



# Compound Semiconductor Materials Committee China TC Chapter

## HB-LED Committee China TC Chapter

### Joint Meeting Summary and Minutes

China Spring Standards Meeting 2021

March 16<sup>th</sup>, 2021, 13:30-17:00

ICC, 1388 Zhangdong Road, Pudong New Area, Shanghai, China

#### TC Chapter Announcements

*Next TC Chapter Meeting*

China Fall Standards Meeting 2021

TBD, China, 2021

#### Table 1 Meeting Attendees

*Italics indicate virtual participants*

**Co-Chairs:** Jiangbo Wang (HC SEMITEK)

**SEMI Staff:** Daniel Qi – SEMI China, Isadora Jin – SEMI China, Ein Wu (SEMI China)

<i>Company</i>	<i>Last</i>	<i>First</i>	<i>Company</i>	<i>Last</i>	<i>First</i>
HC SEMITEK	Wang	Jiangbo	GHTOT	Ji	Yong
SMTC	Wu	Liangwen	JINGAN	Zhang	Heng
Monocrystal	Niu	Chongshi	Dynax	Qian	Hongtu
AK OPTICS	Ma	Tiezhong	HIT	Gan	Yang
Epiworld	Feng	Gan	TDG	Wei	Mingde
Epiworld	Chen	Zhixia	CRRC Semiconductors	Li	Chengzhan
Xinguan Technology	Wang	Ronghua	NATA	Chen	Huabing
NAURA	Wang	Xiangang	CETC13	Sun	Niefeng
AMEC	Cao	Han	NAURA	Cui	Lin
AMEC	Zhu	Qiulong	Cimetrix	Liu	Bo
AMEC	Liu	Yingbin	GTAT	Zhou	Zhenxing
AMEC	Tian	Ye	3M	Jiang	Dinglili
Harbin KY	Zhao	Lili	SGS	Liu	Pingnian
Top Electronics	Ni	Weijiang	Enkris	Chen	Yuchao
Kxware	Huang	Yufeng	Tankeblue	Peng	Tonghua
Sinopatt	Kang	Kai	DDXDF	Zhao	Songbin
CS Microelectronics	Su	Xiaoping	DDXDF	Zhang	Rui
MigeLab	Lu	Min	WinS	Sang	Yongchang
Glory Soft	Shi	Weitang	Huaqiao University	Chen	Yue
Simbba	Song	Weihong	Huaqiao University	Lai	Zhiyuan

**Table 2 Leadership Changes**

<i>WG/TF/SC/TC Name</i>	<i>Previous Leader</i>	<i>New Leader</i>
<i>Compound Semiconductor Materials</i>		
None		
<i>HB-LED</i>		
None		

**Table 3 Committee Structure Changes**

<i>Previous WG/TF/SC Name</i>	<i>New WG/TF/SC Name or Status Change</i>
<i>Compound Semiconductor Materials</i>	
None	
<i>HB-LED</i>	
None	

**Table 4 Ballot Results**

<i>Document #</i>	<i>Document Title</i>	<i>Committee Action</i>
<i>Compound Semiconductor Materials</i>		
None		
<i>HB-LED</i>		
6589	Major Revision to SEMI HB4-0913 (Reapproved 0419) Specification of Communication Interfaces for High Brightness Led Manufacturing Equipment (HB-LED ECI)	<b>Passed</b> with Technical Changes. Ratification ballot to be issued.

#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 between meetings of the TC Chapter**

<i>#</i>	<i>Type</i>	<i>SC/TF/WG</i>	<i>Details</i>
<i>Compound Semiconductor Materials</i>			
6768	SNARF	SiC Substrate TF	New Standard: Test Method for Micropipe Density of Silicon Carbide Wafer by Laser Reflection
6767	SNARF	SiC Substrate TF	New Standard: Test Method for Flatness of Silicon Carbide Wafers by Optical Interference
6769	SNARF	SiC Substrate TF	New Standard: Test Method for Residual Stress of Silicon Carbide Wafers by Photoelastic
<i>HB-LED</i>			
None			

**Table 6 Authorized Activities**

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

<i>#</i>	<i>Type</i>	<i>SC/TF/WG</i>	<i>Details</i>
<i>Compound Semiconductor Materials</i>			
6768	SNARF	SiC Substrate TF	New Standard: Test Method for Micropipe Density of Silicon Carbide Wafer by Laser Reflection

**Table 6 Authorized Activities**

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

#	Type	SC/TF/WG	Details
6767	SNARF	SiC Substrate TF	New Standard: Test Method for Flatness of Silicon Carbide Wafers by Optical Interference
6769	SNARF	SiC Substrate TF	New Standard: Test Method for Residual Stress of Silicon Carbide Wafers by Photoelastic
<b>HB-LED</b>			
None			

#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**

#	When	TF	Details
<b>Compound Semiconductor Materials</b>			
None			
<b>HB-LED</b>			
6371C	Cycle 4-21 or Cycle 5-21	Patterned Sapphire Substrate TF	New Standard: Test Method for Determining Geometrical Parameters of Patterns on Patterned Sapphire Substrate

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

#	TF	Title	Expiration Date
<b>Compound Semiconductor Materials</b>			
None			
<b>HB-LED</b>			
6371	Patterned Sapphire Substrate TF	New Standard: Test Method for Determining Geometrical Parameters of Patterns on Patterned Sapphire Substrate	2022/04/18

**Table 9 SNARF(s) Abolished**

#	TF	Title
<b>Compound Semiconductor Materials</b>		
None		
<b>HB-LED</b>		
None		

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

Standard Designation	Title
<b>Compound Semiconductor Materials</b>	
None	
<b>HB-LED</b>	
None	

**Table 11 New Action Items**

<i>Item #</i>	<i>Assigned to</i>	<i>Details</i>
<i>Compound Semiconductor Materials</i>		
None		
<i>HB-LED</i>		
None		

**Table 12 Previous Meeting Action Items**

<i>Item #</i>	<i>Assigned to</i>	<i>Details</i>
<i>Compound Semiconductor Materials</i>		
	SiC Substrate TF	Do more investigation on SiC Substrate
<i>HB-LED</i>		
None		

## 1 Welcome, Reminders, and Introductions

Committee co-chair Jiangbo Wang chaired the meeting and welcomed all attendees. All the attendees introduced themselves. SEMI Staff called the meeting to order at 13:30 p.m.. 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

## 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>:** Yong Ji (GHTOT) / Yang Gan (HIT)

**Discussion:** None

**Vote:** 32Y - 0 N, (Total 32 companies.) Motion Passed.

**Attachment:** 3 China CSM&HB-LED TC Joint Fall Meeting Minutes 20201013

## 3 Liaison Reports

### 3.1 Compound Semiconductor Materials North America TC Chapter

Isadora Jin (SEMI) reported for the Compound Semiconductor Materials North America TC Chapter. Of note:

**Action Item:** Next meeting –May 2021

- The Co-chair of North America Compound Semiconductor Materials TC is Russ Kremer (Consultant) and Jim Oliver (Northrop Grumman).
- Ballot Results
  - None
- Authorized Ballots
  - Cycle 3-2021



- Doc. 6735, Withdrawal of SEMI M42-0816 - Specification for Compound Semiconductor Epitaxial Wafers
- Doc. 6736, Reapproval of SEMI M86-0915 - Specification for Polished Monocrystalline c-Plane Gallium Nitride Wafers
- Task Force Updates
  - Silicon Carbide TF
    - liaison with Europe TC Chapter
- 5 year review
  - SEMI M9-0816 - Specification for Polished Monocrystalline Gallium Arsenide Wafers
    - Discussing on revision to reflect current industry practice. Proposal will be presented at the next meeting.

**Attachment:** 5 CSM NA Liaison Report March 2021

### *3.2 Compound Semiconductor Materials Europe TC Chapter*

Isadora Jin (SEMI) reported for the Compound Semiconductor Materials Europe TC Chapter. Of note:

**Action Item:** Next meeting –Online via Official Virtual TC Chapter Meeting

April 29, 2021(tentative), 4:30 – 6:30 PM CET

- The Co-chair of Europe Compound Semiconductor Materials TC is Arnd Weber (SiCrystal).
- Committee Structure Changes
  - Year Review Task Force (New TF)
  - Full-Wafer TSD Density Mapping of 4H-SiC Task Force (New TF)
  - M82 Revision Task Force (Disbanded)
  - M83 Revision Task Force (Disbanded)
- Authorized Activities
  - Doc. 6716, SNARF of New Standard: Test Method for quantifying TSDs in 4H-SiC Crystals
    - Full-Wafer TSD Density Mapping of 4H-SiC TF
- Authorized Ballot
  - Doc. 6615, Revision of SEMI M55-0817, Specification for Polished Monocrystalline Silicon Carbide Wafers
    - SiC Material and Wafer Specification TF
- Task Force Highlights
  - SiC TF
    - Leader
      - Arnd Weber (SiCrystal)
    - Drafting Doc. 6615, Revision of M55-0817 Specification for Polished Monocrystalline Silicon Carbide Wafers
    - To include 200 mm wafer for Silicon Carbide
    - Ballot issued in cycle 2-21, to be reviewed at the next meeting

- Full-Wafer TSD Density Mapping of 4H-SiC TF
  - Leader
    - Christian Kranert (Fraunhofer)
  - Drafting Doc. 6716, New Standard: Test Method for Quantifying Threading Screw Dislocations (TSDs) in 4H-SiC Crystals
- 5 Year Review TF
  - Leaders
    - Hans Christian – Munich University of Applied Sciences
    - Arnd Weber (SiCrystal)
  - Reviewing Standards due for 5 year review
    - SEMI M46 - Test Method for Measuring Carrier Concentrations in Epitaxial Layer Structures by ECV Profiling
    - SEMI M63 - Test Method for Measuring the Al Fraction in AlGaAs on GaAs Substrates by High Resolution X-Ray Diffraction
    - SEMI M64 - Test Method for the EL2 Deep Donor Concentration in Semi-Insulating (SI) Gallium Arsenide Single Crystals by Infrared Absorption Spectroscopy
    - SEMI M75 - Specification for Polished Monocrystalline Gallium Antimonide Wafers
    - SEMI M87 - Test Method for Contactless Resistivity Measurement of Semi-Insulating Semiconductors

**Attachment:** 6 Eu CSM Liaison Report Feb2021 v1

### 3.3 Compound Semiconductor Materials Japan TC Chapter

Isadora Jin (SEMI) reported for the Compound Semiconductor Materials Japan TC Chapter. Of note:

**Action Item:** Next meeting –SEMI Japan office, Tokyo, April 2021(tentative)

- The Co-chair of Japan Compound Semiconductor Materials TC is Masayoshi Obara (Shin-Etsu Handotai Co., Ltd.).
- Ballot Review
  - None
- Authorized Activities
  - None
- Task Force Highlights
  - The Japan TC Chapter discussed approval to disband the current Inactive TFs in the next Japan TC Chapter Meetings.
  - The Japan TC Chapter discussed about a New TF instead of the current Inactive TFs to host discussion in Japan to support and complement revision and new standard development activities undertaken by the current TFs under other regions.
- 5-Year Review
  - None

**Attachment:** 7 Japan CSM Liaison Report Jan2021 v1



### 3.4 Compound Semiconductor Materials Taiwan TC Chapter

➤ None

### 3.5 SEMI Staff Report

Isadora Jin (SEMI) gave the SEMI Staff Report. Of note:

#### Action Item:

- SEMI International Standards Overview
- 2020 Critical Dates for SEMI Standards Ballots
- A&R SC Membership Update
- NARSC Members
- Organization chart for China PV&PV Materials Committee
- SNARF Abolished
- Inactive Task Force
- EHS Information

**Attachment:** 4 SEMI Staff Report 20210316 - 43

## 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.

4.1 Document 6589, Revision of SEMI HB4-0913 (Reapproved 0419), Specification of Communication Interfaces for High Brightness LED Manufacturing Equipment (HB-LED ECI)

**Motion:** Han Cao (AMEC) moved that this Document passed TC Chapter review with technical changes and with or without editorial changes and will be forwarded to the ISC A&R SC for procedural review.

**By / 2<sup>nd</sup>:** Han Cao (AMEC) / Min Lu (MigeLab)

**Discussion:** None

**Vote:** 31 in favor and 0 opposed. (Total 32 companies. 1 companies abstain.)

**Attachment:** 11 SEMI\_Doc 6589\_Ballot\_Report 2021Spring - 43

## 5 Subcommittee and Task Force Reports

### 5.1 HB-LED Equipment Communication Interface Task Force

Ye Tian (AMEC) reported for the HB-LED Equipment Communication Interface Task Force. This report contained information on:

#### Action Item:

- Introduced the task force's leaders and members.
- Documents in work:
  - Doc. 6589, Revision to SEMI HB4-0913 (Reapproved 0419) Specification of Communication Interfaces for High Brightness Led Manufacturing Equipment (HB-LED ECI)

**Attachment:** 8 SEMI HB-LED CommunicationTF\_Report Spring2021

### 5.2 SiC Epitaxial Wafer Task Force

Gan Feng (Epiworld) reported for the SiC Epitaxial Wafer Task Force. This report contained information on:

**Action Item:**

- Introduced the task force's leaders and members.
- Documents in work:
  - SEMI Draft Document: 4H-SiC homo-epitaxial wafer Specification 4H-SiC 同质外延片标准

**Attachment:** 9 report of 4h-sic homo-epitaxial wafer specification task force\_20210315

### 5.3 Silicon Carbide Substrate Task Force

Min Lu (MigeLab) reported for the Silicon Carbide Substrate Task Force. This report contained information on:

**Action Item:**

- Introduced the task force's leaders and members.
- New standard application:
  - SNARF for: Laser reflection test method for micropipe density of silicon carbide wafer
  - SNARF for: Photoelastic test method for residual stress of silicon carbide wafers
  - SNARF for: Optical interference test method for flatness of Silicon carbide wafers

**Attachment:** 10 SEMI 碳化硅衬底工作组工作介绍 20210316

## 6 Old Business

### 6.1 Refer to Table 12 Previous Meeting Action Items

## 7 New Business

### 7.1 Requests for ballots in Cycle 4-21 or Cycle 5-21

7.1.1 Document 6371C, Test Method for Determining Geometrical Parameters of Patterns on Patterned Sapphire Substrate

**Motion:** Jianzhe Liu (BST) moved that the committee approve Document 6371C for Letter Ballot in Cycle 4-21 or Cycle 5-21.

**By / 2<sup>nd</sup>:** Jianzhe Liu (BST) / Yang Gan (HIT)

**Discussion:** None

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

**Attachment:** 12 6371C - 202012 初稿-210125 修改

### 7.2 New SNARFs

7.2.1 SNARF, New Activity: Test Method for Micropipe Density of Silicon Carbide Wafer by Laser Reflection

**Motion:** Min Lu (MigeLab) moved that the committee approve the the new activity: Test Method for Micropipe Density of Silicon Carbide Wafer by Laser Reflection

**By / 2<sup>nd</sup>:** Min Lu (MigeLab) / Gan Feng (Epiworld)



**Discussion:** Weitang Shi (GlorySoft): Is surface defect took into account? Is there any data to support?  
Min Lu (MigeLab): Microscope is used to collect data.  
Yang Gan (HIT): The mature result for experiment is appropriate in developing standards.  
Min Lu (MigeLab): This test method is widely accepted.

**Vote:** 22 in favor and 0 opposed. (Total 32 companies.) Motion passed.

**Attachment:** 13 SNARF\_Laser Reflection Test Method for Micropipe Density of Silicon Carbide Wafer-rev1

#### 7.2.2 SNARF, New Activity: Test Method for Flatness of Silicon Carbide Wafers by Optical Interference

**Motion:** Min Lu (MigeLab) moved that the committee approve the the new activity: Test Method for Flatness of Silicon Carbide Wafers by Optical Interference

**By / 2<sup>nd</sup>:** Min Lu (MigeLab) / Niefeng Sun (CETC13)

**Discussion:** Yang Gan (HIT): Is there any similar test method for monocrystalline silicon?  
Yong Ji (GHTOT): It is not easy to test flatness.  
Niefeng Sun (CETC 13): This test method has been successfully used.

**Vote:** 22 in favor and 0 opposed. (Total 32 companies.) Motion passed.

**Attachment:** 13 SNARF\_Optical Interference Test Method for Flatness of Silicon Carbide Wafer -rev1

#### 7.2.3 SNARF, New Activity: Test Method for Residual Stress of Silicon Carbide Wafers by Photoelastic

**Motion:** Min Lu (MigeLab) moved that the committee approve the the new activity: Test Method for Residual Stress of Silicon Carbide Wafers by Photoelastic

**By / 2<sup>nd</sup>:** Min Lu (MigeLab) / Gan Feng (Epiworld)

**Discussion:** Gan Feng (Epiworld): I suggest to develop a general test method for residual stress of SiC wafers. Then particular for Photoelastic.  
Jiangbo Wang (HC-SEMITEK): The general test method is not detailed.  
Gan Feng (Epiworld): Is it suitable to develop standards for each test method?  
Min Lu (MigeLab): This title refers to one test method. More standards about residual stress of SiC wafers can be developed in the future.

**Vote:** 24 in favor and 0 opposed. (Total 32 companies.) Motion passed.

**Attachment:** 13 SNARF\_Photoelastic Test Method for Residual Stress of Silicon Carbide Wafer-rev1

#### 7.3 Five-Year-Review

➤ None

### 8 Next Meeting and Adjournment

The next meeting of the Compound Semiconductor Materials & HB-LED China TC Chapter is scheduled for TBD, 2021 in China.

For more information, please visit Standards Calendar at <http://www.semi.org/en/standards>

Adjournment: 17:30.

Respectfully submitted by:

Isadora Jin



Standards, Senior Specialist

SEMI China

Phone: 86-21-60278578

Email: [jjin@semi.org](mailto:jjin@semi.org)

Minutes tentatively approved by:

Jiangbo Wang (HC SEMITEK), Compound Semiconductor Materials Committee and HB-LED Committee China TC Chapter Co-chair	<2021/4/10>
Guoyou Liu (CRRC TIMES), Compound Semiconductor Materials Committee and HB-LED Committee China TC Chapter Co-chair	<2021/4/10>

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

<i>Title</i>	<i>Title</i>
1 Chinese SEMI Standard Meeting Reminders	2 Compound&HB-LED TC Spring Meeting 2021 Agenda - 观众用 70 份 (黑白)
3 China CSM&HB-LED TC Joint Fall Meeting Minutes 20201013	4 SEMI Staff Report 20210316 - 43
5 CSM NA Liaison Report March 2021	6 Eu CSM Liaison Report Feb2021 v1
7 Japan CSM Liaison Report Jan2021 v1	8 SEMI HB-LED CommunicationTF_Report Spring2021
9 report of 4h-sic homo-epitaxial wafer specification task force_20210315	10 SEMI 碳化硅衬底工作组工作介绍 20210316
11 Ballot Report _ 6589	11 SEMI_Doc 6589_Ballot_Report 2021Spring - 43
12 6371C - 202012 初稿-210125 修改	13 SNARF_2021-SiC (4 比 3)
13 SNARF_Photoelastic Test Method for Residual Stress of Silicon Carbide Wafer-rev1	13 SNARF_Laser Reflection Test Method for Micropipe Density of Silicon Carbide Wafer-rev1
13 SNARF_Optical Interference Test Method for Flatness of Silicon Carbide Wafer -rev1	

<sup>#1</sup> 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.