



**PV Committee China TC Chapter**  
**PV Materials Committee China TC Chapter**  
**Joint Meeting Summary and Minutes**

China Spring Standards Meeting 2017  
 April 18th, 2017, Tuesday, 08:30 -17:00  
 Evergreen Laurel Hotel Shanghai  
 No.1136 Zuchongzhi Road, Pudong District, Shanghai, China

TC Chapter Announcements

Next TC Chapter Meeting

Friday, October 13<sup>th</sup>, 2017 08:30-17:30

Taizhou, Jiangsu, China

**Table 1 Meeting Attendees**

**Co-Chairs:** Guangchun Zhang(CSI)

**SEMI Staff:** Daniel Qi – SEMI China, Sophia Huang – SEMI China, Mina – SEMI China, James Amano- SEMI HQ

<i>Company</i>	<i>Last</i>	<i>First</i>	<i>Company</i>	<i>Last</i>	<i>First</i>
Aoban	Chang	Hui	Lerrie	Wang	Tandong
Aoban	You	Weisong	Lerrie	Fu	Pengbo
Astronergy	Lu	Yurong	Lightway	Zheng	Hailu
BKC Materials	Ning	Haiyang	Linton	Li	Zhixin
BKC Materials	Ding	Xin	Linton	Liu	Erfei
Borouge	Zhou	Xin	LONGi	Deng	Liangping
CESI	Pei	Huichuan	LONGi	Fu	Nannan
CETC 48	Cai	Xianwu	LONGi	Wang	Xiangdong
CETC 48	Liu	Liangyu	MKS	Wu	Lihua
CETC 48	Long	Hui	MKS	Yao	Dailiang
ChianSC	Shen	Fusheng	MKS	Zhu	Yiwang
ChianSC	Tan	Haoyun	NAURA	Li	Buzhong
CPVT	He	Li	NAURA	Sun	Pengtao
CPVT	Song	Hao	NAURA	Li	Dongqi
CSI	Xu	Alan	Revax	Zhou	Xuemei
CSI	Guo	Suqin	Revax	Wen	Lei
CSI	Wang	Xusheng	RIETECH	Zhang	Tao
DAQO	Liu	Cui	RIETECH	Sun	Peiya
Darbond	Yang	Heng	Rutech	Ouyang	Jieyu
DSM	Wang	Xiaoliang	SCCC	Wu	Pengzhen
FJL	Yang	Aijun	Semilab	Huang	Li
FJL	Ni	Jiansheng	SIMT	Chen	Liming
flex	Qiu	Yingliang	Sinosico	Cao	Junying
flex	Zhou	Jinbo	SunChine	Wei	Shimeng
flex	Chong	CK	Sunman	Zhu	Jingbing
flex	Fong	Terry	Sunport	Zhu	Haojie
flex	Low	Hsien Loong	Suntech	Chen	Rulong
GCL	You	Da	Suntech	Gong	Haidan
GCL	Liu	Xiaoxia	Suntech	Zhou	Min

**Table 1 Meeting Attendees**

**Co-Chairs:** Guangchun Zhang(CSI)

**SEMI Staff:** Daniel Qi – SEMI China, Sophia Huang – SEMI China, Mina – SEMI China, James Amano- SEMI HQ

<i>Company</i>	<i>Last</i>	<i>First</i>	<i>Company</i>	<i>Last</i>	<i>First</i>
GCL	Wang	Taoxia	Talesun	Ni	Paul
GCL	Zou	Wentao	Talesun	Wei	Qingzhu
GCL	Shen	Gan	Talesun	Lu	Junyu
GCL	Huang	Qiang	Talesun	Wang	Zhigang
GCL	Wu	Yanrong	Talesun	Zhang	Shude
GCL	Lv	Jinbiao	Talesun	Yi	Hui
GG Solar	Wu	Xiexiang	Talesun	Zhu	Minglu
Gsola	Zeng	Xiangchao	TIANWEI	Lin	Hongfeng
Hanergy	Ding	Jian	Trina	Zhou	Wei
Hanergy	Zhang	Ying	Trina	Ying	Li
Hanergy	Ding	Xiuyun	Trina	Sheng	Yun
Hanwha QCELLS	Li	Zhiwei	Trina	Yan	Ping
Hebei University	Mai	Yaohua	Trina	Zhu	Qiangzhong
Hohai University	Zhang	Zhang	Trina	Xiao	Taoyun
Honbest	Huang	Junran	TUV	Li	Ningda
JA Solar	Zhong	Genxiang	TÜV NORD	Miao	Cunxing
JA Solar	Xu	Desheng	TÜV SÜD	Wu	Yaozhong
JA Solar	Li	Tao	TÜV SÜD	Bo	Xiangxi
JA Solar	Wang	Song	XINTE ENERGY	Fan	Xiecheng
JA Solar	Niu	Xinwei	XINTE ENERGY	Qiu	Yanmei
JA Solar	Huang	Xinming	XINTE ENERGY	Liu	Guoxia
Jinko	Li	Ning	Xinyang Normal University	Li	Yanlei
Jinko	Jin	Hao	XMZJY	Ni	Dong
Jolywood	Zhao	Tongrong	Yingli	Song	Dengyuan
Jolywood	Liu	Yong	Yingli	Ni	Jianxiong
JYT	Chen	Hui	Yingli	Liu	Yan
LDK	Hu	Dongli	Yingli	Liu	Ying
LDK	Peng	Yeqing	ZK Energy	Wu	Zhenyu

**Table 2 Leadership Changes**

<i>WG/TF/SC/TC Name</i>	<i>Previous Leader</i>	<i>New Leader</i>
None		

**Table 3 Committee Structure Changes**

<i>Previous WG/TF/SC Name</i>	<i>New WG/TF/SC Name or Status Change</i>
None	

**Table 4 Ballot Results**

<i>Document #</i>	<i>Document Title</i>	<i>Committee Action</i>
Photovoltaic		
5926	New Standard: Test Method for Bending Property of Flexible Thin Film PV Modules	<b>Passed</b> with editorial changes
5840	New Standard: Guide for Calibration of PV Module UV Test Chambers	<b>Passed</b> with editorial changes

**Table 4 Ballot Results**

<i>Document #</i>	<i>Document Title</i>	<i>Committee Action</i>
5968	New Standard: Guide for Sample Preparation Method for Photovoltaic Backsheet Performance Tests	<b>Failed</b> and return to TF for re-work and reballot in Cycle 5-2017
5661	New Standard: Test Method for Electrical Parameters of Bifacial Solar Module	<b>Failed</b> and return to TF for re-work and reballot in Cycle 5-2017
5842A	New Standard: Test Method for Metal-Wrap-Through Solar Cell Via Resistance	<b>Failed</b> and return to TF for re-work
Photovoltaic Materials		
5843	Revision of SEMI PV22-0716, Specification for Silicon Wafers for Use in Photovoltaic Solar Cells	<b>Passed as balloted</b>

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

#2 **Failed** ballots and line items were returned to the originating task forces for re-work and re-balloting or abandoning.

**Table 5 Activities Approved by the GCS prior to the Originating TC Chapter meeting**

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

**Table 6 Authorized Activities**

Listing of all revised or new SNARF(s) approved by the Originating TC Chapter.

<i>#</i>	<i>SC/TF/WG</i>	<i>Details</i>
Photovoltaic		
6191	Testing Equipment Task Force	New Standard: Guide for the Design of Testing and Sorting Equipment for Crystalline Silicon Solar Cells
Photovoltaic Materials		
6193	PV Silicon Raw Materials Task Force	New Standard: Specification for Trichlorosilane Used in Polysilicon Production
6194	PV Silicon Raw Materials Task Force	New Standard: Test Method for Determination of Hydrogen in PV Polysilicon by Inert Gas Fusion Infrared Absorption Method

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

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

**Table 7 Authorized Ballots**

<i>#</i>	<i>When</i>	<i>TF</i>	<i>Details</i>
Photovoltaic			
6074	Cycle 5-2017	Crystalline Silicon Solar Cell Task Force	New Standard: Test Method for Peeling Force between Electrode and Ribbon/Back Sheet
5982	Cycle 5-2017	PV Module Task Force	New Standard: Specification for Crystalline Silicon Photovoltaic Module Dimensions
5841 A	Cycle 5-2017	PV Diffusion Furnace Test	New Standard: Guide for Specifying Low Pressure Horizontal Diffusion Furnace

**Table 7 Authorized Ballots**

#	When	TF	Details
		Methods Task Force	
6070A	Cycle 5-2017	PV Module Task Force	New Standard: Test Method for Cell Defects in Crystalline Silicon PV Modules by Electroluminescence (EL) Imaging
5925 A	Cycle 5-2017	PV Module Task Force	New Standard: Specification for Dual-glass Module with Crystalline Silicon Terrestrial Solar Cell
5725	Cycle 5-2017	PV Module Task Force	New standard: Practice for Metal Wrap Through (MWT) Back Contact PV Module Assembly
5968A	Cycle 5-2017	PV Module Task Force	New Standard: Guide for Sample Preparation Method for Photovoltaic Backsheet Performance Tests
5661A	Cycle 5-2017	PV Module Task Force	New Standard: Test Method for Electrical Parameters of Bifacial Solar Module
Photovoltaic Materials			
5767 A	Cycle 5-2017	PV Silicon Wafer Task Force	New Standard: Guide for Material Requirements of Internal Feeders Used in Mono-crystal Silicon Growers

**Table 8 SNARF(s) Granted a One-Year Extension**

#	TF	Title	Expiration Date
Photovoltaic			
5661A	PV Module Task Force	New Standard: Test Method for Electrical Parameters of Bifacial Solar Module	2018/10/23
5725	PV Module Task Force	New standard: Practice for Metal Wrap Through (MWT) Back Contact PV Module Assembly	2018/06/13
Photovoltaic Materials			
5767 A	PV Silicon Wafer Task Force	New Standard: Guide for Material Requirements of Internal Feeders Used in Mono-crystal Silicon Growers	2018/09/12

**Table 9 SNARF(s) Abolished**

#	TF	Title
None		

**Table 10 Standard(s) to receive Inactive Status**

Standard Designation	Title
None	

**Table 11 New Action Items**

Item #	Assigned to	Details
ChinaPV-0417-01	Jianxiong Ni, Yingli	Doc 5661 will expire on October 23 <sup>th</sup> , 2017. Jianxiong Ni moved to extend the Doc 5661 for one more year. TC committee members approved it. Therefore, this project will expire on Oct. 23 <sup>th</sup> , 2018. <i>32 in favor and 0 opposed. Motion passed</i>

<i>Item #</i>	<i>Assigned to</i>	<i>Details</i>
ChinaPV-0417-02	Zhen Zhang, Hohai University	Doc 5725 will expire on June 13 <sup>th</sup> , 2017. Zhen Zhang moved to extend the Doc 5725 for one more year. TC committee members approved it. Therefore, this project will expire on June 13 <sup>th</sup> , 2018. <i>32 in favor and 0 opposed. Motion passed</i>
ChinaPV-0417-03	Erfei Liu, Linton	Doc 5767A will expire on September 12 <sup>th</sup> , 2017. Erfei Liu moved to extend the Doc 5767A for one more year. TC committee members approved it. Therefore, this project will expire on September 12 <sup>th</sup> , 2018. <i>32 in favor and 0 opposed. Motion passed</i>
ChinaPV-0417-04	Trina	Send Trina SEMI PV44-0513, SEMI PV45-0513 documents for Five-Year review
ChinaPV-0417-05	Suntech	Send Suntech SEMI PV47-0513 document for Five-Year review

**Table 12 Previous Meeting Action Items**

<i>Item #</i>	<i>Assigned to</i>	<i>Details</i>
ChinaPV-1116-01	Daniel Qi (SEMI China)	For China PV&PV Materials Joint TC Chapter 2017, arranging two meetings, one on April 18 <sup>th</sup> , 2017, the other in mid-October, 2017. When necessary, after SEMI communicates with co-chairs, there can be one more PV&PV Materials Standards Joint TC Chapter meeting. This added meeting's schedule is adjustable. <i>CLOSED</i>
ChinaPV-1116-02	Sophia Huang (SEMI China)	If there are new SNARFs, send them to China PV&PV Materials Standards Joint Technical Committee core members to review at first. Then Sophia arranges the approved SNARFs in agenda, then send SNARFs to Global PV Technical committee members for two weeks' review before meeting begins. <i>CLOSED</i>
ChinaPV-0316-01	7 task forces' leaders	Rearrange the task force members; make sure every member is active. <i>ONGOING</i>
ChinaPV-0715-02	PV Silicon Raw Materials Task Force	Translate Chinese version of published 3 standards -- SEMI PV50-0114, SEMI PV59-0115, SEMI PV64-0715 <i>PV 59 CLOSED</i> <i>PV 50 and PV 64 ONGOING</i>
ChinaPV-0715-03	PV Diffusion Furnace Test Methods Task Force	Translate Chinese version of published 1 standards -- SEMI PV53-0514 <i>ONGOING</i>

## 1 Welcome, Reminders, and Introductions

Committee co-chair Guangchun Zhang chaired the meeting and welcomed all attendees. All the attendees introduced themselves. Daniel Qi called the meeting to order at 09:00AM. The meeting reminders on antitrust issues, intellectual property issues and holding meetings with international attendance were reviewed.

Agenda was reviewed.

**Attachment:** 1 Chinese SEMI Standard Meeting Reminders rev1

## 2 Review of Previous Meeting Minutes

The TC Chapter reviewed the minutes of the previous meeting.

**Motion:** To approve the minutes of the previous meeting as written  
**By / 2<sup>nd</sup>:** Zhixin Li (Linton)  
**Discussion:** None  
**Vote:** 56 in favor and 0 opposed, (Total 56 companies.) **Motion Passed.**  
**Attachment:** 2 China PV TC Meeting Minutes 20161125

### 3 Liaison Reports

#### 3.1 Photovoltaic Materials Europe TC Chapter

Sophia Huang (SEMI) reported for the PV Materials Europe TC Chapter. Of note:

- Next Meeting- TBD
  - One standard published
    - Doc 5889: New Standard: Test method on cell level for potential-induced degradation susceptibility of solar cells and module encapsulation materials
  - PV Materials Committee, European Chapter Leadership changes
    - H. Aulich will resign as co-chair as of December 31, 2016, and his contributions and leadership during the past 9 years are greatly appreciated
    - Ch. Hagendorf, FhG-CSP, is nominated as new co-chair

**Attachment:** 3 EU PV Material Report Oct 2016

#### 3.2 PV and PV Materials Japan TC Chapter

Sophia Huang (SEMI) reported for the PV and PV Materials Japan TC Chapter. Of note:

- Next meeting: April 7, 2017, 1:30 p.m. – 5:00 p.m. at SEMI Japan Office, Tokyo, Japan
  - Hiromu Takatsuka from PVTEC stepped down from co-chair due to his retirement
  - Doc 6016, New Standard: Test Method for Exposure Durability of PV Cells to Acetic Acid Vapor.
    - After the two weeks review by TC Members of both PV and PV Materials, the SNARF was approved at the PV Materials Japan TC Chapter meeting held on April 18, 2016.
    - Ballot draft was reviewed at the TF meeting held on November 7, 2016.
    - Ballot submission was approved at the Japan TC Chapter meeting on December 19, 2016.
    - Ballot is now on Cycle 1-2017

**Attachment:** 4 170118\_LiaisonReport\_JA\_PV&PVM\_v1.1

#### 3.3 Photovoltaic Materials NA TC Chapter

Sophia Huang (SEMI) reported for the PV Materials NA TC Chapter. Of note:

- Next meeting - NA Summer Standards Meeting. SEMI HQ, San Jose CA, Wednesday, July 12, 2017
  - 2 Ballots passed
    - Doc. 5959A, Revision of SEMI PV25-1011 Test Method for Simultaneously Measuring Oxygen, Carbon, Boron and Phosphorus in Solar Silicon Wafers and Feedstock by Secondary Ion Mass Spectrometry
    - Doc. 6039, Reapproval of SEMI PV31-0212 Test Method for Spectrally Resolved Reflective And Transmissive Haze Of Transparent Conducting Oxide (TCO) Films For PV Application
  - One document Authorized for ballot in cycle 9-2016
    - Doc. 6100, Reapproval of SEMI PV1-0211 Test Method for Measuring Trace Elements in Silicon Feedstock for Silicon Solar Cells by High-Mass Resolution Glow Discharge Mass Spectrometry

**Attachment:** 5 PVMaterials NA TC Chapter Liaison Report Nov 2016

### 3.4 Photovoltaic Taiwan TC Chapter

Sophia Huang (SEMI) reported for the Photovoltaic Taiwan TC Chapter. Of note:

- Next Meeting - April 26, 2017 at ITRI office, Hsinchu, Taiwan
- 1 Ballot passed
  - Doc 5598A: New Standard: Test Method for Durability of Low Light Intensity Organic Photovoltaic (OPV) and Dye Sensitized Solar Cell (DSSC), published as 'SEMI PV76-0117'
- Standards Five-year Review need to be Revised
  - SEMI PV23-1011 : ” Test Method for Mechanical Vibration of Crystalline Silicon Photovoltaic (PV) Modules in Shipping Environment”
    - Date: 2011/10/27
    - Original Draft #: 4997B
    - Task Force: Vibration Test Method Task Force
- Study two new topics in the next TC meeting
  - How to track Solar Cell performance
  - Drone monitor system

**Attachment:** 6 Taiwan PV Standard Committee Liaison Report\_March 2017

### 3.5 SEMI Staff Report

Daniel Qi (SEMI) gave the SEMI Staff Report. Of note:

- SEMI Standards Overview
- SEMI Global 2017 Calendar of Events
- 2017 Critical Dates for SEMI Standards Ballots
- SEMI Standards Publications
- PV Standards Publications Recently
- China Photovoltaic TC Update
- Enhance Task Force Management
- Core Members Attendance Record
- Necessary Info. from Website

**Attachment:** 7 SEMI Staff Report 20170418

## 4 Ballot Review

NOTE 1: TC Chapter adjudication on ballots reviewed is detailed in the Audits & Review (A&R) Subcommittee Forms for procedural review. The A&R forms are available as attachments to these minutes. The attachment number for each balloted document is provided under each ballot review section below.

### *PV Materials Committee China TC Chapter*

4.1 Cycle 1-2017: Doc 5843, Revision of SEMI PV22-0716, Specification for Silicon Wafers for Use in Photovoltaic Solar Cells

**Motion:** Nannan Fu (LONGi) moved that this document passed TC Chapter review as balloted and will be forwarded to the ISC A&R SC for procedural review.

**By / 2<sup>nd</sup>:** Zhixin Li (Linton)



**Discussion:** None

**Vote:** 56 in favor and 0 opposed. (Total 56 companies.) **Motion Passed.**

**Attachment:** 8 5843 Procedural Review

*Photovoltaic Committee China TC Chapter*

4.2 Cycle 1-2017: Doc 5926, New Standard: Test Method for Bending Property of Flexible Thin Film PV Modules

**Motion:** Xiuyun Ding (Hanergy) moved that this document passed TC Chapter review with editorial changes and will be forwarded to the ISC A&R SC for procedural review.

**By / 2<sup>nd</sup>:** Zhixin Li (Linton)

**Discussion:** None

**Vote:** 56 in favor and 0 opposed. (Total 56 companies.) **Motion Passed.**

**Attachment:** 9 5926 Procedural Review

4.3 Cycle 1-2017: Doc 5840, New Standard: Guide for Calibration of PV Module UV Test Chambers

**Motion:** Jiansheng Li moved that this document passed TC Chapter review with editorial changes and will be forwarded to the ISC A&R SC for procedural review.

**By / 2<sup>nd</sup>:** Zhixin Li (Linton)/ Dengyuan Song (Yingli)

**Discussion:** None

**Vote:** 56 in favor and 0 opposed. (Total 56 companies.) **Motion Passed.**

**Attachment:** 9 5840 Procedural Review

4.4 Cycle 1-2017: Doc 5968, New Standard: Guide for Sample Preparation Method for Photovoltaic Backsheet Performance Tests

**Motion:** Jianxiong Ni moved that this document re-work in task force and re-ballot in cycle 5-2017.

**By / 2<sup>nd</sup>:** Zhixin Li (Linton)

**Discussion:** None

**Vote:** 56 in favor and 0 opposed. (Total 56 companies.) **Motion Passed.**

**Attachment:** 10 5968 Ballot report - Fail

4.5 Cycle 1-2017: Doc 5661, New Standard: Test Method for Electrical Parameters of Bifacial Solar Module

**Motion:** Jianxiong Ni moved that this document re-work in task force and re-ballot in cycle 5-2017.

**By / 2<sup>nd</sup>:** Zhixin Li (Linton)

**Discussion:** None

**Vote:** 56 in favor and 0 opposed. (Total 56 companies.) **Motion Passed.**

**Attachment:** 11 5661 Ballot report - Fail

4.6 Cycle 1-2017: Doc 5842A, New Standard: Test Method for Metal-Wrap-Through Solar Cell Via Resistance

**Motion:** Xusheng Wang moved that the committee approve SEMI Document Doc 5842A to return to Crystalline Silicon Solar Cell Task Force to re-work and re-ballot.

**By / 2<sup>nd</sup>:** Zhixin Li (Linton)

**Discussion:** None



**Vote:** 56 in favor and 0 opposed. (Total 56 companies.) **Motion Passed.**

**Attachment:** 12 5842A Ballot report - Fail

## 5 Other SDO (Standards Development Organization) Update

### 5.1 IEC TC 82 Update

- IEC TC82 Scope
- IEC TC82 Summary
- TC 82 Working Groups
- Context and Background
- 'PVQAT Effect' on TC82
- TC82 Productivity
- System Certifications
- Standards Development
- Certifiable Standards
- Important New Efforts

**Attachment:** 13 IEC TC82 for SEMI 18 Apr 2017

**Attachment:** 14 IEC\_P-PUBS\_TC82\_2017-05-17

**Attachment:** 15 IEC\_WORKPROGRAMME\_TC82\_2017-05-17

### 5.2 China Electronics Standardization Institute (CESI)

- National Standardization Technical Committees in the field of PV
  - The national photovoltaic energy systems standardization technical committee(SAC/TC90)
  - The National Semiconductor Equipment and Materials Standardization Technical Committee(SAC/TC203)
  - China Photovoltaic Industry Association(CPIA) Standardization Technical Committee
- Review of PV Standardization Work in China
  - The roles of CESI in PV standardization work
  - The international standardization work of China
  - PVQAT China
  - Comprehensive standardization technology system for PV industry
  - The current status of PV standardization in China --GB、SJ
  - The current status of PV standardization in China --CPIA

**Attachment:** 16 Introduction of PV Standardization work in China

**Attachment:** 17 The current status list of PV standardization in China

## 6 Subcommittee and Task Force Reports

### 6.1 PV Silicon Raw Materials Task Force

Xiaoxia Liu (GCL) reported for the PV Silicon Raw Materials Task Force. This report contained information on:

- Working on
  - New Standard: Test Method for Determination of Hydrogen in PV Polysilicon by Inert Gas Fusion Infrared Absorption Method-SNARF Submitted by CPVT/GCL
  - New standard: Specification for Trichlorosilane Used in Polysilicon Production-SNARF Submitted by GCL/SIMT
- Published Standards
  - PV74-0216, New Standard: Test Method for the Measurement of Chlorine in Silicon by Ion Chromatography
  - PV64-0115, 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
  - PV59-0115, New Standard: Test Method for Determining of Total Carbon Content in Silicon Powder by Infrared Absorption after Combustion in an Induction Furnace
  - PV50-0114, New Standard: Specification for Impurities in Polyethylene Packaging Materials for Polysilicon Feedstock

**Attachment:** 18 PV Silicon Raw Materials Task Force Report

### 6.2 PV Silicon Wafer Task Force

Liangping Deng (LONGi) reported for the PV Silicon Wafer Task Force. This report contained information on:

- Working on
  - Doc 5767, New Standard: Guide for Material Requirements of Internal Feeders Used in Mono-crystal Silicon Growers
  - Doc 5843, Revision of SEMI PV22-1011, Specification for Silicon Wafers for Use in Photovoltaic Solar Cells
  - Doc 6072, Revision of SEMI PV29-0212, Specification for Front Surface Marking of PV Silicon Wafers with Two-Dimensional Matrix Symbols
- Published Standard
  - SEMI PV22-0716, Revision of SEMI PV22-1011, Specification for Silicon Wafers for Use in Photovoltaic Solar Cells (technical revision)

**Attachment:** 19 PV Silicon Wafer Task Force Report

### 6.3 Crystalline Silicon Solar Cell Task Force

Dengyuan Song (Yingli) reported for the Crystalline Silicon Solar Cell Task Force. This report contained information on:

- Working on
  - Doc 5842A, New Standard: Test Method for Metal-Wrap-Through Solar Cell Via Resistance
  - Doc 6074, New Standard: Test Method for Peeling Force between Electrode and Ribbon/Back Sheet
  - Doc 6112, New Standard: Specification for Voltage Sweep Time and Direction in Transient Mode I-V Measurement of Silicon Solar Cells
- Published Standards
  - SEMI PV54-0514, New Standard: Specification For Silver Paste, Used To Contact With N+ Diffusion Layer Of Crystalline Silicon Solar Cells
  - SEMI PV58-0115, New Standard: Specification For Aluminum Paste, Used In Back Surface Field Of Crystalline Silicon Solar Cells
  - SEMI PV65-0715, New Standard: Test Method Based on RGB for C-Si Solar Cell Color

- SEMI PV66-0715, New Standard: Test Method for Determining the Aspect Ratio of Solar Cell Metal Fingers by Confocal Laser Scanning Microscope
- SEMI PV67-0815, New Standard: Test Method for the Etch Rate of a Crystalline Silicon Wafer by Determining the Weight Loss

**Attachment:** 20 Crystalline Silicon Solar Cell Task Force Report

#### 6.4 PV Module Task Force

Wei Zhou (Trina) reported for the PV Module Task Force. This report contained information on:

- Working on
  - Doc 5661A, New Standard: Test Method for Electrical Parameters of Bifacial Solar Module
  - Doc 5725, New Standard: Practice for Metal Wrap Through (MWT) Back Contact PV Module Assembly
  - Doc 5840, New Standard: Guide for Calibration of PV Module UV Test Chambers
  - Doc 5925A, New Standard: Specification for Dual-glass Module with Crystalline Silicon Terrestrial Solar Cell
  - Doc 5968A, New Standard: Guide for Sample Preparation Method for Photovoltaic Backsheet Performance Tests
  - Doc 6070A, New Standard: Test Method for Cell Defects in Crystalline Silicon PV Modules by Electroluminescence (EL) Imaging
  - Doc 5982, New Standard: Specification for Crystalline Silicon Photovoltaic Module Dimensions
  - Doc 6069, New Standard: Specification for Structural Silicone Adhesive for the Back Rail Fixture on PV Modules
  - Doc 6073, New Standard: Specification for Crystalline Silicon PV Modules with Integrated Power Optimizer
  - Doc 6113, New Standard: Test Method for Abrasion Resistance of the Polymer Backsheet of Crystalline Silicon Solar Modules
- Published Standards
  - SEMI PV44-0513, Specification for package protect for PV module
  - SEMI PV45-0513, Vinyl Acetate (VA) content test method for Ethylene-Vinyl Acetate (EVA) applied in photovoltaic modules-TGA
  - SEMI PV47-0513, Specification for Anti-Reflective Coated Glass, Used in Crystalline Silicon Photovoltaic Modules
  - SEMI PV61-0115, Specification for Framing Tape for PV Modules
  - SEMI PV62-0215, Terminology for Back Contact PV Cell and Module
  - SEMI PV63-0215, Specification for Ultra-thin glasses used for photovoltaic modules

**Attachment:** 21 PV Module Task Force Report

#### 6.5 Thin Film PV Module Task Force

Ying Zhang (Hanergy) reported for the Thin Film PV Module Task Force. This report contained information on:

- Working on
  - Doc 5926, New Standard: Test Method for Bending Property of Flexible Thin Film PV Modules
- Published Standard
  - SEMI PV73-0216, Test Method for Thin-Film Silicon PV Modules Light Soaking

**Attachment:** 22 Thin Film PV Module Task Force Report

#### 6.6 PV Diffusion Furnace Test Methods Task Force



Liangyu Liu (CETC-48) reported for the PV Diffusion Furnace Test Methods Task Force. This report contained information on:

- Working on:
  - Doc 5841, New Standard: Guide for Specifying Low Pressure Horizontal Diffusion Furnace
  - Doc 5983, New Standard: Test Method for In-line Sheet Resistance Inspection
- Published Standard
  - SEMI PV53-0514, Test Method for In-line Monitoring of Flat Temperature Zone in Horizontal Diffusion Furnaces

**Attachment:** 23 PV Diffusion Furnace Test Methods Task Force Report

### 6.7 Multi-wire Saws Task Force

Liangyu Liu (CETC-48) reported for the Multi-wire Saws Task Force. This report contained information on:

- Working on: None
- Published Standard
  - SEMI PV68-0815, Test Method for the Wire Tension of Multi-Wire Saws

**Attachment:** 24 Multi-wire Saws Task Force Report

## 7 Old Business

None

## 8 New Business

### 8.1 New SNARFs & TFOFs

8.1.1 SNARF-New Standard: Test Method for Determination of Hydrogen in PV Polysilicon by Inert Gas Fusion Infrared Absorption Method

Li He (CPVT) addressed the committee on this topic.

**Motion:** To approve the SNARF

**By / 2<sup>nd</sup>:** Rulong Chen (Suntech)

- Discussion:**
1. Xinwei Niu (JA Solar): The cost is low. Continuous feeding will lead to spill out.
  2. Jinbiao Lv (GCL): Please consider silicon ingot related companies; invite them to join in the project. A test method should consider upstream and downstream industries.
  3. Li He (CPVT): I have not found test method for Hydrogen in PV Silicon materials related documents in foreign database.
  4. Liangping Deng (LONGi): We focus on this SNARF because the amount for monocrystalline will be bigger and bigger. However, it needs further consideration whether this test method is the best.
  5. Dengyuan Song (Yingli): Hydrogen is difficult to test. What is the accuracy of the molten gas? How to control it is the true amount of hydrogen during the test process?

**Vote:** 44 in favor and 0 opposed. (Total 44 companies.) **Motion Passed.**

8.1.2 SNARF-New Standard: Guide for the Applicability Evaluation of Pulsed Solar Simulator for the Measurement of Electrical Properties of High Efficiency Crystalline Silicon Solar Cells

Shude Zhang (Talesun) addressed the committee on this topic.

- Motion:** To approve the SNARF
- By / 2<sup>nd</sup>:** Zhixin Li (Linton)
- Discussion:**
1. Dengyuan Song (Yingli): Please avoid repetition for SNARF 6112, New Standard: Specification for Voltage Sweep Time and Direction in Transient Mode I-V Measurement of Silicon Solar Cells, proposed by Jinko Solar.
  2. Guangchun Zhang (CSI): The testing system itself should have the ability for forward and reverse sweep.
  3. Yaohua Mai (Hebei University): Pulse width, Measuring time and waiting process will affect the result for forward and reverse sweep. It would be better to calibrate the steady mode solar simulator. Many companies will use steady mode light sources to test.
  4. Shude Zhang (Talesun): If use steady mode, spectrum can't match.
  5. Attendee: The result should be compared with the one in labs.
- Vote:** 9 in favor and 0 opposed. (Total 44 companies.) **Motion Failed.**

### 8.1.3 SNARF-New Standard: Specification of Passivated Emitter and Rear Side Solar Cell (PERC)

Zhigang Wang (Talesun) addressed the committee on this topic.

- Motion:** To approve the SNARF
- By / 2<sup>nd</sup>:** Zhixin Li (Linton)
- Discussion:**
1. Dengyuan Song (Yingli):
    - I do not recommend doing a product standard, please starting with a test method. Your SNARF content has included in other standards.
    - PERC is a big topic. The scope is too big.
    - According to solar cell structure, we cannot distinguish whether it is a PERC or regular cell.
  2. Alan Xu (CSI): I recommend doing a specification standard or you can add the content you need in existed IEC standards. We do not have solar cell application specification.
  3. Guangchun Zhang (CSI): GB/T 29195-2012 General Specification of Crystalline Silicon Terrestrial Solar Cells, it includes back surface field and EVA tension. There are many standards related to solar cells.
- Vote:** 4 in favor and 0 opposed. (Total 44 companies.) **Motion Failed.**

### 8.1.4 New TFOF- Testing Equipment Task Force

Hui Long (CETC-48) addressed the committee on this topic.

- Motion:** To approve the new TFOF
- By / 2<sup>nd</sup>:** Zhixin Li (Linton)
- Discussion:**
1. Yaohua Mai (Hebei University): How are test sorting divided?
  2. Hui Long (CETC-48): There are silicon Wafer and solar cell test sorting.
  3. Zhixin Li (Linton): There are not enough representative companies. Task force should invite more famous and related companies.
  4. Liangyu Liu (CETC-48): We will invite representative companies to join us later.
  5. Dengyuan Song (Yingli): CETC-48 make efforts on equipment, it meets the purpose of SEMI Association. This also supports Chinese equipment.
  6. Guangchun Zhang (CSI): Regarding equipment, I suggest to divide into two task forces. One is manufacturing equipment task force, including diffusion furnace and welding machine. The other is test-sorting equipment.
  7. Dongqi Li (NAURA): I agree to put PV diffusion furnace test methods task force as a part of manufacturing equipment task force.
  8. Alan Xu (CSI): Does IV test is included in testing equipment task force?
- Vote:** 34 in favor and 0 opposed. (Total 44 companies.) **Motion Passed.**

### 8.1.5 SNARF- New Standard: Guide for the Design of Testing and Sorting Equipment for Crystalline Silicon Solar Cells

Hui Long (CETC-48) addressed the committee on this topic.

**Motion:** To approve the SNARF

**By / 2<sup>nd</sup>:** Zhixin Li (Linton)

- Discussion:**
1. Guangchun Zhang (CSI):
    - I recommend to firstly preparing the entire structure, which is well recognized and most mature, and then add detailed information later. This standard should include what to do but do not mention detailed parameter. The scope of this equipment standard should control.
    - The test module should have a data interface.
  2. Liangyu Liu (CETC-48):
    - We will take the framework at first and then make the content perfect.
    - We will do a standards based on the information must needed. We plan to do spadework for smart manufacturing and digital workshop.
  3. Dongqi Li (NAURA):
    - Focus on test sorting method and principles.
    - Provide NAURA previous project leader for test equipment dept. to CETC-48 for communication.
  4. Huichuan Pei (CESI): Complete it gradually, as a series standard.
  5. Zhixin Li (Linton): Is it necessary to define the color? This SNARF report is not specific.

**Vote:** 35 in favor and 0 opposed. (Total 44 companies.) **Motion Passed.**

#### 8.1.6 SNARF- New Standard: Specification for Trichlorosilane Used in Polysilicon Production

Taoxia Wang (GCL) addressed the committee on this topic.

**Motion:** To approve the SNARF

**By / 2<sup>nd</sup>:** Zhixin Li (Linton)

- Discussion:**
1. Guangchun Zhang (CSI): trichlorosilane is produced or outsourcing? The using amount of trichlorosilane in China is big.
  2. Jinbiao Lv (GCL): When the production line is just open, trichlorosilane is outsourcing.
  3. Dengyuan Song (Yingli): Is there any NaAlH<sub>4</sub> standards in chemical industry?
  4. Xiaoxia Liu (GCL): There is trichlorosilane related GB (National Standards). It is trichlorosilane for industrial use.
  5. Zhixin Li (Linton): Is there are using requirement for trichlorosilane in other countries?
  6. Huichuan Pei (CESI): Under SAC/TC203, there is a standard called Trichlorosilane for Silicon Epitaxial.

**Vote:** 33 in favor and 0 opposed. (Total 44 companies.) **Motion Passed.**

### 8.2 Request for Ballots in cycle 5-2017

#### 8.2.1 Doc 5767A, New Standard: Guide for Material Requirements of Internal Feeders Used in Mono-crystal Silicon Growers

Erfei Liu (Linton) addressed the committee on this topic.

**Motion:** To approve Doc 5767A for ballot in cycle 5-2017

**By / 2<sup>nd</sup>:** Tongrong Zhao (Jolywood)/ Dengyuan Song (Yingli)

**Discussion:** None

**Vote:** 36 in favor and 0 opposed. (Total 44 companies.) **Motion Passed.**

#### 8.2.2 Doc 6074, New Standard: Test Method for Peeling Force between Electrode and Ribbon/Back Sheet

Hui Yi (Talesun) addressed the committee on this topic.

**Motion:** To approve Doc 6074 for ballot in cycle 5-2017

**By / 2<sup>nd</sup>:** Zhixin Li (Linton)

**Discussion:** 1. Rulong Chen (Suntech): In SEMI PV54-0514 Specification for Silver Paste, Used to Contact with N+ Diffusion Layer of Crystalline Silicon Solar Cells and SEMI PV58-0115 Specification for Aluminum Paste, Used in Back Surface Field of Crystalline Silicon Solar Cells, I remember these two standards mentioned peeling force testing.

**Vote:** 37 in favor and 0 opposed. (Total 44 companies.) **Motion Passed.**

### 8.2.3 Doc 5982, New Standard: Specification for Crystalline Silicon Photovoltaic Module Dimensions

Alan Xu (CSI) addressed the committee on this topic.

**Motion:** To approve Doc 5982 for ballot in cycle 5-2017

**By / 2<sup>nd</sup>:** Zhixin Li (Linton)

**Discussion:** 1. Zhixin Li (Linton): Since dimension is included in this standard, will there be tolerance range?  
2. Alan Xu (CSI): There is only center value range. Tolerances are included in the module vendors and the technical agreements.  
3. Jingbing Zhu (Sunman): Table 2 size and position no not need tolerance. If it is fixed, that is fine.  
4. Xinming Huang (JA Solar): From the point of view of the standard, I recommend adding tolerance.  
5. Guangchun Zhang (CSI):

- The purpose of this standards is to let Aluminum frame, glass, backplane material unified install when make the frame. It will be more convenient.
- Standards for Aluminum frame design structure are necessary. I recommend some companies to make a proposal SNARF.

**Vote:** 23 in favor and 0 opposed. (Total 32 companies.) **Motion Passed.**

### 8.2.4 Doc 5841A, New Standard: Guide for Specifying Low Pressure Horizontal Diffusion Furnace

Pengtao Sun (NAURA) addressed the committee on this topic.

**Motion:** To approve Doc 5841A for ballot in cycle 5-2017

**By / 2<sup>nd</sup>:** Zhixin Li (Linton)

**Discussion:** None

**Vote:** 31 in favor and 0 opposed. (Total 32 companies.) **Motion Passed.**

### 8.2.5 Doc 6070A, New Standard: Test Method for Cell Defects in Crystalline Silicon PV Modules by Electroluminescence (EL) Imaging

Ping Yan (Trina) addressed the committee on this topic.

**Motion:** To approve Doc 6070A for ballot in cycle 5-2017

**By / 2<sup>nd</sup>:** Zhixin Li (Linton)/ Tongrong Zhao (Jolywood)

**Discussion:** None

**Vote:** 27 in favor and 0 opposed. (Total 32 companies.) **Motion Passed.**

### 8.2.6 Doc 5925A, New Standard: Specification for Dual-glass Module with Crystalline Silicon Terrestrial Solar Cell

Qiangzhong Zhu (Trina) addressed the committee on this topic.

**Motion:** To approve Doc 5925A for ballot in cycle 5-2017

**By / 2<sup>nd</sup>:** Zhixin Li (Linton)

**Discussion:** None

**Vote:** 31 in favor and 0 opposed. (Total 32 companies.) **Motion Passed.**

8.2.7 Doc 5725, New Standard: Specification for Dual-glass Module with Crystalline Silicon Terrestrial Solar Cell  
Zhen Zhang (Hohai University) addressed the committee on this topic.

**Motion:** To approve Doc 5725 for ballot in cycle 5-2017  
**By / 2<sup>nd</sup>:** Zhixin Li (Linton)  
**Discussion:** None  
**Vote:** 32 in favor and 0 opposed. (Total 32 companies.) **Motion Passed.**

8.2.8 Doc 5661A, New Standard: Test Method for Electrical Parameters of Bifacial Solar Module  
Jianxiong Ni (Yingli) addressed the committee on this topic.

**Motion:** To approve Doc 5661A for ballot in cycle 5-2017  
**By / 2<sup>nd</sup>:** Zhixin Li (Linton)  
**Discussion:** None  
**Vote:** 56 in favor and 0 opposed. (Total 56 companies.) **Motion Passed.**

8.2.9 Doc 5968A, New Standard: Guide for Sample Preparation Method for Photovoltaic Backsheet Performance Tests

Jianxiong Ni (Yingli) addressed the committee on this topic.

**Motion:** To approve Doc 5968A for ballot in cycle 5-2017  
**By / 2<sup>nd</sup>:** Zhixin Li (Linton)  
**Discussion:** None  
**Vote:** 56 in favor and 0 opposed. (Total 56 companies.) **Motion Passed.**

## 9 Next Meeting and Adjournment

The next meeting is scheduled for October 13, 2017 at Taizhou, Jiangsu, China. See <http://www.semi.org/en/events> for the current list of meeting schedules.

Having no further business, a motion was made to adjourn. Adjournment was at 17:20.

Respectfully submitted by:

Sophia

Standards Specialist

SEMI China

Phone: 86-21-60278553

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Minutes tentatively approved by:

Guangchun Zhang (CSI), Co-chair	<Date approved>
Jun Liu (CESI), Co-chair	<Date approved>



**Table 13 Index of Available Attachments#1**

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2 China PV TC Meeting Minutes 20161125	14 IEC_P-PUBS_TC82_2017-05-17
3 EU PV Material Report Oct 2016	15 IEC_WORKPROGRAMME_TC82_2017-05-17
4 170118_LiaisonReport_JA_PV&PVM_v1.1	16 Introduction of PV Standardization work in China
5 PVMaterials NA TC Chapter Liaison Report Nov 2016	17 The current status list of PV standardization in China
6 Taiwan PV Standard Committee Liaison Report_March 2017	18 PV Silicon Raw Materials Task Force Report
7 SEMI Staff Report 20170418	19 PV Silicon Wafer Task Force Report
8 5843 Procedural Review	20 Crystalline Silicon Solar Cell Task Force Report
9 5926 Procedural Review	21 PV Module Task Force Report
10 5968 Ballot report - Fail	22 Thin Film PV Module Task Force Report
11 5661 Ballot report - Fail	23 PV Diffusion Furnace Test Methods Task Force Report
12 5842A Ballot report - Fail	24 Multi-wire Saws Task Force Report

#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](http://www.semi.org). For additional information or to obtain individual attachments, please contact [SEMI Staff Name] at the contact information above.