

## Wide-Bandgap Semiconductor Single Crystal Market in Japan: Key Research Findings 2017

### ◆ Research Outline

Yano Research Institute has conducted a study on the domestic wide-bandgap semiconductor single crystal market with the following conditions:

1. Research period: April to September, 2017
2. Research target: Manufacturers of wide-bandgap semiconductor single crystals, research institutions, and etc.
3. Research methodologies: Face-to-face interviews by the expert researchers and literature research

#### <What are Wide-Bandgap Semiconductor Single Crystals?>

Wide-bandgap semiconductor single crystals in this research indicate SiC, GaN, Ga<sub>2</sub>O<sub>3</sub>, AlN, and diamond, which are single-crystal semiconductor materials with relatively wider bandgaps than conventional semiconductor materials, such as Silicon (Si), and are expected to be the next-generation materials for power semiconductors.

### ◆ Key Findings

#### ■ Wide-Bandgap Semiconductor Single Crystal Market in 2017 Projected to Attain 9,604 Million Yen

The domestic wide-bandgap semiconductor single crystal market is projected to attain 9,604 million yen in 2017, 108.8% of the size of the previous year, based on the shipment value at manufacturers. Currently, SiC has been proactively bordering on a full-grown stage, leading the entire market. A key for success is considered to be whether it succeeds in being introduced for in-vehicle applications in 2020 and beyond or not.

#### ■ Technologies for Creating and Utilizing Can Become Growth Engines to Affect Future Market Growth

In order for the market of wide-bandgap semiconductor single crystals to grow, the technologies to create high-quality single crystals, i.e., to create less defective crystals, and also the technologies to utilize single crystals as some kinds of devices and modules are required. In short, the technology to create single crystals can be developed in order to effectively utilize them as a device, which, in turn, can raise the rate of adoption for applications, and increase the volume of applications themselves.

#### ■ Wide-Bandgap Semiconductor Single Crystal Market to Expand to 15,300 Million Yen by 2023

The domestic wide-bandgap semiconductor single crystal market is projected to attain 15,295 million yen by 2023, based on the shipment value at manufacturers. The growth factors are: Rising demand in research and development applications, each of the materials being adopted for wider variety of applications, and expansion of such applications. Although the situation is different according to the material, the market as a whole is likely to continue growing for the future.

◆ **Report Format:**

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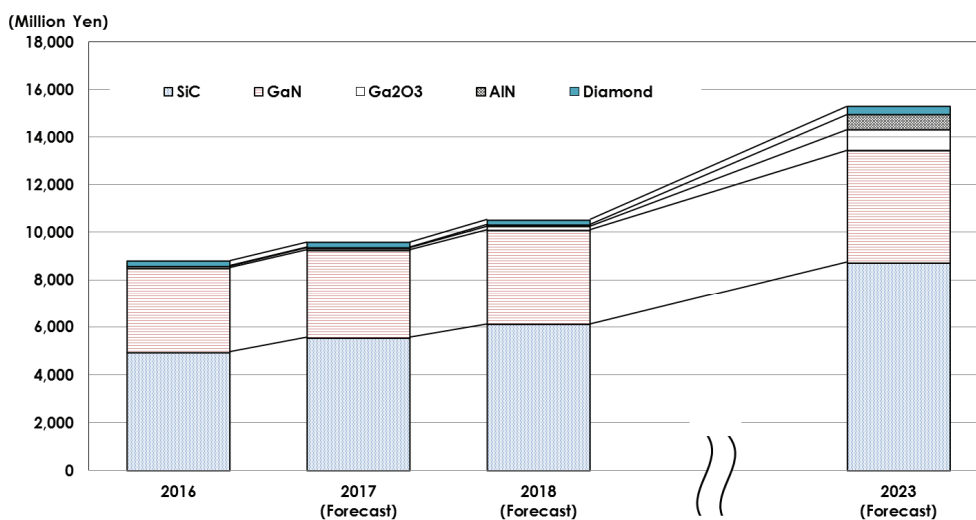
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■ **Figure & Table 1: Transition and Forecast of Wide-Bandgap Semiconductor Single Crystal Market Size by Material**



Estimated by Yano Research Institute

Material/Year	2,016		2017 (Forecast)		2018 (Forecast)		2023 (Forecast)	
	Value	Comp. ratio	Value	Comp. ratio	Value	Comp. ratio	Value	Comp. ratio
SiC	4,959	56	5,554	58	6,129	58	8,749	57
GaN	3,559	40	3,717	39	3,978	38	4,697	31
Ga <sub>2</sub> O <sub>3</sub>	70	1	84	1	171	2	872	6
AlN	20	0	32	0	45	0	645	4
Diamond	218	2	218	2	220	2	332	2
Total	8,826	100	9,604	100	10,543	100	15,295	100

Estimated by Yano Research Institute

Notes:

1. The market size is based on the shipment values at manufacturers.
2. The market size of SiC is calculated without any single crystals for high-frequency devices and those for LEDs included.
3. Since the numeric values are rounded, the total and ratio in the figure and table may not match.