

China PV Standards Committee
China PV Materials Standards Committee
Joint Meeting Summary and Minutes
 China Fall Standards Meeting 2016
 November 25th, 2016, Friday, 08:30 -17:30
 Grand Ballroom, 2F, Crowne Plaza Changshu
 No.6 Kai Yuan Avenue, 215500 Changshu, China

Next Committee Meeting

Tuesday, April 18th, 2017 08:30-17:30
 Shanghai, China

Table 1 Meeting Attendees

Co-Chairs: Zhixin Li (Linton)

SEMI Staff: Lung Chu-SEMI China, Daniel Qi – SEMI China, Sophia Huang – SEMI China, Jesse Zhang – SEMI China, Mina – SEMI China

| <i>Company</i> | <i>Last</i> | <i>First</i> | <i>Company</i> | <i>Last</i> | <i>First</i> |
|------------------|-------------|--------------|--------------------|-------------|--------------|
| CPVT | Song | Hao | LONGi | Deng | Liangping |
| Borouge | Zhou | Xin | LONGi | Fu | Nannan |
| CESI | Feng | Yabin | MKS | Yao | Dailiang |
| CETC 48 | Yang | Zhiquan | Nanjing University | Yu | Linwei |
| CETC 48 | Liu | Liangyu | Nankai University | Ding | Yi |
| CETC 48 | Fan | Yinxin | NCEPU | Ding | Yong |
| CETC 48 | Chen | Fengwu | RIETECH | Zhang | Tao |
| CFLD | Huang | Song | RIETECH | Dai | Yuefang |
| ChianSC | Wang | Jianhui | SCCC | Liu | Bing |
| ChianSC | Dong | Lijuan | Semilab | Huang | Li |
| CNSMQ | He | Dongjiang | Sevenstar | Li | Dongqi |
| CSI | Xu | Tao | Sevenstar | Li | Buzhong |
| CSI | Long | Weixu | SIBCO | Liu | Erming |
| CSI | Zhao | Changrui | SIBCO | Chen | Xuanfang |
| CSI | Yang | Lianli | SunChine | Wei | Shimeng |
| CSI | Gao | Dongsong | Sunman | Zhu | Jingbing |
| CTS | Chen | Fayin | Sunport | Zhu | Haojie |
| DSM | Wang | Weinan | Talesun | Zhou | Jianxin |
| FJL | Shen | Yihui | Talesun | Niu | Zhichun |
| FJL | Lin | Jianchun | Talesun | Wei | Qingzhu |
| GCL | Wan | Yuepeng | Talesun | Li | Chunhui |
| GCL | Lu | Wenfeng | Talesun | Lian | Weifei |
| GCL | Wu | Yanrong | Talesun | Mou | Zhangzhu |
| GG Solar | Wu | Xiexiang | Talesun | Lu | Junyu |
| Goldstone | Xiang | Jianqiu | Talesun | Zhang | Wei |
| Goldstone | Zhang | Zhiyong | Talesun | Hu | Leizheng |
| Gsola | Zeng | Xiangchao | Talesun | Wang | Zhigang |
| GTAT | Zhou | Zhenxing | Talesun | Yi | Hui |
| Hanergy | Zhang | Ying | Talesun | Zhu | Minglu |
| Hanergy | Li | Xuan | TBEA | Qiu | Yanmei |
| Hanergy | Ding | Xiuyun | TBEA | Fan | Xiecheng |
| Hebei University | Xu | Ying | TIANWEI | Liu | Lin |
| Hebei University | Zhang | Zhen | Trina | Zhou | Wei |
| Honbest | Huang | Junran | Trina | Sheng | Yun |

| | | | | | |
|----------|-------|----------|---------------------------|------|-----------|
| JA Solar | Niu | Xinwei | Trina | Yan | Ping |
| JA Solar | Wu | Rutao | Trina | Xiao | Taoyun |
| JA Solar | Xu | Desheng | Trina | Mao | Jing |
| JA Solar | Jiang | Yan | Trina | Wang | Lei |
| Jinko | Li | Ning | Trina | Xiao | Xinmin |
| Jinko | Zhang | Xinyu | TUV | Li | Ningda |
| Jinko | Chen | Jingshao | Xinyang Normal University | Tu | Youchao |
| Jolywood | Zhao | Tongrong | Xinyang Normal University | Liu | Jiangfeng |
| Jolywood | Liu | Yong | Xinyang Normal University | Li | Yanlei |
| LDK | Hu | Dongli | Yingli | Song | Dengyuan |
| LDK | Peng | Yeqing | Yingli | Niu | Jianxiong |
| Lerrie | Wang | Shihai | Yingli | Yuan | Beihai |
| Lerrie | Fu | Pengbo | Yingli | Ren | Xiuqiang |
| Lerrie | Xing | Tao | Yingli | Shi | Jinchao |
| Linton | Liu | Erfei | ZK Energy | Wu | Zhenyu |

Table 2 Leadership Changes

| <i>Group</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

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 #</i> | <i>Document Title</i> | <i>Committee Action</i> |
|-------------------|--|--|
| 5767 | New Standard: Guide for Material Requirements of Internal Feeders Used in Mono-crystal Silicon Growers | Failed and return to TF for re-work |
| 5925 | New Standard: Specification for Dual-glass Module with Crystalline Silicon Terrestrial Solar Cell | Failed and return to TF for re-work |
| 6070 | New Standard: Test Method for Cell Defects in Crystalline Silicon PV Modules by Electroluminescence (EL) Imaging | Failed and return to TF for re-work |

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

| <i>#</i> | <i>Type</i> | <i>SC/TF/WG</i> | <i>Details</i> |
|----------|-------------|---|---|
| 6112 | SNARF | Crystalline Silicon Solar Cell Task Force | New Standard: Specification for Voltage Sweep Time and Direction in Transient Mode I-V Measurement of Silicon Solar Cells |
| 6113 | SNARF | PV Module Task | New Standard: Test Method for Abrasion Resistance of the Polymer Backsheet of |

Table 6 Authorized Activities

| # | Type | SC/TF/WG | Details |
|---|------|----------|-----------------------------------|
| | | Force | Crystalline Silicon Solar Modules |

Note: 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

| # | When | SC/TF/WG | Details |
|------|-------------|---|--|
| 5926 | Cycle1-2017 | Thin Film PV Module Task Force | New Standard: Test Method for Bending Property of Flexible Thin Film PV Modules |
| 5840 | Cycle1-2017 | PV Module Task Force | New Standard: Guide for Calibration of PV Module UV Test Chambers |
| 5843 | Cycle1-2017 | PV Silicon Wafer Task Force | Revision of SEMI PV22-0716, Specification for Silicon Wafers for Use in Photovoltaic Solar Cells |
| 5968 | Cycle1-2017 | PV Module Task Force | New Standard: Guide for Sample Preparation Method for Photovoltaic Backsheet Performance Tests |
| 5661 | Cycle1-2017 | PV Module Task Force | New Standard: Test Method for Electrical Parameters of Bifacial Solar Module |
| 5842 | Cycle1-2017 | Crystalline Silicon Solar Cell Task Force | New Standard: Test Method for Metal-Wrap-Through Solar Cell Via Resistance |

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

| # | TF | Title | Expiration Date |
|------|----|-------|-----------------|
| None | | | |

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-1116-01 | Daniel Qi(SEMI China) | For China PV&PV Materials Joint TC Chapter 2017, arranging two meetings, one on April 18th, 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. |
| 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. |

Table 12 Previous Meeting Action Items

| <i>Item #</i> | <i>Assigned to</i> | <i>Details</i> | <i>Status</i> |
|---------------------|--|---|--|
| ChinaPV-071 6-01 | SEMI HQ James Amano | Efforts to form a PV Materials TC Chapter in China are underway. When formation is approved, the new China PV Materials TC Chapter will be home to the PV Silicon Wafer TF and PV Silicon Raw Materials TF (which currently belong to the China PV TC Chapter). | Close |
| ChinaPV-071 6-02 | SEMI China Sophia Huang | Co-chair Guangchun Zhang suggested that next meeting starts at 09:00 AM | Close |
| ChinaPV-071 6-03 | PV Silicon Raw Materials Task Force | Doc 5699 and 5700 is going to expire. Since the lead company Nanjing University hasn't got the experiment results yet, they'd like to abandon these two documents, proposed by Prof. Shoujun Xiao from NJU. | Close |
| ChinaPV-071 6-04 | PV Module Task Force | Doc 5661 will expire on October 23th, 2016. Tao Tian moved to extend the Doc 5661 for one more year. It was approved by TC committee members. So this project will expire on Oct. 23th, 2017. | Close |
| ChinaPV-031 6-01 | 7 task forces' leaders | Rearrange the task force members; make sure every member is active. | Ongoing |
| ChinaPV-071 5-01 | PV Module Task Force | Translate Chinese version of published 6 standards -- SEMI PV44-0513, SEMI PV45-0513, SEMI PV47-0513, SEMI PV61-0115, SEMI PV62-0215, SEMI PV63-0215 | Close |
| ChinaPV-071 5-02 | PV Silicon Raw Materials Task Force | Translate Chinese version of published 3 standards -- SEMI PV50-0114, SEMI PV59-0115, SEMI PV64-0715 | One standard SEMI PV59-0115 completed, Others Ongoing |
| ChinaPV-071 5-03 | PV Diffusion Furnace Test Methods Task Force | Translate Chinese version of published 1 standards -- SEMI PV53-0514 | Ongoing |
| ChinaPV-071 5-04 | Crystalline Silicon Solar Cell Task Force | Translate Chinese version of published 4 standards -- SEMI PV54-0514, SEMI PV58-0115, SEMI PV65-0715, SEMI PV66-0715 | Close |

1 Welcome, Reminders, and Introductions

Committee member Zhixin Li chaired the meeting and welcomed all attendees. All the attendees introduced themselves. Daniel Qi called the meeting to order at 9:00 AM. The meeting reminders on antitrust issues, intellectual property issues and effective meeting guidelines were reviewed. Agenda was reviewed.

2 Review of Previous Meeting Minutes

Minutes were reviewed. No change was made.

Motion: To accept the minutes of the previous meeting as submitted

By / 2nd: Wei Zhou (Trina)

Discussion: None

Vote: 44-0. Motion passed

[Attachment-1, China PV TC Meeting Minutes 20160729.pdf](#)

3 Staff Report

Daniel Qi (SEMI China) gave the staff report. Highlights

- Current organization chart for PV&PV Materials China TC Chapter
- Overview the SEMI Global 2016 & 2017 Calendar of Events
- 2016&2017 Critical Dates for SEMI Standards Ballots

- SEMI standards publications update
- 6 Published PV Standards in 2016
- China Photovoltaic TC Update: Ran 4+ years, 18 TC meetings, 19 published standards, 17 standards in the pipe line, 7 task forces, 27 core members
- Indicated that enhance task force management
- Core Members Attendance Record
- SEMI standards website updated

[Attachment-2, SEMI Staff Report 20161125.pdf](#)

4 Liaison Reports

4.1 North America PV Materials Committee

Daniel Qi (SEMI China) reported. Highlights:

- 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-3, PVMaterials NA TC Chapter Liaison Report Nov 2016.pdf](#)

4.2 Europe PV Materials Committee

Daniel Qi (SEMI China) reported. Highlights:

- 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-4, EU PV Material Report Oct 2016.pdf](#)

4.3 Japan PV and PV Materials Committee

Daniel Qi (SEMI China) reported. Highlights:

- Next meeting: December 19, 2016, 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.
 - Ballot draft was reviewed at the TF meeting held on November 7, 2016
 - Ballot submission to be proposed at the next Japan TC Chapter meeting to be held on December 19, 2016

[Attachment-5, 161107_LiaisonReport_JA_PV&PVM_v1.0.pdf](#)

4.4 Taiwan PV Committee

Daniel Qi (SEMI China) reported. Highlights:

- Next meeting: Jan. 12, 2017 at ITRI, Taiwan
- Approval Renamed TF
 - Organic and Dye Sensitized Solar Cell Task Force (DSSC&OPV TF) has approved to revised TFOF and renamed as Organic, Dye Sensitized and Perovskite Solar Cell Task Force (DSSC, OPV&PSC TF)
- Passed Cycle 7-2016 ballot and forwarded to procedural review

- Doc #5598A, Test Method for Durability of Low Light Intensity Organic Photovoltaic (OPV) and Dye Sensitized Solar Cell (DSSC)
- Approved one new SNARF
 - PV Reliability Test Method TF: Doc 6071, SNARF for New Standard: Test Method for Polymer Foil Dependent Discoloration of Silver Fingers on PV modules
- Taiwan PV TF Draft and Released Standards Summary

[Attachment-6, Taiwan PV Standards Committee Liaison Report Nov 2016.pdf](#)

5 Ballot Review

5.1 Cycle 7-2016: Doc 5767, New Standard: Guide for Material Requirements of Internal Feeders Used in Mono-crystal Silicon Growers

Motion: Erfei Liu (Linton) moves that committee approve SEMI Document 5767 to return to PV Silicon Wafer Task Force for re-work and re-balloting.

By: Dengyuan Song (Yingli)

Discussion: None

Vote: 35-0, Motion passed

5.2 Cycle 7-2016: Doc 5925, New Standard: Specification for Dual-glass Module with Crystalline Silicon Terrestrial Solar Cell

Motion: Jing Mao (Trina) moves that committee approve SEMI Document Doc 5925 to return to PV Module Task Force for re-work and re-balloting.

By: Dengyuan Song (Yingli)

Discussion:

1. Dengyuan Song(Yingli): Dual-glass module is the development trend in the future. Please convince Bengt Jäckel and then continue your work. Otherwise, drafting this standard won't go smoothly.
2. Tao Xu(CSI): Something new is meaningful to promote the standardization. General modules are only 5%, dual-glass modules up to 3%. Standards are significant, but what is the risks for dual-glass products? Please don't just adding IEC contents in SEMI Document Doc 5925. Please seriously think about how to do a dual-glass modules standards. IEC standards actually include terms for glass backsheets, please read carefully.
3. Zhixin Li(Linton): Since this test method already existed, why do we draft one more standard? Where is the new point for Doc 5925? The fundamental problems must be solved.
4. Wei Zhou (Trina): We are also using IEC6125, but IEC standards don't have specifications for salt.
5. Yong Liu(Jolywood): Dual-glass is a good direction that many things can be explored. Dual-glass modules can be studied as a special subject. Standards should be forward-looking. It must have guiding significance.
6. Zhen Zhang (Hohai University): In this standard, to reflect the advantages of dual-glass, such as: fireproofing. For the environment around the sea, advantages for this standard need to be reflected in the terms.
7. Xiexiang Wu (GG Solar): IEC standard is a wide range of standard. For standards under a certain product type, such as the reliability of the specification salt standard, we can do a definition at SEMI standard.

Vote: 34-0, Motion passed

5.3 Cycle 7-2016: Doc 6070, New Standard: Test Method for Cell Defects in Crystalline Silicon PV Modules by Electroluminescence (EL) Imaging

Motion: Pingyan (Trina) moves that committee approve SEMI Document Doc 6070 to return to PV Module Task Force for re-work and re-balloting.

By: Dengyuan Song (Yingli)

1. Dongjiang He(CNSMQ): Scientists can give you recommendations, but definitions must base on references, for example, the existing international or national standards.
2. Tao Xu(CSI): All above 850 have passed. (Using the wave band)
3. Jianchun Lin (FJL): We detect the wave band based on our needs. We define the lower limit to reach 150.
4. Jingbing Zhu(Sunman): The window must include 1050 peak value.
5. Zhixin Li(Linton): For email communication with international experts, the language should be smooth, refined to improve work quality.

Vote : 29-0 , Motion passed

6 Task Force Reports

6.1 PV Silicon Raw Materials Task Force

- Cancelled 2 documents (Doc 5699, 5700) in work on China PV Summer Meeting in July, 2016
 - Doc 5699 and 5700 is going to expire. Since the lead company Nanjing University hasn't got the experiment results yet, they'd like to abandon these two documents.
- 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-7, SEMI PV Silicon Raw Materials Task Force Report 20161123.pdf

6.2 PV Silicon Wafer Task Force

- 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
- Published Standard
 - SEMI PV22-0716, Revision of SEMI PV22-1011, Specification for Silicon Wafers for Use in Photovoltaic Solar Cells (technical revision)

Attachment-8, PV Silicon Wafer TF Report -- Nov.25th, 2016.pdf

6.3 Crystalline Silicon Solar Cell Task Force

- Working on
 - Doc 5842, New Standard: Test Method for Metal-Wrap-Through Solar Cell Via Resistance
- 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-9, SEMI Crystalline Silicon Solar Cell Task Force Report -2016.11.25--V1.pdf](#)

6.4 PV Module Task Force

- Working on
 - Doc 5661, 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 5925, New Standard: Specification for Dual-glass Module with Crystalline Silicon Terrestrial Solar Cell
 - Doc 5968, New Standard: Guide for Sample Preparation Method for Photovoltaic Backsheet Performance Tests
 - Doc 6070, 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
- 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-10, SEMI PV Module Task Force Report 2016-11-4.pdf](#)

6.5 Thin Film PV Module Task Force

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

[Attachment-11, Thin film PV Task Force Report 20161101.pdf](#)

6.6 PV Diffusion Furnace Test Methods Task Force

- Published Standards
 - SEMI PV53-0514, Test Method for In-line Monitoring of Flat Temperature Zone in Horizontal Diffusion Furnaces
- 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

Attachment-12, PV Diffusion Furnace Test Methods TF.pdf

6.7 Multi-wire Saws Task Force

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

Attachment-13, Multi-wire Saws Task Force (11.25).pdf

7 Old Business

None

8 New Business

8.1 New SNARFs & TFOFs

- SNARF- New Standard: Test Method for Current-Voltage (I-V) Performance Measurement of Perovskite Solar Cells

Motion: To approve the SNARF

By: Dengyuan Song (Yingli)

Discussion:

1. Xinwei Niu (JA Solar): Since SEMI does not have industrial entities, this may be the reason experts believe that the IEC standard is better.
2. Jingbing Zhu (Sunman): Problem for fire adaption should be solved.
3. Dengyuan Song (Yingli): The problem for spectral adaption should be solved. The current equipment can't meet the needs. Since this is a new topic, there will be many opinions. We should continue working. Please don't go halfway.
4. Yun Sheng (Trina): Testing a solar cell needs more than ten minutes. Obviously, we need a new test technology to test Perovskite Solar Cells. There are various of solar cell structure and Perovskite materials. But they won't be included in Organic Photovoltaic and Dye Sensitized Solar Cell.
5. Zhen Zhang (Hohai University): The standard is necessary to do. But this is not a product standard, it doesn't refer to reliability and stability. Firstly, we should do a unified electrical performance.
6. Xinyu Zhang (Jinko): What about the test Atmosphere, under Nitrogen or vacuum environment? Currently, different labs have different test Atmosphere, it hasn't been unified yet.
7. Dongjiang He (CNSMQ): For the related equipment, will there be some companies can cooperate to develop this standard? It seems that it's a little earlier to start drafting this standard at this moment.
8. Attendee: Does the technology have the prospect of industrialization? Regarding researches based on Perovskite, some companies in Xiamen already have the awareness in the study. The focus on this standard is how to accurately test the solar cells. Perovskite and Dye Sensitized standards is not the same in the aspect of structure.

9. Zhixin Li (Linton): Perovskite technology is a new direction and it is attractive. Is it appropriate to do such a standard now?
10. Wei Zhou (Trina): From the technology improvement to industrialization progress, if there is a standard specification, it can make value for technology development and product results.

Vote: 16-28, Motion failed

- SNARF- New Standard: New Standard: Specification for Exposure Time and Voltage Sweep Direction Measurement Silicon Solar Cells in Transient Mode
(Updated SNARF Title: SNARF- New Standard: Specification for Voltage Sweep Time and Direction in transient mode I-V measurement of Silicon Solar Cells)

Motion: To approve the SNARF

By: Tao Xu (CSI)

Discussion:

1. Tao Xu (CSI): Sweep direction is an open topic. It needs to be further reviewed.
2. Xinyu Zhang (Jinko): It can be solved by an algorithm. The algorithm is useful for models. When doing a standard, please take algorithm into consideration. Here I'd like to answer the question why we do the standard at SEMI but not IEC? Because of working urgency and with the increasing of solar cells efficiency, fill factor should be promoted. IEC related standards are test method standards, it's another field. It is relatively mature to do such a specification standard at SEMI. Voltage sweep time is caused by light or capacitance? We use the same parameter with the one using in the industry.
3. Jingbing Zhu (Sunman): Is it appropriate to put exposure time in the SNARF title? When sweeping, light must be stable. If this new standard just emphasizes exposure time, most of this standard's contents are based on IEC standard. 40s and 200s are sweeping time not exposure time. When sweeping time reaches hundreds of milliseconds, voltage sweep time will have effect on capacitance.
4. Dengyuan Song (Yingli): We should find the right test method. With the increase of solar cell efficiency, time will be lengthened. For example: make an algorithm to solve the problem.
5. Yabin Feng (CESI): The standards based on product line are different with the one for certification. In IEC 60904 standard, there is no definite rule for it. Some labs use transient mode and some use steady mode.
6. Xiecheng Fan (Xinte energy): In the SNARF title, I suggest to change 'Mode' to 'industry'.
7. Ping Yan (Trina): Is this standard used for labs or product line? German institute fraunhofer uses steady state, less than 1.8%.
8. Yong Liu (Jolywood): If time permits, labs can do this test. But this standard only solves the problem among industry.

After discussion item, Jinko updated their SNARF title as New Standard: Specification for Voltage Sweep Time and Direction in transient mode I-V measurement of Silicon Solar Cells according to TC members' suggestions.

Vote: 23-0, Motion passed

- SNARF- New Standard: Guide for Silicon Carbide Used for Multi-Wire Sawing of Wafers in the Photovoltaic Industry

Motion: To approve the SNARF

By: Dengyuan Song (Yingli)

Discussion:

1. Dengyuan Song (Yingli): Take cost reduction problem for Silicon carbide into consideration.

2. Yuepeng Wan (GCL): Silicon cutting technology can be transferred. But it is not easy. Cutting technology can be transferred to diamond wire. We need such an abrasive standard, but it seems a bit late to submit this kind of standard now. Abrasive is an important factor for cost.
Strictly speaking, you should revise a standard rather than start a new one. Based on the core content of the standard, we determine whether to develop or modify a standard.

Vote: Not voted, motion cancelled

- SNARF- New Standard: Test Method for Measuring Roundness of Silicon Carbide Used for Multi-Wire Saw Solar Silicon Wafer by Image Analysis

Motion: To approve the SNARF

By: Dengyuan Song (Yingli)

Discussion:

1. Jingbing Zhu (Sunman): Roundness is a statistical number, is there a qualitative or quantitative data? My suspicion: Since the roundness range is relatively wide, we should measure the average value.
2. Yeqing Peng (LDK): Currently, there are automation equipment can quickly determine the roundness value, but because there isn't a unified standard, the roundness test results for different equipment are not the same.
3. Dongli Hu (LDK): Silicon carbide is used as a slurry in the photovoltaic industry. The Silicon Carbide quota for photovoltaic and abrasives industry are different. So we need to develop a new standard.
4. Zhixin Li (Linton): This is a downhill product. I suggest to merge the two SNARFs ' New Standard: Guide for Silicon Carbide Used for Multi-Wire Sawing of Wafers in the Photovoltaic Industry ' and ' New Standard: Test Method for Measuring Roundness of Silicon Carbide Used for Multi-Wire Saw Solar Silicon Wafer by Image Analysis ' together. Please clearly describe the test method and then re-propose the SNARF.
5. Yuepeng Wan(GCL): I suggest to invite abrasive companies to draft this standard together.

Vote: Not voted, motion cancelled

- SNARF- New Standard: Test Method for Determining Resistance of Flexible Thin Film PV Modules to Hail

Motion: To approve the SNARF

By: Yuepeng Wan (GCL)

Discussion:

1. Denyuan Song(Yingli): There is another standard related to thin film module, that is IEC 61646, why you haven't mentioned that? Is it necessary to separately do a hail standard? Hail is mainly about tolerance and impact resistance capacity. I do not recommend to do the standard for a particular feature. Does this meet the requirements for doing a standard? The content of this standard is too narrow.
2. Yabin Feng (CESI): IEC 61215-1 and IEC 61215-2 combined IEC 61646. It is also a thin film related standard. IEC 61215-1 is a standard about all requirements for PV module. IEC 61215-1-1 is the requirement for crystalline silicon module. IEC 61215-2 is a standard with terms of various experimental methods.
3. Xuan Li (Hanergy): IEC standards assess factory safety to ensure safety, at the meanwhile, strengthen the intensity direction. But IEC standards do not include contents for power, appearance and insulation standards.

Vote: 17-15, Motion failed

- SNARF- New Standard: Test Method for Abrasion Resistance of the Polymer Backsheet of Crystalline Silicon Solar Modules

Motion: To approve the SNARF

By: Tao Xu (CSI)

Discussion:

1. Tao Xu(CSI): For the dual-glass module, it solves abrasion resistance of backsheet in the desert. First, link test environments and practical applications together.
The backsheet suppliers must be an important part for drafting this standard.

There are disputes for falling sand and blowing sand. This problem will be discussed after SNARF is approved.

2. Zhixin Li (Linton): Is abrasion for backsheets of crystalline silicon solar module a common problem?
3. Xinwei Niu (JA Solar): Abrasion is a problem. Although it hasn't worn thoroughly, the wear is very powerful. Now there is an international standard about Abrasion Resistance of Coatings on Hard Substrates.
4. Dengyuan Song (Yingli): This standard is necessary, but it should reflect the actual situation. The ten-year backsheets and five-year backsheets are different.
5. Tongrong Zhao (Jolywood): GBT31034-2014, this standard provides a sequence of tests, including one abrasion resistance test. The standard was drafted in 2014 and published on July 1st, 2015.
6. Zhen Zhang (Hohai University): There are so many factors to consider in an outdoor environment; how would you control and balance and simulate the environment? IEC61892, from the aspect of module, can also test the abrasion resistance of backsheets.
7. Wei Zhou (Trina): The standard is necessary and meaningful. How to design the test sequence? It should reflect the state of outdoor using. During the standard developing, we need to do some researches and experiments together in the future.
8. Liangping Deng (LONGi): Regarding this test method, I recommend to do a round cask and then count the number of turns with sands inside. Next time change a group of sand.

Vote: 30-0, Motion passed

8.2 Request for Ballots in cycle 7-2016

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

Motion: To approve Doc 5968 for ballot in cycle 1-2017

By/2nd: Tongrong Zhao (Jolywood)

Discussion: None

Vote: 27-0, Motion passed

- Doc 5661, New standard: Test Method for Electrical Parameters of Bifacial Solar Module

Motion: To approve Doc 5661 for ballot in cycle 1-2017

By/2nd: Tongrong Zhao (Jolywood)

Discussion:

1. Zhen Zhang (Hohai University): The standard includes safety issue. For example: fuses and diodes on the ground. I suggest to invite system companies to join drafting this standard.
2. Ping Yan (Trina): What is this standard's compatibility and difference with IEC60904-1?

Vote: 25-0, Motion passed

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

Motion: To approve Doc 5926 for ballot in cycle 1-2017

By/2nd: Dengyuan Song (Yingli)

Discussion:

1. Dengyuan Song (Yingli): I have some doubt about the power of roller.
2. Xinwei Niu (JA Solar): Why there is only poc image, what about pmax image?

Vote: 26-0, Motion passed

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

Motion: To approve Doc 5840 for ballot in cycle 1-2017

By/2nd: Dengyuan Song (Yingli)

Discussion: None

Vote: 25-0, Motion passed

- Doc 5843, Revision of SEMI PV22-0716, Specification for Silicon Wafers for Use in Photovoltaic Solar Cells

Motion: To approve Doc 5843 for ballot in cycle 1-2017

By/2nd: Tongrong Zhao (Jolywood)

Discussion:

1. Yuepeng Wan (GCL): The size for monocrystal should be the same.
2. Tao Xu (CSI): Silicon Wafer is now standardized. Module should also be standardized. The dimensions' standardization is significant.

Vote: 27-0, Motion passed

- Doc 5842, New Standard: Test Method for Metal-Wrap-Through Solar Cell Via Resistance

Motion: To approve Doc 5842 for ballot in cycle 1-2017

By/2nd: Tao Xu (CSI)

Discussion: None

Vote: 26-0, Motion passed

8.3 Request for publish the Chinese version of standards

- SEMI PV62-0215 Terminology for Back Contact PV Cell and Module/背接触电池组件术语

Motion: To approve for publish Chinese version of standard

By/2nd: Yuepeng Wan (GCL)/ Tongrong Zhao (Jolywood)

Discussion: None

Vote: 25-0, Motion passed

9 Action Item Review

9.1 *Open Action Items*

See Table 7.

9.2 *New Action Items*

See Table 6.

10 Next Meeting and Adjournment

The next meeting of the China PV Standards Committee Chapter will be on April 18th, 2017, Tuesday, in Shanghai, China

Respectfully submitted by:

Sophia Huang

SEMI China

Phone: 86-21-60278553

Email: shuang@semi.org

Minutes approved by:

| | |
|---|-----------|
| Guangchun Zhang (CanadianSolar), Co-chair | 2016/12/8 |
| Zhixin Li (Linton), TC member | 2016/12/8 |

Table 13 Index of Available Attachments #1

| # | Title | # | Title |
|---|--|----|---|
| 1 | China PV TC Meeting Minutes 20160729.pdf | 8 | PV Silicon Wafer TF Report -- Nov.25th,2016.pdf |
| 2 | SEMI Staff Report 20161125.pdf | 9 | SEMI Crystalline Silicon Solar Cell Task Force Report -2016.11.25--V1.pdf |
| 3 | PVMaterials NA TC Chapter Liaison Report Nov 2016.pdf | 10 | SEMI PV Module Task Force Report 2016-11-4.pdf |
| 4 | EU PV Material Report Oct 2016.pdf | 11 | Thin film PV Task Force Report 20161101.pdf |
| 5 | 161107_LiaisonReport_JA_PV&PVM_v1.0.pdf | 12 | PV Diffusion Furnace Test Methods TF.pdf |
| 6 | Taiwan PV Standards Committee Liaison Report Nov 2016.pdf | 13 | Multi-wire Saws Task Force(11.25).pdf |
| 7 | SEMI PV Silicon Raw Materials Task Force Report 20161123.pdf | | |



#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 [SEMI Staff Name] at the contact information above.