

# **SEMI China Compound Semiconductor Materials Std.**

## **Technical Committee**

### **GaN Task Force**

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**CONNECT - COLLABORATE - INNOVATE - GROW - PROSPER**

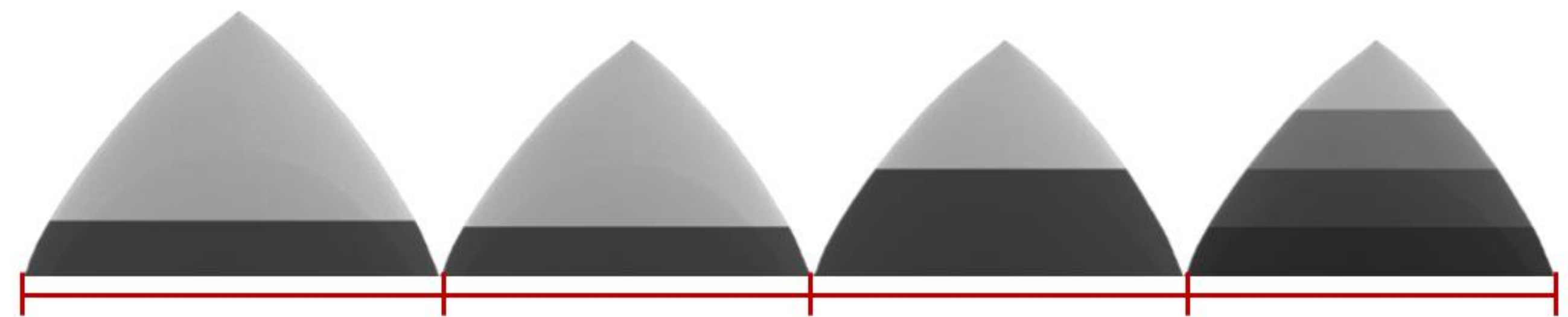
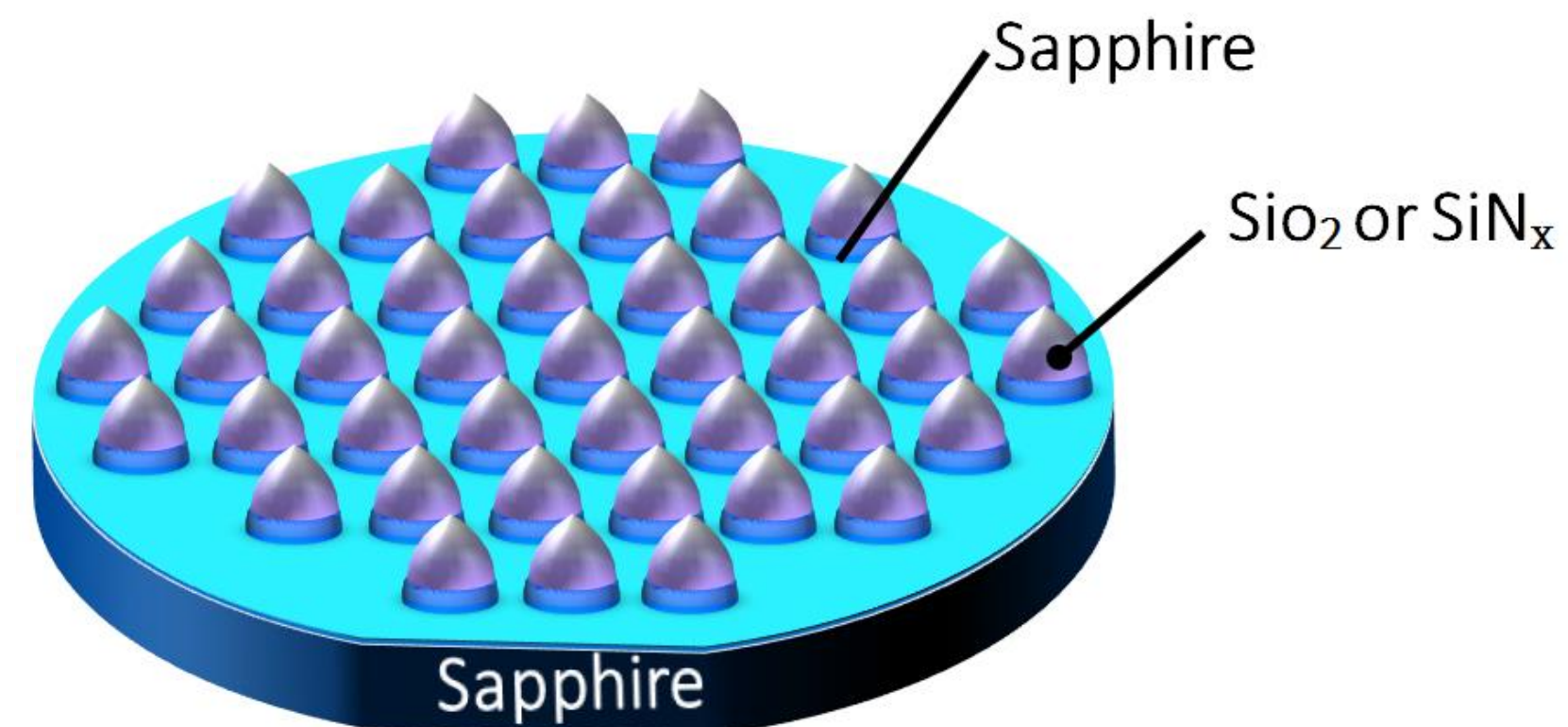
## 一、新提案名称

### 1. Name of New Activity

#### Name of New Activity:

Specification of Multiple Materials Substrate for GaN Epitaxial Growth aiming at HB-LED

用于高亮度LED的GaN基外延生长的复合材料衬底规范



## 二、目的和意义

### 2. Purpose and significance

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1、 GaN作为一种优良的半导体材料，基于带隙、电子迁移率和饱和电子速度等材料参数，广泛应用于LED/大功率/高频晶体管等。

By benefitting from advantages of large bandgap, high electron mobility and saturated electron velocity, gallium nitride (GaN) is identified as an excellent semiconductor for LED/high power/high frequency transistors devices.

2、 由于缺少大尺寸的氮化镓单晶原材料，因此需要在诸如硅、碳化硅和蓝宝石等与氮化镓晶格与热不匹配的衬底上进行生长，但衬底材料的发展控制着氮化镓技术在电子和光电子应用中的成熟速度。

Due to the challenge of wafer-sized gallium nitride bulk substrate, the epitaxial growth on hetero-substrates, e.g. silicon, silicon carbide, as well as sapphire, is necessarily demanded, despite the nonnegligible mismatch exhibits . Therefore, the specific substrates for GaN epitaxy directly determines the promotion of GaN material in electronic and optoelectronic applications.

## 二、目的和意义

### **2. Purpose and significance**

3、异质衬底作为制作GaN光电子或者电力电子器件的基础材料，是整个产业链中的关键一环。发光二极管基于蓝宝石，功率器件基于硅，射频器件基于碳化硅发挥了至关重要的作用。

As the foundational material for manufacturing GaN optoelectronic or power electronic devices, heterogeneous substrates are crucial in the entire industry chain, e. g. sapphire serves as the substrate for light-emitting diodes, silicon is used for power devices, and silicon carbide plays a crucial role in radio frequency devices.

4、近年来，复合材料衬底正逐渐成为一种新的趋势。在高指向性LED发光应用领域快速发展，并在电力电子器件上有潜在的作用。

In recent years, composite material substrates have gradually been a trend. They are rapidly developing in the field of high-directionality LED applications, and exhibit plenty of potentials in power electronic devices.

## 二、目的和意义

### **2. Purpose and significance**

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5、目前国际上现在没有统一的复合材料衬底片标准，现申请制定此标准，为产业链内上下游企业的产品生产和原料采购提供依据，促进该产业链的健康有序发展。

However, there is currently no unified standard for composite material substrates internationally. Therefore, we aim to establish a standard, in order to provide a basis for product manufacturing and raw material procurement for upstream and downstream companies in the industry chain, finally promoting the healthy and orderly development of the industry.



### 三、标准适用范围及主要框架

### 3. Application scope and main framework of the standard

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本标准适用于GaN生长用的多材料衬底，主要规定了以下七部分内容：

This standard is applicable to of Multiple Materials Substrate for GaN Epitaxial Growth . It mainly consists of following seven parts:

- 1、范围 Scope
- 2、规范性引用文件 Normative references
- 3、术语和定义 Terms and definitions
- 4、技术要求（复合材料衬底各项技术参数及指标） Technical requirements (technical parameters and indexes of Multiple Materials Substrate )
- 5、检验方法（复合材料衬底技术参数的测量方法） Inspection methods (measurement methods for each technical parameters of Multiple Materials Substrate )
- 6、检验规则 Inspection regulations
- 7、标志、包装、运输、贮存 Marking, packaging, transportation and storage

## 四、与其他半导体衬底标准的区别

### 4. Differences with other semiconductor epitaxial substrate standards

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鉴于复合材料的独特性，一方面有利于提高GaN外延生长的质量，另一方面，增强了发光器件远场光强分布的指向性；这是通过复合材料性质与图形化技术结合实现，导致其与其他半导体材料衬底标准存在了较大的差异，主要体现在：

By benefitting from the specific advantages of multiple materials substrate, on the one hand, it is beneficial to improve the crystalline quality of epitaxial GaN. On the other hand, it enhances the directivity of far-field light intensity distribution of LED. The above-mentioned improvements from both aspects result from the combination of multiple material properties and graphics, finally leading to the large difference from other semiconductor substrate, which is mainly reflected in:

- 材料组成类别（如材料的层数，材料的物理性质等）； The category of epitaxial layer parameters (such as the layer-number, physical properties, etc.);
- 材料结构参数测量方法（如图形尺寸，角度等）。 The measurement methods of Structural parameters. (such as pattern size, angle, etc.).

# 五、标准参编单位

## 5. Standard participating unit

本标准工作组成员包括了GaN外延、器件和衬底整个产业链上的代表企业。  
Members of this standard working group include representative enterprises in the whole industry chain of GaN substrate, epitaxy and device.

No.	Name	Company	Industry Chain
1	Neng Zhang 张能	Sinopatt Technology Co., Ltd. 广东中图半导体科技股份有限公司	Substrate 衬底制造企业
2	Zirong Wang 王子荣	Sinopatt Technology Co., Ltd. 广东中图半导体科技股份有限公司	Substrate 衬底制造企业
3	Kai Kang 康凯	Sinopatt Technology Co., Ltd. 广东中图半导体科技股份有限公司	Substrate 衬底制造企业
4	Jiangbo Wang 王江波	BOE HC Semitek Corporation 京东方华灿光电股份有限公司	Epitaxial、Device 外延、器件制造企业
5	Guangmin Zhu 朱广敏	BOE HC Semitek Corporation 京东方华灿光电股份有限公司	Epitaxial、Device 外延、器件制造企业
6	Ronghua Wang 王荣华	Runxin Microelectronics (Dalian) Ltd. 润新微电子（大连）有限公司	Epitaxial、Device 外延、器件制造企业
7	Wanxi Chen 程万希	Runxin Microelectronics (Dalian) Ltd. 润新微电子（大连）有限公司	Epitaxial、Device 外延、器件制造企业
8	Ye Yuan 袁冶	Songshan Lake Materials Laboratory 松山湖材料实验室	Substrate 衬底研发
9	Zhiwen Liang 梁智文	Dongguan Institute of Opto-Electronics Peking University 北京大学东莞光电研究院	Epitaxial 衬底研发



六、标准计划完成时间表

**6. Timetable for the standard Completion:**

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No.	Milestones	Completion date
1	Date Prepared	
2	Activity start	
3	1st Draft	
4	Letter Ballot	
5	TC Chapter Approval	

# Motion

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**I move that the Committee approve the new activity:**

Specification of Multiple Materials Substrate for GaN Epitaxial Growth  
aiming at HB-LED