Compound Semiconductor Materials Europe TC Chapter
Meeting Summary and Minutes

SEMICON Europa
November 16, 2023
11:30 AM – 1:00 PM CEST

Internationales Congress Center München, Germany

TC Chapter Announcements

Next TC Chapter Meeting
April 9, 2024. Check www.semi.org/en/standards for the latest update.

Table 1 Meeting Attendees

Co-Chair: Arnd Weber (SiCrystal)
SEMI Staff: Kevin Nguyen (SEMI)

Company	*Last*	*First*
Munich University of Applied Sciences	**Alt**	**Hans-Christian**
SOITEC	*Cela*	*Enrica*
Scientic Visual	**Cheze**	**Caroline**
ASML	**Daware**	**Ajinkya**
Fraunhofer IISB	*Kranert*	*Christian*
Freiberger Compound Materials GmbH	**Kretzer**	**Ulrich**
ST Microelectronics	*Magnusson*	*Björn*
ASML	**Planting**	**Bert**
Wolfspeed	**Rao**	**Shailaja**
GlobalWafers	**Sanna**	**Cristina**
SiCrystal	**Weber**	**Arnd**

Italic indicates online participant. Bold indicates in-person attendance.

Table 2 Leadership Changes

WG/TF/SC/TC Name	*Previous Leader*	*New Leader*
None		

Table 3 Committee Structure Changes

Previous WG/TF/SC Name	*New WG/TF/SC Name or Status Change*
None	SiC Epi Defects Task Force (New TF) • Leader - Christian Kranert (Fraunhoffer)
	Silicon Carbide Engineered Substrate Task Force (New TF) • Leader - Enrica Cela (SOITEC)

Table 4 Ballot Results

Document #	*Document Title*	*Committee Action*
None		

Table 5 Ratification Ballot Results

Document #	*Document Title*	*ISC A&R Action*	*A&R Forms*
None			

Note 1: **Passed** Ratification ballots will be submitted to SEMI publication for final processing.

Note 2: **Failed** Ratification ballots were returned to the originating task forces for re-work and re-balloting or abandoning.

Table 6 Authorized Activity

#	*Type*	*SC/TF/WG*	*Details*
7160	SNARF	SiC Epi Defects TF	New Standard: Guide for Defects found in Homoepitaxial Layers of Silicon Carbide
7161	SNARF	Test Methods TF	Line Item Revision of SEMI M93, Test Method for Quantifying Basal Plane Dislocation Density in 4H-SiC by X-Ray Diffraction Topography/Imaging

#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*
7161	Cycle 9, 1 or 2-2024	Test Methods TF	Line Item Revision of SEMI M93, Test Method for Quantifying Basal Plane Dislocation Density in 4H-SiC by X-Ray Diffraction Topography/Imaging

Table 8 New Action Items

Item #	*Assigned to*	*Details*
Nov16-2023-1	Kevin Nguyen (SEMI staff)	To distribute the SNARF for New Standard: Specification for Silicon Carbide Engineered Substrate, to all Compound Semiconductor Materials members for two weeks review.

Table 9 Previous Meeting Action Items

Item #	*Assigned to*	*Details*	*Status*
May01-2023-1	Tom Barbieri (Wolfspeed)	To conduct a feasibility study on Epi Defects and perhaps form a Task Force to create a SEMI Document.	Closed as it was taken care by Christian Kranert.

1 Welcome, Reminders, and Introductions

1.1 Arnd Weber called the meeting to order at 11:30 AM. Attendees introduced themselves. Kevin Nguyen presented meeting reminders on antitrust, intellectual property issues and effective meeting guidelines.

2 Review of Previous Meeting Minutes

2.1 The TC Chapter reviewed the minutes of the previous meeting.

Motion: To approve the meeting minutes
By / 2nd: By: Shailaja Rao / Wolfspeed
Second: Maria Cristina Sanna / GlobalWafers
Discussion: None
Vote: 7-0. Motion passed.

3 Task Force Report

3.1 *SiC-Task Force*

3.1.1 Arnd Weber reported the TF has been reviewing SEMI M81, Guide to Defects Found in Monocrystalline Silicon Carbide Substrates, is due for 5 year review. The TF will have more teleconferences to review changes to M81.

3.2 *Test Methods Task Force*

3.2.1 Christian Kranert reported minor editorial changes are needed for SEMI M93 - Test Method for Quantifying Basal Plane Dislocation Density in 4H-SiC by X-Ray Diffraction Topography/Imaging. The errors were footnotes of the tables in the appendix of the Standard are not referenced, the text under Table A1-1 is incomplete. The purpose of this activity is to fix these issues for a better readability of the Standard. The SNARF was presented.

Motion: Approve the SNARF for line item revision of M93
By: Christian Kranert / Fraunhofer IISB
Second: Shailaja Rao / Wolfspeed
Discussion:
Result: 10-Y 0-N Voting Result: Pass - 100.00%.

Motion: Authorize the Document for Letter Ballot for Line Item Revision of M93
By: Christian Kranert / Fraunhofer IISB
Second: Shailaja Rao / Wolfspeed
Discussion:
Result: 10-Y 0-N Voting Result: Pass - 100.00%.

Attachment: SNARF_SEMI_M93_Line_Item_Revision (1)

3.3 *5-year Review Task Force*

3.3.1 Hans Christian Alt reported doc. 7053, Line Item Revisions of SEMI M63, Test Method for Measuring the Al Fraction in AlGaAs on GaAs Substrates by High Resolution X-Ray Diffraction, was approved and published by SEMI.

3.3.2 SEMI M54-0319 - Guide for Semi-Insulating (SI) GaAs Material Parameters, is due for 5 year review. Ulrich Kretzer will join the task force and contribute. Hans-Christian will review the document in more details and determine the next step.

3.4 Proposed New Activity (new SNARF): SIC Epi-Defect Standard

3.4.1 Christian Kranert presented a new activity on SiC Epi Defects Task Force. The objective of the TF is to unify the nomenclature of defects found in homoepitaxial layers of SiC and reported by the relevant non-destructive metrology techniques. Arnd is fully supported of this effort. The nomenclatures for epi defect need to be defined as every companies have their own ways of defining.

Motion: Approve the SiC Epi Defects Task Force
By: Shailaja Rao / Wolfspeed
Second: Christian Kranert / Fraunhofer IISB
Discussion:
Result: 9-Y 0-N Voting Result: Pass - 100.00%.

3.4.2 Christian Kranert also presented the SNARF for a **New Standard: Guide for Defects found in Homoepitaxial Layers of Silicon Carbide.**

Motion: Approve the SNARF for New Standard: Guide for Defects found in Homoepitaxial Layers of Silicon Carbide
By: Christian Kranert / Fraunhofer IISB
Second: Shailaja Rao / Wolfspeed
Discussion:
Result: 9-Y 0-N Voting Result: Pass - 100.00%.

Attachment: TFOF_epi_defects

Attachment: SNARF_epi defects rev1

3.5 Proposed New Activity for Silicon Carbide Engineered Substrate Task Force

3.5.1 Björn Magnusson presented a new task force on Silicon Carbide Engineered Substrate. The TF will be led by Enrica Cela (SOITEC). The goal is to establish a new standard for SiC engineered substrates. The complementary SNARF for New standard: Specification for Silicon Carbide Engineered Substrate was also presented. However, it was not submitted to TC Members for 2 weeks review. Kevin Nguyen will take an action item to distribute the SNARF after the meeting.

Motion: Approve the Silicon Carbide for Engineered Substrate TFOF
By: Björn Magnusson / STMicroelectronics Silicon Carbide AB
Second: Bert Planting / ASML Netherlands BV
Discussion:
Result: 10-Y 0-N Voting Result: Pass - 100.00%.

Attachment: TFOF_SiC engineered substrate specification v2

4 Ballot Review

4.1 None

5 Liaison Reports

5.1 *China CSM TC Chapter*

5.1.1 Kevin Nguyen reported. Of note:

- Last meeting
    - April 26, 2023
    - Dongguan, Guangdong
- Next meeting
    - Fall meeting, 2023
    - Exact date and time will be determined.
- Ballot Review

- Doc. 6768, New Standard: Test Method for Micropipe Density of Silicon Carbide Wafer by Laser Reflection
    - Failed
- Doc. 6769, New Standard: Test Method Qualitative for Residual Stress of Silicon Carbide Wafers by Photoelastic
    - Failed

Attachment: CSM China TC Chapter Apr 2023

5.2 *Japan CSM TC Chapter*

5.2.1 Kevin Nguyen reported. Of note:

- Last meeting
    - Jan. 19, 2022 at Japan Winter 2022 Meetings
    - Web Conference
- Next meeting
    - TBD
- New TFOF
    - Silicon Carbide Substrate liaison TF

Attachment: Japan CSM Liaison Report Feb2022 v1

5.3 *North America CSM TC Chapter*

5.3.1 Kevin Nguyen reported. Of note:

- Last Meeting: November 22, 2022 via online
- Next Meeting: TBD
- Ballot Review
    - Doc. 6952, Reapproval of SEMI M10-0218 *Terminology for Identification of Structures and Features Seen on Gallium Arsenide Wafers* – Passed as balloted
    - Doc. 6953, Line Item Revision of SEMI M79-0218 *Specification for Round 100 mm Polished Monocrystalline Germanium Wafers for Solar Cell Applications* – Passed as balloted
    - Doc. 6954, Line Item Revision of SEMI M23-0811 (Reapproved 0218) *Specification for Polished Monocrystalline Indium Phosphide Wafers* – Passed as balloted
- M86 (GaN) Revision TF
    - Doc. 6806, Revision of M86, *Specification for Polished Monocrystalline c-Plane Gallium Nitride Wafers* (Subject: To revise 1-4 inches diameter) – Passed in June 2022 and published as M86-0922

Attachment: NA CSM TC Chapter Liaison report Nov 2022 v1

6 New Business

6.1 None

7 Next Meeting and Adjournment

7.1 The next virtual meeting is scheduled for April 9, 2024 at 4:30 PM - 6:30 PM CEST. Kevin will work with Arnd for the schedule. Refer to http://www.semi.org/standards for the list of meeting schedules.

Having no further business, adjournment was at 1:00 PM CEST.

Respectfully submitted by:

Kevin Nguyen,
SEMI Standards Operations Manager
Phone: 408-943-7997
Email: knguyen@semi.org

Minutes tentatively approved by:

Arnd Weber (SiCrystal)	

Table 10 Index of Available Attachments#1

Title
SNARF_SEMI_M93_Line_Item_Revision (1)
TFOF_epi_defects
SNARF_epi defects rev1
TFOF_SiC engineered substrate specification v2
CSM China TC Chapter Apr 2023
Japan CSM Liaison Report Feb2022 v1
NA CSM TC Chapter Liaison report Nov 2022 v1

#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.