



# HB-LED North America TC Chapter

## Meeting Summary and Minutes

NA Standards Spring 2017 Meetings  
 Thursday, April 6, 2017, 10:30 – 12:00  
 SEMI Headquarters, Milpitas, California

### TC Chapter Announcements

*Next TC Chapter Meeting*

SEMICON West 2017 Standards Meetings  
 Thursday, July 13, 2017, 10:30 – 12:00  
 Marriott Marquis Hotel, San Francisco, CA

### Table 1 Meeting Attendees

*Italics indicate virtual participants*

**Co-Chairs:** Andrew Kim (InnovationforX), Chris Moore (BayTech-Resor), Iain Black (Philips), Mike Feng (Silian)

**SEMI Staff:** Laura Nguyen

<i>Company</i>	<i>Last</i>	<i>First</i>	<i>Company</i>	<i>Last</i>	<i>First</i>
Asahi Glass	Takahashi	Mark	<i>Pacific Light Tech</i>	<i>Kurtin</i>	<i>Juanita</i>
<i>BayTech-Resor</i>	<i>Baylies</i>	<i>Winthrop</i>	<i>Peter Wagner Consulting</i>	<i>Wagner</i>	<i>Peter</i>
InnovationforX	Kim	Andrew	Sonoscan	Martell	Steve
Monocrystal	Radzikhovskaya	Natasha	SEMI	Amano	James
<i>Op-test</i>	<i>Hsu</i>	<i>Margaret</i>	SEMI	Nguyen	Laura

### Table 2 Leadership Changes

None

### Table 3 Committee Structure Changes

None

### Table 4 Ballot Results

None

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

None

### Table 6 Authorized Activities

None

### Table 7 Authorized Ballots

None



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

None

**Table 9 SNARF(s) Abolished**

None

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

None

**Table 11 New Action Items**

<i>Item #</i>	<i>Assigned to</i>	<i>Details</i>
2017April#01	Laura Nguyen	To contact Natalie to reach out to the Source Gas companies that are representatives in Korea.
2017April#02	Laura Nguyen	Send SEMIViews access for HB1 and HB8 to members in the meeting to review/compared docs with existing New Standards. <b>CLOSED.</b>
2017April#03	Andrew Kim	Look into getting talks into upcoming conferences for HB-LED. <b>On-going.</b>
2017April#04	Laura Nguyen	To find out about previous press releases for HB1 and if there can be another one submitted.
2017April#05	Win Baylies	To prepare abstracts for HB-LED Standards for <i>Strategies in Light</i> (with Steve & Andrew)
2017April#06	Laura Nguyen	Send Andrew Kim SNARF and TFOF form. <b>CLOSED.</b>
2017April#07	Juanita, Win	Reach out to a contact at GE.
2017April#08	Andrew Kim	To draft an email introduction to send out to various phosphor manufacturers for feedback.
2017April#09	Laura Nguyen	To send Andrew sample surveys for reference to draft something with more detail to discuss further for the next meeting.
2017April#10	Margaret Hsu	To send Andrew name of a German Supplier.
2017April#11	Andrew Kim	To send Peter Wagner address of where to send wafers from Osram.
2017April#12	Peter Wagner	Peter to send Laura and Andrew excel file from Osram. <b>CLOSED.</b>

**Table 12 Previous Meeting Action Items**

<i>Item #</i>	<i>Assigned to</i>	<i>Details</i>
2016Nov#01	Laura Nguyen	To contact Assembly Task Force leaders if there is any on going activity. <b>Contacted Paul Reid, email bounced. On-going to contact by phone</b>
2016Nov#02	Win Baylies	To contact John Ciraldo (Rubicon) regarding PSS activity. <b>CLOSED.</b>
2016Nov#03	Andrew Kim	To send Laura contacts of possible participants for the Wafer Task Force to join. <b>CLOSED.</b>
2016Nov#04	Laura Nguyen	To contact Natalie (SEMI Korea) to find out what support they need to continue their activities. Copy Andrew Kim. <b>On-going. CLOSED.</b>
2016Nov#05	Win Baylies	Send files to Peter and Andrew of past Wafer TF activities. Peter to confirm what size wafers. <b>CLOSED.</b>
2016Nov#06	Peter Wagner	To contact Osram regarding the ID marks to the wafers. <b>Osram sent an excel file containing data about two wafers, wafer a and wafer b. One wafer engraved with UV and the other with CO2. They are willing to send the information if we send them an address. They are also not interested in doing anymore experiments. Wafers will be sent to Andrew. CLOSED.</b>
2016Nov#07	Steve, Andrew	Following up from New Business discussion, Steve and Andrew to connect to get in contact with equipment makers and R&D teams of various LED companies. <b>On-going – abstract and press releases. CLOSED, under new business during Spring Meetings.</b>
2016Nov#08	Andrew Kim	To contact Lumileds and other phosphor companies. <b>CLOSED, will expand to other regions (Japan, Germany, China)</b>
2016Nov#09	Peter Wagner	To contact Osram and Silicone manufactures. <b>CLOSED.</b>

**Table 12 Previous Meeting Action Items**

<i>Item #</i>	<i>Assigned to</i>	<i>Details</i>
2016Nov#10	Andrew Kim	To draft email to send out to companies for input. Copy Peter and Laura. <b>On-going. Update: new AI taken at Spring Meetings. CLOSED.</b>
2016Nov#11	Laura Nguyen	To contact Sophia to ask her leaders about possible silicone and phosphor makers. Andrew to send Laura introduction email. <b>On-going</b>
2016July#06	Andrew, Win, Laura	Contact Julie about PSS/DSP Wafers images/scales to see where she is; let her know where we are and to see if she has any information on where to go from here. <b>TBD: Julie has moved out of the industry. Need to find replacement during Fall meetings. Update: China formed a PSS/DSP Task Force. Julie informed Andrew of a Google Drive other members have access to. Andrew to find out Google Drive information.</b>
2016July#07	Win Baylies	Send Andrew any documents and images related to these TFs. <b>OPEN – will forward Silian images of selected surface characteristics prior to Fall meeting.</b>

## 1 Welcome, Reminders, and Introductions

Andrew Kim (InnovationforX) called the meeting to order at 10:40. The meeting reminders on antitrust issues, intellectual property issues and holding meetings with international attendance were reviewed. Attendees introduced themselves.

**Attachment:** SEMI Standards Required Meeting Elements

## 2 Review of Previous Meeting Minutes

The TC Chapter reviewed the minutes of the previous meeting.

**Motion:** To accept the previous meeting minutes as written.  
**By / 2<sup>nd</sup>:** Steve Martell (Sonoscan) / Mark Takahashi (Asahi Glass)  
**Discussion:** None.  
**Vote:** 3-0 in favor. Motion passed.

**Attachment:** [2016Spring] HB-LED Minutes FINAL

## 3 Liaison Reports

### 3.1 HB-LED China TC Chapter

Laura Nguyen (SEMI) reported for the HB-LED China TC Chapter. Of note:

- Cochairs: Yong Ji (GHOT), Weizhi Cai (SANAN)
- Org Chart {See attachment for Figure}
- Meeting Information
  - Last meeting: October 14, 2016 – China Standards Fall Meeting 2016 in Dandong, Liaoning, China
  - Next meeting: April 20, 2017 – China Standards Spring Meeting 2016 in Wuhu, Anhui, China
- Single Crystal Sapphire Task Force
  - Charter: Draft the standards on specifications for single crystal sapphire intended for use for manufacturing HB-LED wafers.
  - Working on:
    - Doc. 5723A, New Standard: Specification for Single Crystal Sapphire Intended for Use for Manufacturing HB- LED Wafers
      - Approved ballot with editorial changes and authorized for A&R Process



- Doc. 5946, New Standard: Test Method for Grain Boundary of Single Crystal Sapphire by Optical Homogeneity Technique (OHT)
  - Discussion from NA: See attachment in Section 7.1 of these minutes for comment on Doc 5946.
- Sapphire Single Crystal Ingot Task Force
  - Charter:
    - Define the key parameters of LED sapphire ingot, including dimension, orientation of the end face and flat, surface quality, bulk defects, etc.
    - Formulate the inspection methods of the key parameters for LED sapphire ingot.
    - Formulate and establish inspection standards of the key parameters for LED sapphire ingot.
  - Working on:
    - Doc. 5775A, New Standard: Specification for Sapphire Single Crystal Ingot Intended for Use for Manufacturing HB-LED Wafers
      - Approved ballot with editorial changes and authorized for A&R Process
- GaN based LED Epitaxial Wafer Task Force
  - Charter: This Task Force is chartered to develop test methods and specifications for GaN based HB-LED epitaxial wafer in order to increase the production efficiency.
  - Working on:
    - Doc. 5776, New Standard: Test Method for Detecting Surface Defects of GaN based LED Epitaxial Wafer Used for Manufacturing HB-LED
      - Authorized for ballot in cycle 8-2016
- Sapphire Single Crystal Orientation Task Force
  - Charter: Develop the standards and measurement methods for the determination of orientations of sapphire single crystal products to enhance the consistency in measurement data and to provide the solutions for increasing measurement precision as well.
  - Working on:
    - Doc. 5945, New Standard: Test Method for Determining Orientation of A Sapphire Single Crystal
      - Approved ballot as submitted and authorized for A&R Process
- Staff Contact: Sophia Huang ([shuang@semi.org](mailto:shuang@semi.org)), Daniel Qi ([fqi@semi.org](mailto:fqi@semi.org))

**Attachment:** [2016Fall] Liaison HB-LED China

### 3.2 Korea Chapter Formation Group (CFG)

Natalie Shim (SEMI Korea) informed Laura Nguyen (SEMI) that the Korea CFG does not have a liaison report at this time, but they are currently working on five open SNARFs.

**Action Item:** 2017April#01, Laura to reach out to Natalie to connect with Source Gas companies in Korea.

### 3.3 SEMI Staff Report

Laura Nguyen (SEMI) gave the SEMI Staff Report. Of note:

- SEMI Global 2017 Calendar of Events
  - LED Taiwan (April 12-15, 2017; Taipei, Taiwan)
  - SEMICON Southeast Asia (April 25-27, 2017; Penang, Malaysia)
  - Intersolar Europe (May 31-June 2, 2017; Munich, Germany)
  - SEMICON West (July 11-13, 2017, San Francisco, California)



- SEMICON Taiwan (September 13-15, 2017; Taipei, Taiwan)
- PV Taiwan (October 12-14, 2017; Taipei, Taiwan)
- SEMICON Europa (November 14-17, 2017; Munich, Germany)
- SEMICON Japan (December 13-15, 2017; Tokyo, Japan)
- Upcoming North America Standards Meetings
  - SEMICON West 2017 (July 10-13, 2017, San Francisco, California)
  - NA Standards Fall 2017 Meetings (November 6-9 [tentative], SEMI HQ in Milpitas, California)
- Letter Ballot Critical Dates for 2017
  - West 2017 adjudication
    - Cycle 4: ballot submission due: Apr 14/Voting Period: Apr 25 – May 25
    - Cycle 5: ballot submission due: May 12/Voting Period: May 26 – June 26

Critical Dates 2017; <http://www.semi.org/en/Standards/Ballots>

- Standards Publications Report

<i>Cycle</i>	<i>New</i>	<i>Revised</i>	<i>Reapproved</i>	<i>Withdrawn</i>
December 2016	0	2	0	0
January 2017	1	4	4	0
February 2017	1	9	2	0
March 2017	0	16	11	0

Total in portfolio – 972 (includes 170 Inactive Standards – see attachment to see breakdown)

- SEMI Standards Publications – New Standards
  - SEMI PV76, Test Method for Durability of Low Light Intensity Organic Photovoltaic (OPV) and Dye-Sensitized Solar Cell (DSSC)
  - SEMI HB8, Test Method for Determining Orientation of a Sapphire Single Crystal
- Nonconforming Titles {None}
- HB-LED Standards needing Five-Year Review {None}
- SNARF 3 Year Status, TC Chapter may grant a one-year extension
  - None for HB-LED NA TC Chapter

**Attachment:** [2017Spring] Staff Report HB-LED

#### 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.

**None**

#### 5 Subcommittee and Task Force Reports

The following task forces are currently inactive:

- Impurities and Defects in Sapphire Wafers Task Force
- Equipment Communication Interfaces Task Force



- Equipment Automation Interfaces Task Force
- Test Methods Task Force

The committee did not go over any reports of the particular Task Forces below. The HB-LED docs from China were the main discussion and can be found in Section 7.1 in these minutes, under New Business.

#### 5.1 *Assembly Task Force*

#### 5.2 *Patterned Sapphire Substrate (PSS) Task Force*

#### 5.3 *Wafer Task Force*

#### 5.4 *Source Materials Task Force (Korea CFG)*

Laura Nguyen (SEMI) reported for the Source Materials Task Force. Natalie Shim (SEMI Korea) informed Laura Nguyen (SEMI) that the Korea CFG does not have a report at this time, but they are currently working on five open SNARFs.

## 6 Old Business

### 6.1 *Previous Action Items*

Previous action items are noted in Table 12 in 'red' and for recent updates in 'blue'. There is no further old business.

## 7 New Business

### 7.1 *Review Draft Documents 5723A and 5775A from China HB-LED for comments/feedback.*

Laura Nguyen addressed the committee on this topic. Sophia (SEMI China) is requesting feedback from the NA Chapter. See attachment for comments from NA.

**Action Item:** 2017April#02, Laura to send SEMIViews access for HB1 and HB8 to members in the meeting to review/compared docs with existing New Standards.

**Attachment:** [2017Spring] Discussion for China HB-LED Committee

### 7.2 *Press Release for HB1*

Andrew Kim addressed the committee on this topic.

#### Discussion:

- (Andrew) Doesn't believe companies know about SEMI HB1.
- (Steve) Have SEMI release some type of a press release to the high-bright LED magazines.
- (Andrew) Possibly figure out if the press release can be sent specifically to LED companies, wafer companies and metrology companies.

**Action Item:** 2017April#03, Andrew to look into getting talks into upcoming conferences for HB-LED.

**Action Item:** 2017April#04, Laura to find out about previous press releases for HB1 and if there can be another one submitted.

### 7.3 *Strategies in Light*

Andrew Kim addressed the committee on this topic. Look into preparing material for this event and other events.

- Abstract for promotions of HB-LED Standards.
- Possibly have someone do a small presentation.



**Action Item:** 2017April#05, Win Baylies (Steve Martell & Andrew Kim) to prepare abstracts for HB-LED Standards

#### 7.4 Update on Phosphors

Andrew Kim addressed the committee on this topic.

Some research since last meeting.

##### Discussion:

- One company was interested in attending Spring Meetings but had a customer conflict.
- Contacted other manufactures: feedback is similar; interest in Standards, but concern to whether the Standards serve anyone's interest
- (Steve) Would need to find a common ground to help cost go down, similar to MEMS industry
- (Andrew) Not enough phosphor vendor in US, possibly in Europe and/or Japan
- (Juanita) There was a short discussion during a DOE workshop on a Euro spec on properties of quantum dots.
  - In the audience someone spoke about a standard for measuring quantum yield, but Juanita clarified it is difficult to measure quantum yield, in liquid.
- (Andrew) There is still a gap in measuring all of these materials as phosphors applied to LED.
- (Committee) Discussion of SNARF formalities.
- (Margaret/Op-test) Calling in with interest to testing standards for HB-LED test and measurements
- Andrew to add Margaret to the discussion.

##### Another topic from last meeting

- (Andrew) How it's integrated on the LED is important
- Spoke to two Silicone makers, not appropriate territory for them.
- Suggest more effective approach would be to work on a material spec for phosphor then come back with progress.
- (Peter) Talked to silicone makers in Europe, and they currently do not see any benefits to regarding standardizing silicone
- (Andrew) Looks like we are getting different reception from phosphor makers than silicone makers; so best to focus on phosphor makers.
- (Juanita) Have you approach GE? I can send an email to see if he is interested.
- (Andrew) Will try to send any names of German manufactures for Peter to contact. At this time, there are no China companies that come to mind.
- (Win) I can reach out to Len Perrots to reach out for anyone in China – have Andrew to draft an email for introduction and also send to Sophia to reach out to any China companies.
- (Margaret) Part of the problem, tools are home built that has been modified to get the info that is needed.
- (Andrew) Would be a good idea to talk to Lumileds/Osram to talk to the operations-engineering folks.
- (Margaret) In order to compare phosphors and quantum dots together we do need a standard.
- Win sent a name John Trembley. (may be interested in this discussion)
- Work on putting together a survey/SNARF/TFOF together for a Phosphor task force.



- Action Item:** 2017April#06, Laura to send Andrew SNARF and TFOF form.
- Action Item:** 2017April#07, Juanita and Win to reach out to a contact at GE.
- Action Item:** 2017April#08, Andrew to draft an email introduction to send out to various phosphor manufacturers for feedback.
- Action Item:** 2017April#09, Laura to send Andrew sample surveys for reference to draft something with more detail to discuss further for the next meeting.
- Action Item:** 2017April#10, Margaret to send Andrew a name of German Supplier of a standard of evaluation tool of efficacy.
- Action Item:** 2017April#11, Andrew to send Peter address to send wafers from Osram to him.
- Action Item:** 2017April#12, Peter to send excel file from Osram to Andrew and Laura.

**8 Next Meeting and Adjournment**

The next meeting is scheduled for Thursday, July 13, 2017 at SEMICON West 2017 Standards Meetings at the Marriott Marquis Hotel in San Francisco, California. See <http://www.semi.org/standards-events> for the current list of events.

The tentative schedule is provided below:

- Thursday, July 13
- 09:00-10:30 Joint HB-LED (TFs)
- 10:30-12:00 HB-LED (C)

Adjournment: 12:05.

Respectfully submitted by:

Laura Nguyen  
 International Standards Coordinator  
 SEMI Headquarters  
 Phone: 1.408.943.7019  
 Email: [lnguyen@semi.org](mailto:lnguyen@semi.org)

Minutes tentatively approved by:

Andrew Kim (InnovationforX), Co-chair	July 13, 2017
Chris Moore (BayTech-Resor), Co-chair	<Date approved>
Iain Black (Philips), Co-chair	<Date approved>
Mike Feng (Silian), Co-chair	<Date approved>

**Table 13 Index of Available Attachments<sup>#1</sup>**

<i>Title</i>	<i>Title</i>
SEMI Standards Required Meeting Elements	[2017Spring] Staff Report HB-LED
[2016Fall] HB-LED Minutes FINAL	[2017Spring] Discussion for China HB-LED Committee
China HB-LED Committees Liaison Report20161028	

#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 Laura Nguyen at the contact information above.