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Semiconductor Fabrication Materials Market Assessment, By Material Type [Silicon wafers, Wet Chemicals, CMP slurry and pads, Photomasks, Photoresist and Photoresist ancillaries, Industrial Gases (Argon, Helium, Rare Gases and Others), Sputter targets, Electrostatic chunks, IC lead frame and Others], By Semiconductor type [n-type and p-type], By End-user [Electrical and Electronics (Consumer Electronics, Appliances and Others), Energy and Power, Medical devices, Transportation (Automotive, Marine, Aerospace and Others), Telecommunication and Others], By Region, Opportunities, and Forecast, 2016-2030F

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Abstracts

Global semiconductor fabrication materials market size was valued at USD 58.7 billion in 2022, which is expected to grow to USD 101.6 billion in 2030, with a CAGR of 7.1% during the forecast period between, 2023 and 2030. The growth trajectory of the semiconductor fabrication materials market is influenced by drivers such as the rising demand for consumer electronics, which encompasses a wide spectrum of devices like smartphones, tablets, laptops, and wearable gadgets. As consumer preferences pivot towards devices imbued with heightened power and advanced functionalities, the semiconductor industry witnesses an increase in demand due to the incorporation of competitive materials.

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Concurrently, the surging expansion of data centers and the proliferation of cloud computing further raises the demand for semiconductor fabrication materials. Also, due to the surge in cloud-based services and the pervasive integration of the Internet of Things (IoT) mandated semiconductors that can adeptly manage larger data volumes while ensuring elevated operational efficiency.

Furthermore, the automotive sector is undergoing a rapid transformation characterized by the emergence of electric vehicles, autonomous driving technologies and interconnected features. This change in basic assumptions necessitates a new era of semiconductor solutions capable of accommodating the intricate demands of modern vehicles. Similarly, the increasing prominence of artificial intelligence (AI) and machine learning application spanning across various sectors, serves as another pivotal driver in the semiconductor fabrication materials market.

Strong Demand for Consumer Electronics to Drive the Market

The growing consumer appetite for electronic devices spanning various categories including smartphones, tablets, laptops, and wearable technologies serves as a pivotal driver behind the escalating demand for intricately engineered semiconductor fabrication materials. As consumers continue to exhibit an ever-heightened inclination towards devices with better power, enriched features, and flawless interconnectivity, the semiconductor industry is paramount in orchestrating a responsive course of action.

For instance, according to the Appliances and Consumer Electronics (ACE) industry body CEAMA, in 2022, the industry observed a notable surge of 35%, attributed to enhanced sales within the cooling product sector. An upswing in the sales of mid-range and premium electronic devices in India notably fortified this growth. This heightened sales trajectory is anticipated to sustain its momentum over the forecast period, consequently leading to a robust and sustained demand for materials used in the fabrication of semiconductors.

Application of Semiconductors in Artificial Intelligence and Machine Learning

The expanding prevalence of AI and machine learning applications accentuates the growing reliance on advanced semiconductor fabrication materials. These materials are pivotal in supporting the intricate processors and memory technologies that are the backbone of AI and machine learning functionalities. This dependence is particularly salient across a wide array of industries, ranging from healthcare to finance, where the integration of AI and machine learning is becoming increasingly indispensable,

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reshaping decision-making processes, and predictive capabilities. Given the complexity of these specialized processors and memory technologies, a concurrent demand arises for sophisticated semiconductor fabrication materials, which serve as the foundational building blocks for the meticulous engineering of these crucial components.

For instance, using AI-powered chips within autonomous vehicles equipping them with the ability to assess their environment and make instantaneous decisions swiftly. Similarly, within the healthcare sector, AI-powered chips are finding application in real-time patient monitoring and the timely detection of potential health anomalies. These expanding applications of AI technology serve as a compelling driver propelling the requirement for advanced semiconductor fabrication materials globally.

Growing Automotive Sector Rises the Demand for Semiconductor

A shift towards greater connectivity, autonomy, and electrification marks the evolving landscape of modern vehicles. This transformation necessitates semiconductor components that deliver high performance and endure the demanding conditions inherent to automotive environments. Consequently, the automotive sector is emerging as a significant driver in the global demand for semiconductor fabrication materials.

For instance, the Federation of Automobile Dealers Associations disclosed that retail sales for 2022 reached an impressive 2.21 crore vehicles. Notably, the automobile sector experienced a significant year-on-year volume increase, with a notable surge of 15.28%, compared to the 1,83,21,760 units sold in 2021. This global increase in vehicle sold raises the requirement for semiconductors, increasing demand for global semiconductor fabrication materials.

Impact of COVID-19

The global semiconductor fabrication materials market experienced a dual impact from the COVID-19 pandemic. It encountered hurdles from supply shortages, varying demand patterns, and logistical challenges. Industries, like automotive, were adversely affected due to the market restrictions, which reduced the global demand for semiconductor fabrication materials. Moreover, the constrained supply of raw materials further weakened the market's supply side.

Conversely, the semiconductor fabrication materials market saw positive effects, driven by heightened demand from sectors such as the electronic sector. The rise in remote work, telemedicine, and online services increased demand for data centers and related

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infrastructure, influencing the market for semiconductor materials.

Impact of Russia-Ukraine War

The ongoing conflict between Russia and Ukraine has severe impact on the semiconductor fabrication materials market as both countries were major manufacturers of raw materials for semiconductors. Ukraine occupied a crucial position as a vital source and supplier of essential raw materials. Notably, it exported semiconductor-grade neon, a critical component employed in semiconductor manufacturing processes. Similarly, Russia's significance stems from being a primary source of palladium, a pivotal material used extensively in memory and sensor chips. Russia accounts for a substantial 45 percent share of the global palladium supply. Therefore, the war between Ukraine and Russia has significantly disrupted the global semiconductor supply chains.

Key Players Landscape and Outlook

Prominent manufacturers of semiconductor fabrication materials are expanding their operations in key semiconductor manufacturing hubs. This strategic expansion is undertaken with the objective of effectively catering to the escalating global demand for semiconductor fabrication material.

For instance, Air Liquide is committing a substantial investment of approx. USD 200 million to establish expansive production facilities across Taiwan and South Korea, anticipated to commence operations in 2024 and 2025 respectively, these facilities have been meticulously situated in proximity to key strategic clientele.

On a global level, the semiconductor fabrication materials market displays a positive outlook shaped by the progress in downstream sectors. The relentless pursuit of technological advancement, combined with the escalating demand for high-performance electronics across sectors like consumer electronics, automotive, and data centers, emphasizes a steady market growth. The integration of innovative materials and innovative manufacturing processes aligns with the evolving landscape of semiconductor technology as AI, machine learning, and other emerging technologies assume greater significance further strengthening the market’s outlook.

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Contents

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8. SEMICONDUCTOR FABRICATION MATERIAL MARKET OUTLOOK, BY REGION, 2016-2030F

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9. SUPPLY SIDE ANALYSIS

10. MARKET MAPPING, 2022

11. MACRO ENVIRONMENT AND INDUSTRY STRUCTURE

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