting Minutes

North America Spring Standards Meetings 2013

Wednesday, 3 April, 2013, 1:00 PM - 4:00 PM

SEMI HQ, San Jose, CA

Next Committee Meeting

July 10, 2013, San Francisco Marriott Marquis, CA in conjunction with Intersolar North America Meetings.

Check www.semi.org/standards for the latest update.

Attendees:

SEMI Staff

Kevin Nguyen – SEMI HQ

Co-chairs – Win Baylies (BayTech Group)

Table 1 – Meeting Attendees

<i>Last Name</i>	<i>First Name</i>	<i>Company</i>
Baylies	Win	BayTech Group
Gotts	Hugh	Balazs/Air Liquide
Martell	Steve	Sonoscan
Xia	Yong	SuperSight
Swirhun	James	Sinton Instruments

Table 2 – Organization/Task Force Changes

None

Table 3 – Ballot Summary

Passed ballots and line items will be submitted to the ISC Audit & Review Subcommittee for procedural review.

Failed ballots and line items were returned to the originating task forces for re-work and re-balloting.

#	<i>Document Title</i>	<i>Committee Action</i>
5439	Line Item Revision to SEMI PV13-1111, Test Method for Contactless Excess-Charge-Carrier Recombination Lifetime Measurement in Silicon Wafers, Ingots, and Bricks Using an Eddy-Current Sensor	See below
	Line Item 1 - Revision proposed here adds references to this study in the Reference Material section and adds a precision statement based on the study to the Uncertainty section.	Passed as balloted
4675C	New Standard: Test Method for the Measurement of Elemental Impurity Concentrations in Silicon Feedstock for Silicon Solar Cells By Bulk Digestion, Inductively Coupled-Plasma Mass Spectrometry	Passed as balloted

Table 4 – Authorized Ballots

#	<i>When</i>	<i>SC/TF/WG</i>	<i>Details</i>
None			

Table 5 – Authorized Activities

Listing of all new TFOFs, SNARFs, and other activities approved by the committee.

#	Type	SC/TF/WG	Details
5567	SNARF	Int'l PV Analytical Test Methods TF	New Auxiliary Document: Interlaboratory Study for PVxx, Test Method for the Measurement of Elemental Impurity Concentrations in Silicon Feedstock for Silicon Solar Cells By Bulk Digestion, Inductively Coupled-Plasma Mass Spectrometry

Note: SNARFs and TFOFs are available for review on the SEMI Web site at:

<http://downloads.semi.org/web/wstdsbal.nsf/TFOFSNARF>

Table 6 – Previous Meeting Actions Items

Item #	Assigned to	Details	Status
1012-01	Kevin Nguyen (SEMI Staff)	To inform China PV Silicon Wafer TF leaders and Kris Shen (SEMI China staff) on SEMI PV22-1011 - Specification for Silicon Wafers for Use in Photovoltaic Solar Cells. Instead of creating a new standard, ask to consider doc. 5382 Specification for Quasi-monocrystalline Silicon Wafers used in Photovoltaic Solar Cells, be combined with PV22.	Completed
1012-02	Kevin Nguyen (SEMI Staff)	For communication purpose, Kevin to ask regional SEMI staff to list email and contact information for New SNARF's and documents on their regional liaison reports.	Completed
1012-03	Kevin Nguyen (SEMI Staff)	To post a call for participation on a round robin for interlaboratory study for document 5438 - Test Method For The Measurement Of Oxygen Concentration In PV Silicon Materials For Silicon Solar Cells By Inert Gas Fusion Infrared Detection Method	Completed
1012-04	Kevin Nguyen (SEMI Staff)	To send Chris Moore the PV Minority Carrier Lifetime WG members email list. Chris will inform them that the activity is now merged with the PV Electrical and Optical Properties Measurement TF	Completed

Table 7 – New Actions Items

Item #	Assigned to	Details
None		

1.0 Call to Order

Win Baylies called the meeting to order and welcomed everyone who attended. A round of self-introduction was made. All SEMI standards meetings are subjected to SEMI Anti-Trust Reminder and Guidelines concerning Patentable Technology. SEMI Regulations now require all attendees to be members of SEMI standards. Membership enrollment is at www.semi.org/standardsmembership. The agenda was reviewed and approved.

2.0 Review and Approval of Meeting Minutes from NA Fall Standards Meeting in San Jose, CA, October 31, 2012.

Minutes were reviewed. No change was made.

Motion: To accept the minutes as written.

By / 2nd: Steve Martell (Sonoscan)/Hugh Gotts (Air Liquide)

Discussion: None

Vote: Unanimous. Motion passed

[Attachment – 1, NAPVMaterialsMeetingMinutes20121031](#)

3.0 Staff Report

Report was given by Kevin Nguyen. Highlights.

- 2013 Event

<i>Event Name</i>	<i>Event Details</i>
SEMICON West	July 9-11, 2013 San Francisco, California
SEMICON Taiwan	September 4-6, 2013 Taipei
SEMICON Europa	October 8-10, 2013 Dresden, Germany

- West '13 Visitor Registration is now open.
 - The last day for FREE Expo Only badge (a \$150 onsite value) is May 10.
 - Register today!
 - www.semiconwest.org
- Technical Ballot Critical Dates
 - Cycle 3, 2013
 - Ballot Submission Date: April 17
 - Voting Period Starts: May 1
 - Voting Period Ends: May 31
 - Cycle 4, 2013
 - Ballot Submission Date: May 20
 - Voting Period Starts: June 1
 - Voting Period Ends: July 1
- Major Items Included in Revision to the Regulations
 - This revision to the Regulations added a new category called Complementary File.
 - TC Chapters must take action on Standards that reference files in formats other than pdf (e.g., XML schema, WDSL, xls)
 - All non-pdf files published prior to March 2013 Regulations are Various Materials.
 - TC Chapters must decide if non-pdf files are required for implementation of the Standard, and if so, TC Chapter must issue a ballot to make the non-pdf files "Complementary Files".
 - Elimination of Regional Standards
 - Exit mechanism from LOA in limbo
 - Clarification and additional guidance on Letter of Intent (LOI)
- March 2013 Publication Cycle
 - New Standards: 0
 - Revised Standards: 3
 - Reapproved Standards: 2
 - Withdrawn Standards: 0
 - Total SEMI Standards in portfolio: 871 (Includes 93 Inactive Standards)
- Standards Usage Interview
 - Looking for details on how standards are actually used:
 - Development/Engineering
 - Procurement
 - Manufacturing
 - Interview should take less than 30 minutes – contact James or any Standards staff
- The Official SEMI Standards Group
 - <http://www.linkedin.com/groups/Official-SEMI-Standards-Group-1774298/about>

Attachment – 2, SEMI Staff Report (Spring 2013) revB

4.0 Liaison Report

4.1 European PV Committee

Report was given by Kevin Nguyen. Highlights.

- Last meeting
 - March 10-12, 2013
 - PV Fab Managers Forum
 - Berlin, Germany
- Next meeting
 - June 19-21, 2013
 - Intersolar Europe
 - Munich, Germany
 - Check www.semi.org/standards for latest update
- Ballot Results Summary from previous meeting
 - Doc 5434, New Standard: Test Method for In-Line Measurement of Lateral Dimensional Characteristics of Square and Pseudo-Square PV Silicon Wafers – PASSED
 - Doc 5530, New Standard: Specification for Orientation Fiducial Marks for PV Silicon Wafers - PASSED
 - Doc 5502, Revision to PV39-0912, Test Method for In-Line Measurement of Cracks in PV Silicon Wafers by Dark Field Infrared Imaging – PASSED
 - Doc 5531, Revision to PV40-0912, Test Method for In-Line Measurement of Saw Marks on PV Silicon Wafers by a Light Sectioning Technique Using Multiple Line Segments - PASSED
- PV Silicon Materials TF
 - Published Standards
 - PV17-1012 Specification for Virgin Silicon Feedstock Materials for Photovoltaic Applications
 - PV39-0912 Test Method for In-Line Measurement of Cracks in PV Silicon Wafers by Dark Field Infrared Imaging
 - PV40-0912 Test Method for In-Line Measurement of Saw Marks on PV Silicon Wafers by a Light Sectioning Technique Using Multiple Line Segments
 - PV41-0912 Test Method for In-Line, Noncontact Measurement of Thickness and Thickness Variation of Silicon Wafers for PV Applications Using Capacitive Probes
 - PV42-0113 Test Method for In-Line Measurement of Waviness of PV Silicon Wafers by a Light Sectioning Technique Using Multiple Line Segments
- SEMI Europe Staff
 - Yann Guillou , SEMI Europe yguillou@semi.org

[Attachment – 3, EU PV Materials Liaison Report 20130315 \(1\)](#)

4.2 Japan PV/PV Materials Committee

Report was given by Kevin Nguyen. Highlights

- Last Meeting
 - December 5, 2012 at Makuhari Messe, Chiba, Japan
- Next Meeting
 - April 12, 2013 at SEMI Japan Office, Tokyo, Japan
- Japan PV Materials TF
 - Drafting Doc. #5417 “New Standard: Test Method for Measurement of Defects in PV Silicon Wafers in PV Modules by Electroluminescence (EL) Imaging”
 - No standardized methods for EL (and IR*) measurements
 - IR*: Standardization activity has already started in EU PV Materials Committee.

- EL: difficult to identify cracks in multi-crystalline silicon cells - need another method
- SEMI PV Standards Introductory Workshop
 - Date: Wednesday, 5 December, 2012: Time: 11:00am-13:00pm
 - Location: Main Stage at PV Japan 2012 Exhibition Hall
 - It drew more than 60 participants.
- SEMI Japan Staff
 - Hirofumi Kanno, hkanno@semi.org

[Attachment – 4, JA PVC_PVMC Updates](#)

4.3 Taiwan PV Committee

Kevin highlighted the report.

- Last meeting
 - March 8, 2013
 - ITRI, Hsinchu
- Next meeting
 - TBD
 - ITRI, Hsinchu
- Building Integrated Photovoltaic (BIPV)TF <New>
 - Charter
 - The objective is to develop technical Standards related to BIPV (Building-integrated photovoltaic), including classification, standardization and evaluation of BIPV products and components.
 - Scope
 - The task force will develop BIPV Standards in which equipment suppliers, material and component manufacturers, module makers and other involved parties can find conformity.
 - Initial work will focus on: Providing common criteria or rules to classify BIPV products, so that the Standards developed afterward can easily define the applied scope.
 - Drafting:
 - Doc. 5560, New Standard: Classification of Building Integrated Photovoltaic (BIPV)
- PV Package Performance TF
 - The objective is to develop technical standard criteria related to PV wafer, cell and module package performance and type approval.
 - Drafting doc. 5431, New Standard: Test Method for Performance Criteria of Photovoltaic (PV) Wafer, Cell, and Module Package
- Regional Staff Contact Information
 - Catherine Chang (cchang@semi.org)

[Attachment – 5, Taiwan PV_Liaison_20121221](#)

4.4 China PV Committee

Kevin Nguyen reported. Highlights

- Last meeting
 - China Spring Standards Meeting 2013
 - Shanghai, China
 - Monday, March 18, 2013
- Next meeting
 - China Summer Standards Meeting 2013
 - Yangzhou, China

- Friday, June 28, 2013
- Check www.semi.org/standards for latest update
- New TFOF/SNARF
 - Doc.5564, New Standard: Test Method for the Measurement of Chlorine in Silicon by Ion Chromatography (PV Silicon Raw Materials Task Force)
 - Doc.5563, New Standard: Specification for Framing Tape for PV Modules (Crystalline Silicon PV Module TF)
- Ballot results
 - Doc. 5384, New Standard: Specification for Package protection technology for PV Modules
 - Ballot **approved** with editorial changes at March 18 TC meeting
 - Will be submitted to A&R SC for procedural review
 - Doc. 5385, New Standard: Test Method for the content of Vinyl Acetate (VA) in Ethylene-Vinyl Acetate (EVA) applied in PV modules—Thermal Gravimetric Analysis (TGA)
 - Ballot **approved** with editorial changes at March 18 TC meeting
 - Will be submitted to A&R SC for procedural review
 - Doc. 5475, New Standard: Specification for Anti-reflective-coated Glass, Used In Crystalline Silicon Photovoltaic Modules
 - Ballot **approved** with editorial changes at March 18 TC meeting
 - Will be submitted to A&R SC for procedural review
 - Doc. 5428, New Standard: Specification for Impurities in Polyethylene Packaging Materials for Polysilicon Feedstock
 - Ballot **failed** at March 18 TC meeting, returned to TF for rework
 - Doc. 5382, New Standard: Specification for Quasi-monocrystalline Silicon Wafers used in Photovoltaic Solar Cells
 - Ballot **failed** at March 18 TC meeting, returned to TF for rework
- Metal Paste for Crystalline Silicon Solar Cells TF
 - Working on draft 5426, Specification for Aluminum Paste, Used in Back Surface Field of Crystalline Silicon Solar Cells
 - Working on draft 5427, Specification for Front Surface Silver Paste, Used in P-Type Crystalline Silicon Solar Cells
- PV Diffusion Furnace Test Methods TF
 - Working on draft 5429: Test Method for In-line Monitoring of Flat Temperature Zone in Horizontal Diffusion Furnaces
- PV Silicon Raw Materials Task Force
 - Working on Doc.5477, New Standard: Test Method for Determining B, P, Fe, Al, Ca Contents in Silicon Powder for PV Applications by Inductively-Coupled-Plasma Optical Emission Spectrometry
 - Working on Doc.5476, New Standard: Test Method for Determination of Total Carbon Content in Silicon Powder by Infrared Absorption after Combustion in an Induction Furnace
- Silicon Thin Film PV Module Task Force
 - Working on Doc.5478, New Standard: Test method for Thin-film Silicon PV modules Light Soaking
- SEMI China Standards Contact : Kris Shen (kshen@semi.org)

[Attachment – 6, China Photovoltaic Committee Liaison Report20130329](#)

5.0 Ballots Review

- 5.1 Document 4675C, New Standard: Test Method for the Measurement of Elemental Impurity Concentrations in Silicon Feedstock for Silicon Solar Cells By Bulk Digestion, Inductively Coupled-Plasma Mass Spectrometry

5.1.1 Document passed technical review and is being forwarded to the ISC A&R Subcommittee for procedural review. See attachment below for details of ballot adjudication.

[Attachment – 7, 4675CProceduralReview](#)

- 5.2 Document 5439, Line Item Revision to SEMI PV13-1111, Test Method for Contactless Excess-Charge-Carrier Recombination Lifetime Measurement in Silicon Wafers, Ingots, and Bricks Using an Eddy-Current Sensor

5.2.1 Document passed technical review and is being forwarded to the ISC A&R Subcommittee for procedural review. See attachment below for details of ballot adjudication.

[Attachment – 8, 5439ProceduralReview](#)

6.0 Current NA Activities

6.1 *Int'l PV Analytical Test Methods TF/Hugh Gotts(Air Liquide)*

6.1.1 Hugh Gotts reported meeting summary. Highlights.

6.1.1.1 Document 4675C, New Standard: Test Method for the Measurement of Elemental Impurity Concentrations in Photovoltaic-Grade Silicon Feedstock by Bulk Digestion, Inductively Coupled-Plasma Mass Spectrometry

- This document passed. A round robin test to validate the method is needed.

Motion: To approve the SNARF New Auxiliary Document: Interlaboratory Study for PVxx, Test Method for the Measurement of Elemental Impurity Concentrations in Silicon Feedstock for Silicon Solar Cells By Bulk Digestion, Inductively Coupled-Plasma Mass Spectrometry

By / 2nd: Hugh Gotts (Air Liquide)/James Swirhun (Sinton Instruments)

Discussion: None

Vote: 4-0. Motion passed

[Attachment – 9, SNARF Form_TM by ICP-MS_RR](#)

6.1.1.2 Status of doc. 5435, Auxiliary Information to include interlaboratory study for SEMI PV25-1011, Test Method for Simultaneously Measuring Oxygen, Carbon, Boron and Phosphorus in Solar Silicon Wafers and Feedstock by Secondary Ion Mass Spectrometry

- According to Patrick Schnabel, he had trouble obtaining data from some of the labs that had promised participation and that were provided with material. So far he has only data from 4 labs. To do the data work up according to ASTM E691-09 with sufficient statistical significance, 6 labs is the minimum required minimum.
- He might have to resort to different statistical methods for a precision statement as he does not believe he will receive the outstanding data anymore. He has contacted these labs now multiple times.

6.1.1.3 Status of doc. 5501, Auxiliary Document: Interlaboratory Study for PV43-0113 - Test Method For The Measurement Of Oxygen Concentration In PV Silicon Materials For Silicon Solar Cells By Inert Gas Fusion Infrared Detection Method

- According to Patrick, a little good news is reported. He has now 4 participants for the Inert Gas fusion RR and two more that will likely sign up (from China).
- If he included the two EAG labs (NY and Toulouse) he would have 8. Also he has the material now. He is more optimistic now that he will have some progress by Intersolar North America.

[Attachment – 10, Update for PV25-1011 and PV43-0113 - Patrick Schnabel](#)

6.2 PV Electrical and Optical Properties Measurement TF/Chris Moore (Semilab), Austin Blew (LEI)

6.2.1 James Swirhun presented the meeting summary.

- Pilot Study and Round Robin for Eddy Current Standard PV28-0212 Test Methods for Measuring Resistivity or Sheet Resistance with a Single-Sided Noncontact Eddy-Current Gauge – Austin Blew/Mark Benjamin
 - Presentation prepared by Austin Blew/Danh Nguyen – not given due to insufficient attendance to the TF meeting.
 - Tentative Teleconference on May 7, 1pm ET to discuss presentation with interested parties.
- Ballot
 - Doc. 5439, Revision to SEMI PV13-1110, Test Method for Contactless Excess-Charge-Carrier Recombination Lifetime Measurement in Silicon Wafers, Ingots, and Bricks Using an Eddy-Current Sensor
 - One negative with no details. Contact attempted, no response received. TF recommendation is to find the negative related, but not technically persuasive on account of insufficient information.

[Attachment – 11, PV Electrical 3 Apr 2013 Summary](#)

7.0 Old Business

7.1 No old business was reported.

8.0 New Business

8.1 No new business was reported.

9.0 Next Meetings

9.1 The NA PV Materials committee is scheduled at Intersolar NA in July 10, 2013, San Francisco Marriott Marquis, CA. Check www.semi.org/standards for the latest update.

10.0 Action Item Review

Summary of action was reviewed by Kevin Nguyen. If any, these can be found in the New Action Items table 7 at the beginning of these minutes.

11.0 Adjourn

Adjournment of the meeting was held at 2:00 PM

These minutes are respectfully submitted by:

Kevin Nguyen,
SEMI NA Standards Committee Manager
Phone: 408-943-7997
Email: knguyen@semi.org

Approved by:
Win Baylies (BayTech Group)

Date: April 18, 2013

Table 8 – Index of Attachment Summary

#	<i>Title</i>		<i>Title</i>
1	NAPVMaterialsMeetingMinutes20121031	7	4675CProceduralReview
2	SEMI Staff Report (Spring 2013) revB	8	5439ProceduralReview
3	EU PV Materials Liaison Report 20130315 (1)	9	SNARF Form_TM by ICP-MS_RR
4	JA PVC_PVMC Updates	10	Update for PV25-1011 and PV43-0113 - Patrick Schnabel
5	Taiwan PV_Liaison_20121221	11	PV Electrical 3 Apr 2013 Summary
6	China Photovoltaic Committee Liaison Report20130329		

#1 Due to file size and delivery issues, attachments must be downloaded separately. A .zip file containing all attachments for these minutes is available at www.semi.org. For additional information or to obtain individual attachments, please contact Kevin Nguyen at the contact information above