



**China Silicon Carbide Industry Report,
2016-2020**

Feb.2017

STUDY GOAL AND OBJECTIVES

This report provides the industry executives with strategically significant competitor information, analysis, insight and projection on the competitive pattern and key companies in the industry, crucial to the development and implementation of effective business, marketing and R&D programs.

REPORT OBJECTIVES

- ◆ To establish a comprehensive, factual, annually updated and cost-effective information base on market size, competition patterns, market segments, goals and strategies of the leading players in the market, reviews and forecasts.
- ◆ To assist potential market entrants in evaluating prospective acquisition and joint venture candidates.
- ◆ To complement the organizations' internal competitor information gathering efforts with strategic analysis, data interpretation and insight.
- ◆ To suggest for concerned investors in line with the current development of this industry as well as the development tendency.
- ◆ To help company to succeed in a competitive market, and

METHODOLOGY

Both primary and secondary research methodologies were used in preparing this study. Initially, a comprehensive and exhaustive search of the literature on this industry was conducted. These sources included related books and journals, trade literature, marketing literature, other product/promotional literature, annual reports, security analyst reports, and other publications. Subsequently, telephone interviews or email correspondence was conducted with marketing executives etc. Other sources included related magazines, academics, and consulting companies.

INFORMATION SOURCES

The primary information sources include Company Reports, and National Bureau of Statistics of China etc.

Abstract

China is the largest producer and exporter of silicon carbide in the world, with the capacity reaching 2.2 million tons, sweeping more than 80% of the global total. However, excessive capacity expansion and oversupply lead to the capacity utilization less than 50%. In 2015, the silicon carbide output in China totaled 1.02 million tons, with the capacity utilization rate of only 46.4%; in 2016, the total output was estimated to be about 1.05 million tons, with the capacity utilization rate of 47.7%.

Since China's silicon carbide export quota was abolished, China's silicon carbide export volume grew rapidly during 2013-2014, and tended to stabilize during 2015-2016. In 2016, China's silicon carbide exports came to 321,500 tons, up 2.1% year on year; wherein, Ningxia's export volume amounted to 111,900 tons, accounting for 34.9% of the total exports and acting as a main silicon carbide exporter in China. As China's silicon carbide products are mainly low-end preliminarily processed products with moderate added value, the average price gap between export and import is enormous. In 2016, China's silicon carbide exports had the average price at USD0.9 / kg, less than 1/4 of the import average price (USD4.3 / kg).

Silicon carbide is widely used in iron & steel, refractories, ceramics, photovoltaic, electronics and so on. In recent years, silicon carbide has been included in the third generation of semiconductor materials as a hot spot of the global R & D and applications. In 2015, the global silicon carbide substrate market size reached about USD111 million, and the size of silicon carbide power devices reached about USD175 million; both of them will see the average annual growth rate of more than 20% in the next five years.

At present, China has succeeded in R & D of semiconductor silicon carbide, and realized the mass production of 2-inch, 3-inch, 4-inch and 6-inch silicon carbide monocrystalline substrates, silicon carbide epitaxial wafers, and silicon carbide components. Representative enterprises include TanKeBlue Semiconductor, SICC Materials, EpiWorld International, Dongguan Tianyu Semiconductor, Global Power Technology and Nanjing SilverMicro Electronics.

Today, the development of silicon carbide crystals and devices has been contained in Made in China 2025, New Material Industry Development Guide, National Medium and Long-term Science and Technology Development Plan (2006-2020) and many other industrial policies. Driven by multiple favorable policies and emerging markets such as new energy vehicles and smart grid, Chinese semiconductor silicon carbide market will witness quick development in future.

SiC Wafer and Device-related Enterprises in China

Type	Company	Year	Event
SiC Monocrystalline	TanKeBlue Semiconductor	2007	Six SiC crystal growth furnaces were put into operation in Xinjiang Production Base
		2009	Mass production of 2-inch and 3-inch SiC wafers was achieved
		2011	Mass production of 4-inch SiC crystals
		2014	6-inch SiC monocrystalline substrates were developed
	SICC Materials	-	The company mainly produces 2-inch, 3-inch and 4-inch SiC monocrystalline substrates, with the annual capacity of 20,000 pieces.
SiC Epitaxial Wafers	EpiWorld International	2012	3-inch and 4-inch SiC semiconductor epitaxial wafers were industrialized
		2014	Successful production of 6-inch SiC epitaxial wafers made the company be the first vendor that provided commercial 6-inch SiC epitaxial wafers in China
		2015	The company self-developed SiC epitaxial growth basal plane dislocation (BPD) suppression technology, and achieved zero-BPD in 4-inch SiC epitaxial wafers for the first time
	Tianyu Semiconductor Technology	-	Annual capacity: 20,000 to 30,000 3-inch and 4-inch SiC epitaxial wafers
SiC Devices	Global Power Technology	2014	The self-developed SiCSchottky diodes (600V-3300V) were successfully mass-produced. Among them, the yield rate of 600V / 10A, 1200V / 20A and other products complied with the international advanced level
		2015	The company developed 1200V/10A SiC BJT devices successfully and mass-produced 3300V / 50A high-power SiCSchottky diode products
	Yangjie Electronic Technology	2015	The company planned to raise RMB150 million for SiC chip and module R & D and industrial construction projects
	Nanjing SilverMicro Electronics	2014	The company released SiC MOSFET series products suitable for high-voltage industrial applications
	Wedge Industrial	2015	The company and Maple Semiconductor Inc. co-invested to set up Shenzhen Wedge Maple SiC Semiconductor Co., Ltd. whose products will be mainly used in electric vehicles and special motors
	CSIC	2016	The company planned to build a SiC power module R & D and industrialization project with a total investment of RMB2 billion in Xiamen. Covering a land area of about 40 mu, the project mainly works on design, R & D and manufacturing of third-generation semiconductor SiC power modules, with the high-power module capacity of 1.5 million sets/a and the annual output value of about RMB4 billion after the completion.

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The report mainly deals with the followings:

- ◆Development of global silicon carbide industry, including the status quo of SiC raw materials and SiC wafer, etc.
- ◆Development of China silicon carbide industry, including status quo, supply and demand, competitive landscape, import & export, price trend, and development trends, etc.;
- ◆Development of upstream and downstream sectors of silicon carbide industry;
- ◆Operation, silicon carbide business, etc. of 18 silicon carbide manufacturers.

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