Semiconductor Materials Market - Growth, Trends, Covid-19 Impact, and Forecasts (2023 - 2028)

Market Report | 2023-01-23 | 199 pages | Mordor Intelligence

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Report description:

The semiconductor materials market is expected to register a CAGR of 4.71% over the forecast period. Semiconductor materials represent one of the significant innovations in the electronics industry. By employing materials such as silicon (Si), germanium (Ge), and gallium arsenide (GaAs), electronics manufacturers have been able to replace traditional thermionic devices that made electronic items heavy and non-portable. Since the inception of semiconductor elements, there has been a high degree of miniaturization, making electronic equipment more compact and mobile.

Key Highlights
With the miniaturization trend gaining momentum in the semiconductor industry, the demand for semiconductor materials is also expected to grow as manufacturing advanced node ICs, heterogeneous integration, and 3D memory architectures require more processing steps; this drives higher wafer fabrication and packaging materials consumption.
Semiconductors are moving away from rigid substrates to more flexible plastic material and paper, all due to new material and fabrication discoveries. The trend toward more flexible substrates has led to numerous devices, from light-emitting diodes to solar cells and transistors.
The semiconductor industry has been growing with miniaturization, and advancements and innovations in this field have directly impacted all downstream technologies. ??With the surging demand for high-end packaging solutions and rising packaging costs, OSAT vendors witnessed a considerable surge in demand from all the end-user industries, especially consumer electronics and automotive applications.
The semiconductor industry is considered one of the most complex due to the more than 500 processing steps involved in manufacturing various products and the harsh environment the industry workers face (e.g., the volatile electronic market and the unpredictable demand). Depending on the complexity of the manufacturing process, there can be up to 1,400 process steps in the manufacturing of semiconductor wafers alone. Transistors are formed on the lowest layer, but the process is repeated as

numerous circuits are assembled to create the final product.
The COVID-19 pandemic halted the manufacturing of several items in the semiconductor production equipment industry owing to continued lockdowns in critical global regions. Lockdown measures also reduced the demand for semiconductor chips, especially across the industrial and automotive sectors, which had a global impact on the semiconductor sector. The continued decline in worldwide demand and automobile export shipments negatively impacted the semiconductor market, slowing the demand for semiconductor manufacturing equipment in the long run.

Semiconductor Materials Market Trends

Rising Demand for Consumer Electronics Goods to Drive the Market

Consumer electronics (CE) forms a multibillion-dollar industry, steadily progressing and developing technology and adding new product lines toward changing lifestyles. With the advent of IoT, various end-user industries are increasingly adopting advanced consumer electronic products to enhance their operations.
According to Cisco, the Internet of Things (IoT) has become a prevalent system by which people, processes, devices, and data connection to the Internet and each other. M2M connections are anticipated to grow from 6.1 billion in 2018 to 14.7 billion globally in 2023. Furthermore, Cisco predicts that, by 2023, there will be 1.8 M2M connections for each member of the global population. By 2023, the consumer share of the total devices, including fixed and mobile devices, will be 74%, with businesses claiming the remaining 26%. However, according to Cisco, consumer share will grow at a slightly slower rate, at a 9.1% CAGR relative to the business segment, which is expected to witness a 12.0% CAGR.
With the growing deployment of massive IoT technologies such as NB-IoT and Cat-M - primarily consisting of wide-area use cases involving large numbers of low-cost, low-complexity devices with long battery life and low throughput, the number of IoT devices connected by Cat-M and NB-IoT technologies is expected to overtake 2G/3G connected IoT devices in 2023, and broadband IoT in 2027, making up 51% of all cellular IoT connections at that time (Source: Ericsson). Such trends are expected to significantly transform the outlook of the consumer electronics industry, which in turn will drive the demand for semiconductor chips to support connectivity features.
The smartphone market is the major consumer of semiconductors in this segment. The smartphone market has been very competitive in recent years. The increasing usage of cell phones is anticipated to drive the global market. For instance, according to Ericsson, smartphone subscriptions are expected to reach 7.8 billion by 2027, from 6.3 billion in 2021.
Other significant drivers behind the demand growth are the 5G rollout and IoT. The growing interest of telecom operators to invest and launch in 5G technology is expected to fuel the demand for 5G capable devices, where consumers and industries are expected to opt for 5G devices. For instance, according to Ericsson, 5G mobile subscription, which grew from 273.96 million in 2020 to 664.18 million in 2021, is expected to reach 4,389.77 million globally by 2027, driving the demand for semiconductor chips and semiconductor materials in the process.
5G networks use massive MIMO in which many antennas are deployed at the base station, wherein semiconductor chips are widely used. Therefore, 5G will offer an enormous opportunity for the market studied during the forecast period.

China to Witness Significant Growth

The Chinese government's Made in China 2025 national strategic plan has been a significant factor in driving the semiconductor industry's growth in the country. The central aim of the plan is the growth of the semiconductor industry. Also, China's National Intellectual Property Administration (CNIP) 2021 budget anticipates 2 million filings per year till 2023, which is expected to drive the semiconductor materials market.

China's new five-year plan for 2021-25, announced in March 2021 by the government, establishes boosting basic research as a critical priority. Central government spending on basic research was expected to increase by 11% in 2021, well above the 7% planned for the overall R&D investment and the 6% target for GDP growth. Semiconductors have been designated as one of the seven areas that will be given priority in terms of funding and resources. Firms involved in design develop nanometer-scale integrated circuits that perform the critical tasks that make electronic devices work, such as computing, storage, network connectivity, and power management.
To address market needs, power semiconductor manufacturers are quickly adopting materials such as silicon carbide (SiC), which can operate at higher voltages, temperatures, and frequencies while delivering improved efficiency and reliability in the country. For instance, in June 2020, Zhengzhou Yutong Group Co. Ltd (Yutong Group), a large-scale industrial Chinese manufacturer of commercial vehicles that specializes in electric buses, announced that it is using Cree 1200V silicon carbide devices in a StarPowerpower module for its new industry-leading, high-efficiency powertrain system for electric buses. The parties are working together to accelerate the commercial adoption of silicon carbide-based inverters in electric bus applications. Upon rollout, Yutong Group will deliver their first electric bus in China to use silicon carbide in its powertrain, representing a significant advancement in providing an even more efficient e-bus to the market.
Furthermore, China's automotive industry has been increasing, and the country plays an increasingly important role in the global automotive market. The government of China views its automotive industry as one of its pillar industries, including the auto parts sector. The government had expected China's automobile output to reach 30 million units by 2020 and 35 million units by 2025. Although the pandemic has had a notable impact on the country's automobile industry, recent data suggests that the country's automotive industry is on track to its 2025 goals. For instance, according to China Association for Automobile Manufacturers (CAAM), in 2021, the total number of cars produced in China was about 26.1 million. Furthermore, in 2022 as well the automotive industry has reported steady growth. For instance, in September 2022, about 2.6 million vehicles were sold in the country. According to Semiconductor Equipment and Materials International, China's spending on semiconductor equipment reached USD 29.62 billion in 2021. The growing demand for semiconductor chips, along with increasing investment in manufacturing facilities and equipment, is expected to create a favorable market scenario for the studied market growth during the forecast period.

Semiconductor Materials Market Competitor Analysis

Brand identity plays a major role in the Semiconductor Materials market, considering the importance of quality that the end-users expect from a semiconductor manufacturing player. With the presence of large market incumbents, such as BASF, LG Chem Ltd., and KYOCERA Corporation, the market penetration is also high. Overall, the intensity of competitive rivalry is expected to grow moderately over the forecast period.

November 2022 - Indium Corporation, a worldwide materials provider to the electronics assembly and semiconductor packaging company in the United States, opened its newest 37,500-square-foot production plant in Penang, Malaysia. The new plant has begun manufacturing operations and will increase production capacity to better service the company's clients in Malaysia and the neighboring area, notably Thailand and Vietnam.
May 2022 - L.G. Chem began developing photoresist (P.R.) utilized in the semiconductor back-end processes with the intention of providing it to worldwide semiconductor businesses. After engraving ultra-fine circuit designs on the front-end procedure of semiconductors, the company is creating P.R. for the back-end technique to improve chip performance.

Additional Benefits:

The market estimate (ME) sheet in Excel format
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