

NA PV/PV Materials TC Chapters Meeting Minutes

NA Fall Standards Meeting 2014

Wednesday, 5th November, 2014, 1:00 PM - 3:00 PM

SEMI HQ, San Jose, CA

Next Committee Meeting

Wednesday, April 1, 2015, San Jose, CA in conjunction with NA Spring Standards Meetings. Check www.semi.org/standards for the latest update.

SEMI Staff

Kevin Nguyen – SEMI HQ

Co-chair – Hugh Gotts (Air Liquide)

Table 1 – Meeting Attendees

<i>Last Name</i>	<i>First Name</i>	<i>Company</i>
Baylies	Win	BayTech-Resor
Gotts	Hugh	Air Liquide Electronics US
Martell	Steve	Sonoscan
Moore	Chris	BayTech-Resor

Table 2 – Organization/Task Force Changes

None

Table 3 – Ballot Summary

None

Table 4 – Authorized Ballot

None

Table 5 – Authorized Activities

<i>#</i>	<i>Type</i>	<i>SC/TF/WG</i>	<i>Details</i>
5801	SNARF	International PV Analytical Test Methods, Metrology, and Inspection Task Force	New Standard: Guide for the Planning, Implementing and Analyzing data from a Round Robin used to verify a Test Method
5802	SNARF	International PV Analytical Test Methods, Metrology, and Inspection Task Force	New Standard: Test Method for In-line, Noncontact Measurement of Saw Marks on Silicon Wafers for PV Applications Using Laser Position Sensor
5803	SNARF	International PV Analytical Test Methods, Metrology, and Inspection Task Force	New Standard: Test Method for In-line, Noncontact Measurement of Thickness and Thickness Variation of Silicon Wafers for PV Applications Using Laser Position Sensor
4825	SNARF	International PV Analytical Test Methods, Metrology, and Inspection Task Force	New Standard: Test Methods for Hg Probe Measurements of Crystalline Silicon PV Materials and Devices SNARF was abandoned.

Table 6 – Previous Meeting Actions Items

<i>Item #</i>	<i>Assigned to</i>	<i>Details</i>	<i>Status</i>
0714-1	Hugh Gotts (Air Liquide)	To follow up with Brent Ames (Applied Materials) for various SNARFs on Test Method for Metrology of Bare cSi Wafers.	Completed
0714-2	Peter Wagner (Self)	To contact Kris Shen (China) and Andy Tuan (Taiwan) to engage interest in round robin participation on SEMI PV40, 41, 42 and 46	Completed
0714-3	Chris Moore,	To prepare a SNARF for a Guideline for Round Robin	Completed

<i>Item #</i>	<i>Assigned to</i>	<i>Details</i>	<i>Status</i>
	Hugh Gotts and Win Baylies		
0714-4	Hugh Gotts (Air Liquide)	To conduct 5 year review of SEMI PV3 Guide for High Purity Water Used in Photovoltaic Cell Processing, and report at the next meeting	Pending

Table 7 – New Actions Items

<i>Item #</i>	<i>Assigned to</i>	<i>Details</i>
1114-1	Hugh Gotts (Air Liquide)	Hugh to forward these standards to his colleague for review. <ul style="list-style-type: none"> • SEMI PV5-1110 Guide for Oxygen (O₂), Bulk, Used in Photovoltaic Applications • SEMI PV6-1110 Guide for Argon (Ar), Bulk, Used in Photovoltaic Applications • SEMI PV7-1110 Guide for Hydrogen (H₂), Bulk, Used in Photovoltaic Applications • SEMI PV8-1110 Guide for Nitrogen (N₂), Bulk, Used in Photovoltaic Applications • SEMI PV11-1110 Specifications for Hydrofluoric Acid, Used in Photovoltaic Applications • SEMI PV12-1110 Specifications for Phosphoric Acid Used in Photovoltaic Applications

1.0 Call to Order

Hugh Gotts 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 Intersolar NA, San Francisco, CA, July 9, 2014

Minutes were reviewed. No change was made.

Motion: To accept the minutes as written.

By / 2nd: Chris Moore (BayTech-Resor)/Steve Martell (Sonoscan)

Discussion: None

Vote: Unanimous. Motion passed

[Attachment – 1, NAPVMaterialsMeetingMinutes20140709](#)

3.0 Staff Report

Report was given by Kevin Nguyen. Highlights.

- 2014 Event

<i>Event Name</i>	<i>Event Details</i>
SEMICON Japan	December 3-5, 2014 Tokyo

- 2015 Event

<i>Event Name</i>	<i>Event Details</i>

<i>Event Name</i>	<i>Event Details</i>
SEMICON West	July 14-16 San Francisco
SEMICON Europa	October 6-8 Dresden, Germany
SEMICON Japan	December 16-18 Tokyo

- NA Standards 2015 Meetings
 - March 30 – April 2 [SEMI HQ in San Jose, California]
- Technical Ballot Critical Dates
 - Cycle 8, 2014
 - Ballot Submission Date: Nov 17
 - Voting Period Starts: Dec 1
 - Voting Period Ends: Dec 31
 - Cycle 1, 2015
 - Ballot Submission Date: Nov 17
 - Voting Period Starts: Dec 1
 - Voting Period Ends: Dec 31
- Total SEMI Standards in portfolio: 917
 - Includes 108 Inactive Standards

Kevin also briefly mentioned the proposed changes to the Regulations, pending the approval of the ISC. The official version of the Regulations is anticipated for use by SEMICON Japan meeting. Significant change includes group 1, 2, 4 and 10. See attachment for details.

- Group 1 - Standards Document Development Project Period
 - Project must be completed in 3 yrs, a year extension is allowed
- Group 2 - SNARF Review Period
 - New/Major Revision SNARF shall be issued to TC Members two weeks for feedback
- Group 3 - Official Virtual Meeting
- Group 4 - GCS Voting on Minority Reports
 - GCS voting will be issued in a standardized template. No vote or abstain vote is considered in favor of the minority report.
- Group 5 - Voting Interest Definition Improvement
- Group 6 - Additional Miscellaneous Subtype Example/ Appendix 4 for Procedure for Title Correction
- Group 7 - Clarification of Safety Guideline Meaning in Title
- Group 8 - Preventing SNARF and TFOF Being Approved Outside of the Global TC's Charter and Scope
- Group 9 – Clarify Usage of Originating vs. Responsible TC Chapter
- Group 10 – Ballot Adjudication Improvements
 - Ballots with reject will be sent back to TC members as Ratification ballots. Complex procedures depicted in a diagram shown in the attached slides
- Group 11 – TC Chapter Formation Procedures

[Attachment – 2, Regs_SC_to_NARSC2014_1102](#)

[Attachment – 3, SEMI Staff Report \(Fall 2014\)](#)

4.0 Liaison Reports

4.1 European PV Materials Committee

Report was given by Kevin. Highlights.

- Last meeting
 - Oct 7, 2013
 - SEMICON Europa
 - Dresden, Germany
- Next meeting
 - To be announced
- Ballot Results Summary from October meeting
 - Doc 5565, Line Item Revision to PV42, Test Method for In-Line Measurement of Waviness on PV Silicon Wafers by a Light Sectioning Technique Using Multiple Line Segments – PASSED
 - Doc 5433, New Standard, Test Method for In-line Characterization of PV Silicon Wafers regarding Grain Size – PASSED and PUBLISHED as **PV52-0214**
 - Doc 5432, New Standard, Test Method for In-line Characterization of PV Silicon Wafers by Using Photoluminescence – PASSED and PUBLISHED as **PV51-0214**
- 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
- A workshop on Round Robin was conducted at the Intersolar Europe meeting in June 2014. There is a need for a second workshop to be held for next year.
- SEMI Europe Staff
 - Andrea Busch (abusch@semi.org)

[Attachment – 4, 141022_Europe_PVMat_LiaisonReport \(1\)](#)

4.2 Japan PV/PV Materials Committee

Report was given by Kevin Nguyen. Highlights

- Last Meeting
 - September 11, 2014 at SEMI Japan Office, Tokyo, Japan
- Next Meeting
 - December 10, 2014 at SEMI Japan Office, Tokyo, Japan
- Japan PV Materials TF
 - New Standard: “Test Method for Measurement of Cracks in PV Silicon Wafers in PV Modules by Laser Scanning”
 - Balloted for Cycle 3-2014 and passed with editorial changes at Japan Summer 2014 Meetings on July 4.
 - It became necessary to perform IP assessment defined in the SEMI Regulations §15.3.2 again because the owner of IP known at the time of July 4 meeting reported additional IPs of potential relevance upon submission of LOA.
 - The TC Chapter assessed at Japan Fall 2014 Meeting on September 11 as follows.

- JP5015341B and JP2014041095A are potentially material patented technology (PMPT) for Doc. 5532. The TC Chapter determined on technical grounds that use of the PMPT is justified for Doc. 5532
 - The TC Chapter directed the responsible Standards staff to ask the patent holder for the LOA for those two patents based on the SEMI Regulations §15.3.3.
 - The LOA request is sent to the patent holder.
- SEMI Japan Staff (Chie Yanagisawa, cyanagisawa@semi.org)

[Attachment – 5, 141105_JA_PV&PVM_NA-Fall-2014_R0.3](#)

4.3 Taiwan PV Committee

Highlights. Report given by Kevin.

- Last meeting
 - July 1, 2014
 - SEMI Office, Hsinchu
- Next meeting
 - Oct 3, 2014
 - ITRI
- Ballots approved and passed TC Review
 - Draft #: 5431 New Standard: Test Method for Performance Criteria of Photovoltaic (PV) Cell and Module Package
 - Draft #: 5597 New Standard: Test Method for Current-Voltage (I-V) Performance Measurement of Organic Photovoltaic (OPV) and Dye-Sensitized Solar Cell (DSSC)
- New Regional Staff Contact Information.
 - Andy Tuan (atuan@semi.org)

[Attachment – 6, Taiwan Liaison Report for ISC Meeting May 2014](#)

4.4 China PV Committee

Kevin reported. Highlights

- Last meeting
 - Dalian, Liaoning, China
 - Friday, September 12th, 2014
- Next Meeting
 - Changsha, Hunan, China
 - Friday, December 12th, 2014
- *PV Silicon Wafer Task Force*
 - Doc. 5724, New Standard: Guide for Specifying Quasi Monocrystalline Silicon Wafers used in Photovoltaic Solar Cells
 - Authorized for rebalot in Cycle 7-2014
 - Doc. 5767, New Standard: Guide for Material Requirements of Internal Feeders Used in Mono-crystal Silicon Growers (New SNARF)
- *PV Module Task Force*
 - Published
 - SEMI PV44-0513, Specification for Package Protection Technology for PV Modules
 - SEMI PV45-0513, Test Method for the Content of Vinyl Acetate (VA) in Ethylene-Vinyl Acetate (EVA) Applied in PV Modules Using Thermal Gravimetric Analysis (TGA)

- SEMI PV47-0513, Specification for Anti-Reflective-Coated Glass, Used in Crystalline Silicon Photovoltaic Modules
 - Drafting
 - Doc. 5563A, Specification for Framing Tape for PV Modules
 - Passed with editorial changes, to be submitted to A&R Subc for procedural review
 - Doc. 5660, Specification for Ultra-thin Glasses Used for Photovoltaic Modules
 - Passed as balloted, to be submitted to A&R Subc for procedural review
 - Doc. 5661, Test Method for Electrical Parameters Testing of Bifacial Solar Module
 - Doc. 5644, Terminology for Back Contact PV Cell and Module
 - Passed as balloted, to be submitted to A&R Subc for procedural review
 - Doc. 5725, New Standard: Practice for Metal Wrap Through (MWT) Back Contact PV Module Assembly
 - Doc. 5725, New Standard: Practice for Metal Wrap Through (MWT) Back Contact PV Module Assembly (New SNARF)
- *PV Diffusion Furnace Test Methods Task Force*
 - Doc. 5429: Test Method for In-line Monitoring of Flat Temperature Zone in Horizontal Diffusion Furnaces
 - Passed by TC, Published as SEMI PV53-0514
- *PV Silicon Raw Materials Task Force*
 - Published
 - SEMI PV50-0114 Specification for Impurities in Polyethylene Packaging Materials for Polysilicon Feedstock
 - Activity:
 - Doc. 5476B, Test Method for Determination of Total Carbon Content in Silicon Powder by Infrared Absorption after Combustion in an Induction Furnace
 - Doc. 5564B, Test Method for the Measurement of Chlorine in Silicon by Ion Chromatography
 - Both passed as balloted, to be submitted to A&R Subc for procedural review
- *PV Thin Film Task Force*
 - Drafting:
 - Doc. 5478: Test Method for Thin-film Silicon PV modules Light Soaking
- *PV Power Station Equipment Integrated Performance Task Force*
 - Drafting:
 - Doc. 5648: Test Method for the Integrated Efficiency of Installed PV Components
 - Doc. 5729, New Standard: Specification for Hotspot in Crystalline Silicon PV Modules in the Field (New SNARF)
- *Crystalline Silicon Solar Cell Task Force*
 - Doc. 5426A, Specification for Aluminum Paste, Used in Back Surface Field of Crystalline Silicon Solar Cells
 - Passed as balloted, to be submitted to A&R Subc for procedural review
- Multi-wire Saws Task Force (New TF)
 - Charter
 - Provide test methods and data support for Multi-wire saws;

- Resolve the differences between the suppliers and users in the field of Multi-wire saws;
- Provide the consistency and versatility of Multi-wire saws, and improve productivity and reduce the loss in the Multi-wire saws industrial chain;
- Improve the development of standards of Multi-wire saws industry.
- Activities:
 - Doc. 5728, New Standard: Test Method for the Wire Tension of Multi-wire Saws (New SNARF)
- SEMI China Standards Contact : Kris Shen (kshen@semi.org)

[Attachment – 7, China Photovoltaic Committee Liaison Report20141021](#)

5.0 Ballots Review

- 5.1 There was not ballot to review.

6.0 Current Activities

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

- Hugh Gotts reported meeting summary. Highlights.
- Status of doc. 4825, New Standard: Test Methods for Hg Probe Measurements of Crystalline Silicon PV Materials and Devices - Chris Moore
 - No longer interest. Chris would like to abandon this effort.
- **Motion:** To remove SNARF 4825
By / 2nd: Chris Moore (BayTech-Resor)/Win Baylies (BayTech-Resor)
Discussion: None
Vote: 3/0. Motion passed
- Status of doc. 5093, Auxiliary Document: Round Robin (Multi-laboratory Test) of SEMI PV9-1110, Test Method for Excess Charge Carrier Decay in PV Silicon Materials by Non-Contact Measurement of Microwave Reflectance After a Short Illumination Pulse - Chris Moore
 - Chris forwarded this information to appropriate contact. More will be reported at the next meeting.
- 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 - Patrick Schnabel, Hugh Gotts
 - Patrick Schnabel has dropped out of this activity. Data collected but not evaluated. The TF will look for additional resources to evaluate the data.
- 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 - Patrick Schnabel, Hugh Gotts
 - Patrick Schnabel has dropped out of this activity. Data collected but not evaluated. The TF will look for additional resources to evaluate the data.
- Status of Doc. 5567, Auxiliary Document: Interlaboratory Study for PV49-1110, Test Method for the Measurement of Elemental Impurity Concentrations in Silicon Feedstock for Silicon Solar Cells By Bulk Digestion, Inductively Coupled-Plasma Mass Spectrometry - Hugh Gotts
 - Collecting additional sample material for evaluation.

- **New Business**

- SNARF for New Standard: Guide for the Planning, Implementing and Analyzing data from a Round Robin used to verify a Test Method was presented by Chris Moore.

Motion: To approve the SNARF

By / 2nd: Chris Moore (BayTech-Resor)/ Win Baylies (BayTech-Resor)

Discussion: None

Vote: 3/0. Motion passed

- SNARF for New Standard: Test Method For In-Line Measurement Of Saw Marks On PV Silicon Wafers By Laser Position Sensor (Asaf Schlezinger) was shown.

Motion: To approve the SNARF

By / 2nd: Chris Moore (BayTech-Resor)/ Win Baylies (BayTech-Resor)

Discussion: None

Vote: 3/0. Motion passed

- SNARF for New Standard: Test Method For In-Line, Noncontact Measurement Of Thickness And Thickness Variation Of Silicon Wafers For PV Applications Using Laser Position Sensor (Asaf Schlezinger) was shown.

Motion: To approve the SNARF

By / 2nd: Chris Moore (BayTech-Resor)/ Win Baylies (BayTech-Resor)

Discussion: None

Vote: 3/0. Motion passed

[Attachment – 8, SNARF for round robin](#)

[Attachment – 9, SNARF Saw Marks](#)

[Attachment – 10, SNARF Silicon Thickness](#)

[Attachment – 11, 2014 Fall NA PV Standards Analytical TF agenda](#)

7.0 Old Business

All old businesses were completed.

8.0 New Business

- 8.1 Kevin Nguyen informed the committee there are a list of Standards due for 5 year review. The committee should review and take various actions with a choice of balloting for reapproval, sending to inactive list, removal or revising it.

- SEMI PV5-1110 Guide for Oxygen (O₂), Bulk, Used in Photovoltaic Applications
- SEMI PV6-1110 Guide for Argon (Ar), Bulk, Used in Photovoltaic Applications
- SEMI PV7-1110 Guide for Hydrogen (H₂), Bulk, Used in Photovoltaic Applications
- SEMI PV8-1110 Guide for Nitrogen (N₂), Bulk, Used in Photovoltaic Applications
- SEMI PV11-1110 Specifications for Hydrofluoric Acid, Used in Photovoltaic Applications
- SEMI PV12-1110 Specifications for Phosphoric Acid Used in Photovoltaic Applications

- **Action Item # 1 – Hugh Gotts will direct attention to his colleague for review**



9.0 Next Meetings

The next NA PV/PV Materials TC Chapter is scheduled for Wednesday, April 1, 2015 at the SEMI HQ office, San Jose, CA. Check www.semi.org/standards for 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 2:45 PM

These minutes are respectfully submitted by:

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

Approved by:
Lori Nye (Brewer Science)
Hugh Gotts (Air Liquide)

Table 8 – Index of Attachment Summary

#	Title		Title
1	NAPVMaterialsMeetingMinutes20140709	7	China Photovoltaic Committee Liaison Report20141021
2	Regs_SC_to_NARSC2014_1102	8	SNARF for round robin
3	SEMI Staff Report (Fall 2014)	9	SNARF Saw Marks
4	141022_Europe_PVMat_LiaisonReport (1)	10	SNARF Silicon Thickness
5	141105_JA_PV&PVM_NA-Fall-2014_R0.3	11	2014 Fall NA PV Standards Analytical TF agenda
6	Taiwan Liaison Report for ISC Meeting May 2014		

#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