

# **Japan Semiconductor Fabrication Materials Market Assessment, By Material Type [Silicon wafers, Wet Chemicals, CMP slurry and pads, Photomasks, Photoresist & Photoresist ancillaries, Industrial Gases (Argon, Helium, Rare Gases, Others), Sputter targets, Electrostatic chunks, IC lead frame, Others], By Semiconductor type [n-type, p-type], By End-user [Electrical & Electronics (Consumer Electronics, Appliances, Others), Energy & Power, Medical devices, Transportation (Automotive, Marine, Aerospace, Others), Telecommunication, Others], By Region, Opportunities and Forecast, FY2017-FY2031**

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## **Abstracts**

Japan semiconductor fabrication materials market size was valued at USD 6.8 billion in FY2023, which is expected to grow to USD 10.92 billion in FY2031, with a CAGR of 6.22% during the forecast period between, FY2024 and FY2031. Continuous technological advancements and innovation significantly drive the Japan semiconductor fabrication materials market. The persistent pursuit of smaller, faster, and more energy-efficient semiconductor devices underscores the ongoing requirement for creative fabrication materials and cutting-edge processes. The demand for fabrication materials is further amplified by Japan's thriving electronics sector, which plays a central role in generating demand for semiconductors, spanning diverse areas including consumer electronics, automotive applications, and industrial equipment.

Furthermore, Japan's integral position within the global semiconductor supply chain closely aligns with the fluctuations in worldwide semiconductor demand, thereby exerting a significant influence on the materials market and amplifying the demand for semiconductor fabrication materials. Additionally, the increasing prevalence of advanced packaging technologies, including System-in-Package (SiP) and fan-out wafer-level packaging (FOWLP) in Japan accentuates the necessity for innovative materials tailored to cater intricate interconnections and optimal thermal management within complex semiconductor devices. Semiconductor fabrication materials witness increasing demand from the rising adoption of these advanced packaging approaches in the semiconductor industry.

### Strong Demand from Electronics Sector

Japan's electronics industry stands as a robust and diverse sector encompassing the production of consumer electronics, automotive components, and industrial machinery. This expansive industry creates a substantial demand for semiconductor chips, which fuels the requirement for various fabrication materials. Notably, Japan's pivotal role in the global semiconductor supply chain further strengthens the demand for semiconductors in the country, increasing the demand for fabrication materials market.

For instance, the government of Japan has allocated a substantial investment of USD 474.58 Million to promote the growth of domestic semiconductor manufacturing. Additionally, a Japanese enterprise has collaborated with a Belgian research consortium named Imec to advance the development of next-generation semiconductor chips. This strategic partnership seeks to reinvigorate Japan's semiconductor industry and enhance its competitive standing in the global chip manufacturing landscape, directly raising the requirement for semiconductor fabrication materials in Japan.

### Huge Developments of AI to Create Significant Demand

The increasing investments in artificial intelligence (AI) across Japan significantly drive the demand for semiconductor fabrication materials. As AI technologies permeate diverse industries, there is a growing need for high-performance semiconductor chips tailored for AI applications, necessitating specialized materials for their production. To meet this demand, semiconductor manufacturers must advance their manufacturing processes, relying on cutting-edge fabrication materials that offer improved properties such as enhanced energy efficiency and processing capabilities.

For instance, in December 2022, Japan unveiled its commitment to expediting the

authorization procedures for AI diagnostic imaging devices and simplifying the regulations pertaining to medical AI software. This initiative coincides with the launch of the 'Society 5.0' program, designed to forge a technologically advanced society by integrating forefront innovations such as artificial intelligence (AI) and the Internet of Things (IoT) to enhance overall quality of life. Furthermore, the government has introduced a novel regulatory framework to evaluate and grant licenses to AI-driven medical apparatuses, encompassing parameters for clinical trials, and safety evaluations. The rising investments and initiatives of AI from the Japanese government will drive the demand for semiconductor fabrication materials in the country.

### Ramping Up Efforts to Strengthen Semiconductor Industry

Efforts to Strengthen Japan's semiconductor industry are poised to affect the semiconductor fabrication materials market significantly. Advancements in material technology will heighten the demand for fabrication materials, shifts in the global supply chain dynamics and increase competition in the market. As a result, fabrication materials will become crucial to Japan's semiconductor industry's growth. For instance, in May 2022, Micron Technology announced its intention to invest approximately USD 3.5 billion in extreme ultraviolet technology (EUV) over the coming years, with backing from the Japanese government. This initiative aims to establish Micron as the pioneer in introducing EUV technology for production in Japan. Foreign investments like this will improve semiconductor production and raise the demand for semiconductor fabrication materials in Japan.

### Global Supply Chain Collaboration

The country's semiconductor industry engages in strategic partnerships and collaborations with international manufacturers, contributing to the strength and resilience of its supply chain. The collaborative efforts facilitate knowledge exchange and technological advancements, allowing Japanese companies to stay at the forefront of innovation. By fostering a collaborative approach in the global supply chain, Japan's semiconductor fabrication material market ensures a stable flow of resources and positions itself as a key player in addressing the evolving needs of the semiconductor industry on a global scale. For instance, at the G7 Hiroshima Summit in May 2023, leaders announced a commitment to strengthen supply chains for critical goods, including semiconductors, through global partnerships. Japan's semiconductor strategy for 2023 includes strengthening domestic manufacturing capability and fostering R&D for next-generation semiconductor technology through international collaboration. The Japanese government aims to increase domestic semiconductor manufacturing

capacity and has allocated significant funds for this purpose. The strategy emphasizes the importance of global partnerships, as other technology-driven nations are focusing on building resilient supply chains for semiconductors. Japan's plan is part of its broader economic security policy, aiming to increase semiconductor sales and revitalize its semiconductor industry, which has faced challenges in the past.

### Impact of COVID-19

The Japan semiconductor fabrication materials market underwent a dual impact during the COVID-19 pandemic. It faced challenges due to supply shortages, fluctuating demand patterns, and logistical complexities during the pandemic. Sectors such as automotive were particularly affected due to market restrictions, leading to decreased demand for semiconductor fabrication materials in the country. Additionally, the constrained availability of raw materials further exacerbated the supply-side constraints in the market. Conversely, the Japanese semiconductor fabrication materials market witnessed positive outcomes due to heightened demand from sectors such as electronics. The surge in remote work, telemedicine and online services raised the need for data centers and related infrastructure, consequently influencing the demand for semiconductor fabrication materials.

### Impact of Russia-Ukraine War

The ongoing conflict between Russia and Ukraine is profoundly impacting the Japan semiconductor fabrication materials market, given that both nations have played crucial roles as significant producers of semiconductor raw materials and Japan's high reliance on imports for raw materials. Ukraine has historically exported semiconductor-grade neon, a fundamental component in semiconductor manufacturing processes. Similarly, Russia's significance for Japan lies in its role as a primary source of palladium, a critical material extensively used in memory and sensor chips. More than 30% of palladium consumed in Japan is sourced from Russia. Consequently, the conflict's repercussions are significantly disrupting Japan semiconductor fabrication materials market.

### Recent Developments

In September 2023, Shin-Etsu Chemical, and OKI, a company specializing in communication equipment jointly developed a new technology for cost-effective manufacturing of gallium nitride (GaN). This innovation can reduce the manufacturing cost of GaN materials by more than 90%, significantly decreasing the cost of fast charging chargers, electric vehicle motor electronic control, and other devices. The

technology enables the vertical conduction of GaN and is expected to promote the production of high-power, high-quality devices on 200-mm substrates, contributing to the growth of power devices and RF GaN devices in the rapidly expanding 5G and beyond 5G markets.

In April 2023, Fujifilm revealed its plans to invest a staggering USD 31.5 million at its electronic materials manufacturing location in Belgium to expand its semiconductor materials manufacturing capabilities. With this mammoth USD 31.5 million expansion initiative, the production capacity of Fujifilm Electronic Materials (Europe) N.V., which produces solvents, developers, cleansers, and polyimides among the chemicals needed for semiconductor manufacturing, will increase.

8 Aug 2023, Tokyo Ohka Kogyo Co., LTD. decided to construct a new manufacturing building in Koriyama Plant one of our main production bases. The construction is scheduled to begin in July 2024, with operations scheduled to commence in the second half of 2026. The Koriyama Plant manufactures various types of photoresists including EUV/ArF/ KrF photoresists for semiconductor manufacturing processes. As the semiconductor market is expected to grow over the medium- to long- term, we decided to construct a new manufacturing building in the Plant with the aim of further improving product quality and expanding supply capacity.

### Key Players Landscape and Outlook

Prominent Japanese manufacturers of semiconductor fabrication materials are strategically improving international market expansion by establishing operations in other countries.

In October 2023, Fujifilm Corporation has successfully completed the acquisition of the semiconductor process chemicals business of Entegris, a United States - based semiconductor materials manufacturer. The acquisition includes all outstanding shares of CMC Materials KMG Corporation, an Entegris group company involved in the global semiconductor process chemical business. The acquired business will now operate under the FUJIFILM Electronic Materials Process Chemicals brand. The capital invested in this acquisition amounts to approximately USD 700 million. Semiconductor process chemicals play a crucial role in the semiconductor manufacturing process, involving cleaning, drying, and etching. Fujifilm aims to strengthen its position in the semiconductor industry by expanding its product lineup, enhancing manufacturing bases globally, and leveraging advanced research and development capabilities.

In June 2023, the Japanese Investment Corp. (JIC), has proposed a USD 6.3 billion acquisition of semiconductor materials giant JSR, a key player in the semiconductor supply chain, specializing in photoresists. Photoresists are crucial for the chip manufacturing process, specifically for etching patterns into wafers. This move underscores global efforts by governments to secure their semiconductor supply chains and strengthen their domestic chip industries, particularly in areas where they have a historical advantage.

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\*Companies mentioned above DO NOT hold any order as per market share and can be changed as per information available during research work.

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