

**China HB-LED Standards Committee
Meeting Summary and Minutes**

China Fall Standards Meeting 2016

Friday, October 14, 2016, 09:00 -15:00

Friend Plaza Hotel Dandong, No. 158 Middle Binjiang Road, Dandong, Liaoning, China

Next Committee Meeting

Thursday, April 20th, 2017

Table 1 Meeting Attendees

Co-Chairs: Yong Ji (GHTOT), Weizhi Cai(SANAN)

SEMI Staff: Daniel Qi – SEMI China, Sophia Huang – SEMI China, Mina Chen – SEMI China

<i>Company</i>	<i>Last</i>	<i>First</i>	<i>Company</i>	<i>Last</i>	<i>First</i>
Achemetal	Li	Bo	KENIQI	Zhu	Jiancheng
AMEC	Lee	Steven	KENIQI	Lu	Bin
AURORA	Zuo	Hongbo	Kepeida	Li	Jizhong
AURORA	Yang	Xinhong	Kingtong	Chen	Tao
AURORA	Zhang	Xuejun	KRDQ	Personal	Guoping
AURORA	An	Zijian	Lanbaoyuan	Li	Haohan
CEC Zhenhua	Zhou	Jianjie	LGYL	Huang	zhenjin
Cheng Mei	Huang	Christine	LGYL	Du	Junping
CHIPFOUNDATION	Hao	Maosheng	Liaoyang Institute of Powder Metallurgy	Tan	Haibo
Chunshu	Zang	Lei	Liaoyang Institute of Powder Metallurgy	Gao	Dianbin
Chunshu	Huang	Mingrui	Lifei	Li	Wenhua
C-PE	Pan	Xiangcheng	Monocrystal	Niu	Chongshi
DDXDF	Zhao	Songbin	Monocrystal	Wang	Zhan
DDXDF	Zhen	Wei	NJC	Zheng	Songsen
DIASC	Liang	Chao	QZTECH	Huang	Charles
DIAT	Kang	Jiejiao	RISTAL	Jiang	Junyong
DLD	Zhang	Bing	Rui Hong Yuan	Zheng	Shengzhong
ECBO	Liu	Jianzhe	Ruidu	Zhou	Weining
ECBO	Sheng	Xiaoyan	SANAN	Cai	Weizhi
ETI	Wu	Liangwen	SANPING TECHNOLOGY	Zhao	Youwen
ETI	Ding	Yisheng	SANPING TECHNOLOGY	Zheng	Hongjun
GCL	Liu	Yifeng	Sapphire Materials	Xing	Xing
Gemsung	Song	Jun	Sapphire Materials	Ma	Pengxiang
Gemsung	Sun	Jue	Sapphire Techonology	Deng	Puyuan
Gemsung	Zhu	Shuai	Shanghai Sapphire Single Crystal Engineering Technology Research Center	Wu	Feng
GHTOT	Ji	Yong	Shenjia	Dong	Zhiyuan
GHTOT	Zhao	Jun	SHJDTY	Qian	Kuang
GHTOT	Qi	Liuyun	Shunkang Sapphire	Zhang	Lina
GRISH	Wang	Xu	Shunkang Sapphire	Feng	Yunming
HC SEMITEK	Wang	Jiangbo	Sino Nitride	Liu	Nanliu
HIT	Gan	Yang	SINOMA	Huang	Cunxin
Hongbo	Chen	Yong	SST	Song	Weihong

Honglu	Huang	Zhimin	TDG	Duan	Jinzhu
Honglu	Wang	Fan	TDG	Sun	Qiang
Honglu	Zhang	Yang	Tianlong	Pan	Yanping
INJET	Chen	Jinjie	TRUSTEC	Qin	Eric
INJET	Zhou	Yinghuai	TRUSTEC	Dai	Eason
INJET	Tang	Xing	TSD	Liu	Yongfeng
INJET	Chen	Cai	Union-diamond	Li	Jun
INVENLUX	Yan	Chunhui	Unionlight	Li	Tao
iStarwafer	Zheng	Dong	Unionlight	Chen	Lin
JING ZHI	Zhang	Jinsui	Winifred	Li	Xiaodong
Jingan	Si	Fanghu	Wuxisj	Yang	Jianliang
JINGHUAN	Zhang	Jun	Wuxisj	Gong	Hongjie
Jingmai	Qu	Min	Xinjing	Wen	Ming
Jingyu	Yang	Fuzhan	Yongan Machine	Li	Zhengliang
Jingyu	Yang	Hua	YUJING	Zhang	Guoqiu
Jingyu	Qi	Naisheng	Zhongtianli	Tang	Baofa
Jingyu	Zhu	Longhu	Zhongzhiwang	Cao	Hongliang
Jingyu	Li	Zheng			

Table 2 Leadership Changes

<i>Group</i>	<i>Previous Leader</i>	<i>New Leader</i>
Patterned Sapphire Substrate Task Force(new TF)		Jianzhe Liu (ECBO)

Table 3 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>
5945	New Standard: Test Method for Determining Orientation of A Sapphire Single Crystal	Passed as balloted
5723A	New Standard: Specification for Single Crystal Sapphire Intended for Use for Manufacturing HB- LED Wafers	Passed with editorial changes
5775A	New Standard: Specification for Sapphire Single Crystal Ingot Intended for Use for Manufacturing HB-LED Wafers	Passed with editorial changes

Table 4 Authorized Ballots

<i>#</i>	<i>When</i>	<i>SC/TF/WG</i>	<i>Details</i>
5776	Cycle 8-2016	GaN based LED Epitaxial Wafer Task Force	New Standard: Test Method for Detecting Surface Defects of GaN based LED Epitaxial Wafer Used for Manufacturing HB-LED

Table 5 Authorized Activities

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

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

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

Table 6 New Action Items

<i>Item #</i>	<i>Assigned to</i>	<i>Details</i>
None		

Table 7 Previous Meeting Action Items

<i>Item #</i>	<i>Assigned to</i>	<i>Details</i>	<i>Status</i>
ChinaHBLED-0416-01	Hongbo Zuo from Aurora	Take over the SNARF # 5629, New Standard: Guide for Identification of Features on the Surface of Sapphire Wafers from NA, to complete the standard.	Ongoing
ChinaHBLED-0416-02	Jiangbo Wang from HC SEMITEK	Take over the SNARF # 5776, New Standard: Test Method for Detecting Surface Defects of GaN based LED Epitaxial Wafer Used for Manufacturing HB-LED, since the previous author was left from THTF.	Doc 5776 approved for Cycle 8-2016 voting

1 Welcome, Reminders, and Introductions

Committee co-chair Yong Ji chaired the meeting and welcomed all attendees, all the attendees introduced themselves. Daniel Qi called the meeting to order at 9:45 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: Jianzhe Liu (ECBO)

Discussion: None

Vote: 45-0. Motion passed

Attachment-1, China HB-LED TC Meeting Minutes 20160421.pdf

3 Staff Report

Daniel Qi (SEMI) gave the staff report. Highlights

- Overview the SEMI Global 2016&2017 Calendar of Events
- Ballot Critical Dates
- SEMI standards publication update
- Overview recent published standards from HB-LED TC
- Reminder to enhance task force management
- Showed the updated SEMI standards website
- Showed Necessary Information/Website Links

Attachment-2, SEMI Staff Report 20161014.pdf

4 Liaison Reports

4.1 North America PV Materials Committee

Daniel Qi (SEMI) reported. Highlights:

- The co-chairs of North America HB-LED TC are Andrew Kim (InnovationforX), Chris Moore (BayTech-Resor), Iain Black (Philips Lumileds), and Mike Feng (Silian)
- There are 7 active task forces and 1 inactive task force under the TC
- Doc 5016 passed Committee Review in July 2016 and passed A&R, still pending publications while Doc 5818 published in August 2016
- HB-LED Impurities and Defects Discussion moved to inactive at SEMICON West 2016
- China chapter will take over SNARF #5629
- NA Chapter Requests to China Chapter to define the difference between Doc 5723& 5775
- Next meeting - Thursday, November 10, 2016 SEMI Headquarters in San Jose, CA

Attachment-3, NA HB-LED Liaison Report July2016.pdf

4.2 Korea HB-LED Working Group

Daniel Qi (SEMI) reported. Highlights:

- The leader of the Korea HB-LED working group are HyeongSoo Park (SEMES) and Jong Hyeob Baek (KOPTI)

- 2 teams under the working group
 - Source Materials TF
 - HB1 Review team
- 5818 (HB1 Revision) passed NA HB-LED TC Chapter adjudication and A&R review. It was published in August, 2016.
- 5 drafts was modified as follow the comments and was requested ballot authorization in August via GCS

[Attachment-4, KR HB-LED liaison July.pdf](#)

5 Ballot Review

5.1 Cycle 5-2016: Doc. 5945, New Standard: Test Method for Determining Orientation of A Sapphire Single Crystal

Motion: To approve the document as balloted

By/2nd: Xinhong Yang (AURORA)

Discussion: None

Vote: 47-0. Motion passed

[Attachment-5, 5945 Procedural Review.pdf](#)

5.2 Cycle 5-2016: Doc. 5723A, New Standard: Specification for Single Crystal Sapphire Intended for Use for Manufacturing HB- LED Wafers

Motion: To approve the document with editorial changes

By/2nd: Xinhong Yang (AURORA)

Discussion: None

Vote: 38-0. Motion passed

[Attachment-6, 5723A Procedural Review.pdf](#)

[Attachment-7, 5723A with editorial changes.pdf](#)

5.3 Cycle 5-2016: Doc. 5775A, New Standard: Specification for Sapphire Single Crystal Ingot Intended for Use for Manufacturing HB-LED Wafers

Motion: To approve the document with editorial changes

By/2nd: Yang Gan (HIT)

Discussion:

1. Xinhong Yang (AURORA): We' checked some other standard documents, there is also no clear definition for roundness and straightness. We'll make an explanation for this.
2. Songbin Zhao (DDXDF): I think the two definitions should be added.
3. Attendee: You can add a reference and illustrate the definition comes from which standard.
4. Yang Gan (HIT):
Hardness and polishing rate are used as test methods. Please refer to what GHTOT has done.
Find a third party to balance or evaluate Peter Wagner's negatives and suggestions. Try our best to work on the standard writing.
5. Yong Ji (GHTOT): When there is different opinions and when contradiction occurs, it will be better to find a reference so that the contradiction can be transferred.
6. Zijian An (AURORA): We don't think it is necessary to redefine 'roundness' and 'straightness', because these two terms are general applicable terms of geometric tolerance, which have permanent definition and not dedicated to sapphire ingot appearance and dimension inspection.

Vote: 36-0. Motion passed

[Attachment-8, 5775A Procedural Review.pdf](#)

[Attachment-9, 5775A with editorial changes.pdf](#)

6 Task Force Reports

6.1 *Single Crystal Sapphire Task Force*

- Introduced the task force's leaders and members
- Doc5723 have been balloted on cycle-5 2016, voting interest accepts 96.55%, only one rejected ballots. Received many comments from same voter after discussion and communication, we recall the document and revised by task force. TF revised the document to 5723A which request to ballot on next cycle in this China HB-LED standard committee.
- Additional one Doc 5946 Test Method for Grain Boundary of Single Crystal Sapphire by Optical Homogeneity Technique (OHT), still working on the draft.

[Attachment-10, Single Crystal Sapphire TF Report-2016-10-14.pdf](#)

6.2 *Sapphire Single Crystal Ingot Task Force*

- Introduced the task force's leaders and members
- Working on: Doc. 5775, New Standard: Specification for Sapphire Single Crystal Ingot Intended for Use for Manufacturing HB-LED Wafers, modify the standard content according to the suggestions from global vote

[Attachment-11, Sapphire Single Crystal Ingot TF Report 20161014.pdf](#)

6.3 *GaN based LED Epitaxial Wafer Task Force*

- Introduced the task force's leaders and members
- Working on Doc. 5776, New Standard: Test Method for Detecting Surface Defects of GaN based LED Epitaxial Wafer Used for Manufacturing HB-LED, will request for cycle 8-2016 ballot

[Attachment-12, GaN based LED Epitaxial Wafer Task Force.pdf](#)

6.4 *Sapphire Single Crystal Orientation Task Force*

- Introduced the task force's leaders and members
- Working on : Doc 5945, New Standard: Test Method for Determining Orientation of A Sapphire Single Crystal, no reject in Cycle 5-2016, going to A&R review process

[Attachment-13, Sapphire Single Crystal Orientation TF Report-2016-10-14.pdf](#)

7 Old Business

None

8 New Business

8.1 *New SNARFs & TFOFs*

- SNARF - New Standard: New Standard: Classification for Surface Quality of Patterned Sapphire Substrate (PSS) for HB-LED

Motion: To approve the SNARF

By/2nd: Songbin Zhao (DDXDF)/ Songsen Zheng (NJC)

Discussion :

1. Yong Ji (GHTOT)
 - Scratch refers to the long strip. If there is scratch, there may also have pit. Is the connection part taken into consideration?
 - STD is caused during the process. It has no connection with quality.
 - The quality of the crystal and the quality of the surface is different.

2. Jiangbo Wang (HC SEMITEK)
Are the limitations of image size taken into consideration? The STD problem is important and needs to be taken into consideration.
3. Jianzhe Liu (ECBO)
 - If STD was put in this standard; does it match with the standard title ‘Classification for Surface Quality of Patterned Sapphire Substrate (PSS) for HB-LED’?
 - PSS is currently 50 nanometers as a level/grade.
4. Yang Gan (HIT)
 - Products may have good, middle, low quality. But defects are problems of distribution.
 - Shot fail, stepper mark and abnormal shape all need to be defined.
5. Hongbo Zuo (AURORA)
 - I have a question about length. If the pattern is long, how to make classification? I think you should list a table to illustrate their relationship with ABC etc. The usage of standard should be classified and then it can be doable in the future.
 - Surface performance: We should link Surface topography with quality characteristics so that the correlation will be better. Pattern integrity, the proportion of abnormal characteristics need to be described. This kind of description should be related to post-process and application in order to do a useful standard in the future.
 - We should consider where can this standard be used? We should consider several factors for usage.
 - Should we use this standard to define shape? Divide shape feature defects into several classifications? Divide Surface quality defects into several classifications? I think this is more reasonable.
6. Chunhui Yan (Invenlux)
 - ABC classification is required and should be quantified. STD may affect the quality. I suggest putting this part in this standard.
7. Attendee: Is the facial crystal displacement calculated to crystal quality?
8. Guoping Li (KRDQ): We can develop a general rule at first. Then we put what we can do and what are difficult to do by classification. This is a heavy workload. It is tough to do by one company. It needs to be done by several companies from upstream to downstream. Guobiao has published GaN Substrate Standard General Rule. We can refer to it and develop a general rule.

Vote: Proposed Company gave up the SNARF, Motion failed

[Attachment-14, SNARF-Classification for Surface Quality of Patterned Sapphire Substrate \(PSS\) for HB-LED.pdf](#)

[Attachment-15, SNARF PPT-Classification for Surface Quality of Patterned Sapphire Substrate \(PSS\) for HB-LED.pdf](#)

- TFOF - Patterned Sapphire Substrate Task Force

Motion: To approve the TFOF

By/2nd: Xinhong Yang (AURORA)

Discussion:

1. Hongbo Zuo (AURORA): AOI can only measure two-dimensional, three-dimensional focal length is the next step we have to do.
2. AURORA, GAPSS, ETI, HC SEMITEK, NJC, Monocrystal, HIT, KRDQ will join this new task force. The main contact person for this new task force will update Patterned Sapphire Substrate Task Force Members after the meeting.
3. Yang Han (HIT): For the task force name, please add ‘ed’ after pattern

Vote: 41-0. Motion passed

[Attachment-16, New TF Patterned Sapphire Substrate Task Force.pdf](#)

[Attachment-17, New TF SEMI HB-LED Task Force Report TFOF 20161010.pdf](#)

8.2 Request for Ballots in cycle 8-2016

- Doc. 5776, New Standard: Test Method for Detecting Surface Defects of GaN based LED Epitaxial Wafer Used for Manufacturing HB-LED

Motion: To approve the Doc 5776 for ballot in cycle 8-2016

By/2nd: Liangwen Wu (ETI)

Discussion:

Yang Han (HIT): To make adjustments on text, wording and punctuation.

Vote: 41-0. 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 HB-LED Standards committee will be on April 20th, 2017 Thursday in Wuhu, Anhui, China.

Respectfully submitted by:

Sophia Huang
SEMI China

Minutes approved by:

Yong Ji (GHTOT), Co-chair	
Weizhi Cai (SANAN), Co-chair	2016/10/28

Table 8 Index of Available Attachments #1

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3	NA HB-LED Liaison Report July2016.pdf	12	GaN based LED Epitaxial Wafer Task Force.pdf
4	KR_HB-LED_liaison_July.pdf	13	Sapphire Single Crystal Orientation TF Report-2016-10-14.pdf
5	5945 Procedural Review.pdf	14	SNARF-Classification for Surface Quality of Patterned Sapphire Substrate (PSS) for HB-LED.pdf
6	5723A Procedural Review.pdf	15	SNARF PPT-Classification for Surface Quality of Patterned Sapphire Substrate (PSS) for HB-LED.pdf
7	5723A with editorial changes.pdf	16	New TF_Patterned Sapphire Substrate Task Force.pdf
8	5775A Procedural Review.pdf	17	New TF_SEMI HB-LED Task Force Report TFOF 20161010.pdf
9	5775A with editorial changes.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.