

# SiC single-crystal technology trend and market forecast (2010~2020)

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## Abstracts

SiC wafers have been drawing attention for their applications to high efficiency LEDs and power semi-conductor substrates, but there have been obstacles to the market growth such as high prices and insufficient suppliers, which are attributed to technical difficulties. Since the U.S. company, Cree, is not only dominating the SiC wafer supply for high efficiency LED applications but also holding many related patents, it is hard for other companies to enter the SiC-based LED market. With the world emerging issues such as global environmental and energy problems, one of pressing issues the power semi-conductor industry is facing is to develop technologies for electric energy, which accounts for about 35% of the total energy consumption.

Since power semi-conductors, which are used in power supply units or power converters to save energy and reduce product sizes, play a great role in improving energy efficiency, system stability and reliability through unique functions, they are expected to contribute to solving the global issues ??environmental production and energy saving.

In particular, SiC power devices, which theoretically consume 1/100 of the energy conventional silicon power devices do, are expected to save energy drastically. In addition, since they can not only save system costs but also be used under extreme conditions, when applied as high temperature devices, a great ripple effect is expected. Due to the excellent properties, SiC semi-conductor technologies have reached a significant level, and single crystal substrates have already been deployed in a commercial level in technologically advanced countries such as the United States, Japan, and Europe SiC semi-conductor devices. These countries are spurring research through huge projects.

Accordingly, power semi-conductor companies are already accelerating commercialization of SiC power devices, strengthening cooperation with SiC wafer manufacturers. The Japanese company, Rohm, which announced its plan to use SiC for all power semi-conductor production, acquired a 74.5% stake in the German SiC substrate manufacture SiCrystal from Siemens in 2009. The specialized semi-conductor application company, Power Integration, has developing applications for and HEVs and EVs, and inverters for PV/wind power generation, since it strategic investment (\$30 million) into the U.S. SiC manufacturer, SemiSouth Laboratories, in 2010.

Thus, the global SiC Wafer market is expected to grow from a \$52.6M business in 2012 into a \$58.6M business in 2013. The market is expected to continue to grow rapidly with the annual growth rate of 2801%, hitting \$87.9M in 2015 and \$552.5M in 2020.

This report is dedicated to examining SiC technologies from SiC powder to pellets and single crystals, and analyzing the current SiC single crystal growth technologies and industry trends. In addition, it provides forecasts for the SiC market and each SiC wafer application market until 2020.

This report is expected to be a good help for SiC Wafer and power-semiconductor manufacturers, and companies considering market entry into related industries.

### **This report is mainly composed of**

Overview of SiC power, pellet, and single crystal technologies

SiC single crystal growth technologies and technology development trend

SiC single crystal industry and company trends

SiC single crystal market forecast (2010~2020)

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