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LED Materials Market - Global Industry Size, Share, Trends, Opportunity, and Forecast Segmented By Substrate Material Type (Silicon Carbide, Silicon & Sapphire), By Wafer Type (Gallium Arsenide Vs Gallium Nitride), By Epitaxy Material (Trimethylgallium Vs Trimethylaluminum), By Application (General Lighting, Automotive Lighting & Others), By General Lighting Type (Residential Lighting, Industrial Lighting, Outdoor Lighting & Other General Lighting Application) , By Automotive Lighting Type (Interior Lighting, Exterior Lighting, Backlighting, Televisions, Monitors & Handheld Devices) By Region & Competition, 2021-2031F

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Abstracts

The Global LED Materials Market is projected to expand from USD 19.27 Billion in 2025 to USD 35.52 Billion by 2031, registering a CAGR of 10.73%. This market comprises the specialized precursors, chemicals, and substrates necessary for producing light-emitting diodes, including silicon carbide or sapphire wafers, gallium nitride epitaxy layers, encapsulants, and phosphors. The growth of this sector is primarily underpinned by structural drivers rather than temporary consumer preferences, specifically rigorous government energy efficiency mandates and the systematic substitution of traditional lighting with solid-state alternatives in automotive, industrial, and residential sectors. These foundational requirements guarantee a steady baseline of demand for high-purity semiconductor materials, independent of discretionary spending cycles.

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However, the industry contends with significant obstacles regarding raw material price volatility and the geographic centralization of supply chains, factors that can create bottlenecks and disrupt manufacturing stability. The immense scale of material throughput needed to satisfy global requirements is highlighted by recent trade figures. According to the China Association of Lighting Industry, the nation's lighting industry achieved a total export value of $56.1 billion in 2024, emphasizing the massive and ongoing volume of LED components needed to sustain international markets.

Market Driver

The escalating demand for Micro-LED and Mini-LED materials within advanced display sectors is restructuring the supply chain, as these technologies require significantly larger volumes of high-purity phosphors and substrates per unit area compared to standard screens. This transition toward high-density production is driving substantial capital investments to guarantee material availability. For instance, BOE Technology Group entered the commissioning stage of its new 29 billion yuan ($4 billion) Mini-LED production plant in Beijing in January 2025, demonstrating the massive infrastructure needed to process these materials. Furthermore, capacity is expanding industry-wide; the China Association of Lighting Industry noted that in April 2024, twenty-one new lighting industrial projects with aggregate fixed investments surpassing 1.5 billion yuan were signed, indicating strong demand for the raw materials critical to component fabrication.

Simultaneously, the rapid integration of automotive LED lighting in electric vehicles is boosting demand for specialized, highly reliable materials designed to endure severe conditions. As manufacturers shift to electric platforms, lighting has become a central design feature, utilizing ambient systems and adaptive headlights that depend on advanced encapsulants and ceramic substrates for effective thermal management. This growth is propelled by increased LED content per vehicle. According to ams OSRAM, the company secured roughly ?5 billion in new semiconductor business lifetime value during the 2024 fiscal year, a figure reported in February 2025 and largely driven by automotive demand. These agreements highlight the essential requirement for premium semiconductor materials that guarantee enduring performance in safety-critical mobility settings.

Market Challenge

The geographic centralization of supply chains and the associated volatility in raw

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material prices pose a significant hurdle to the growth of the Global LED Materials Market. Because the production of critical precursors and substrates is localized in specific regions, the industry is extremely vulnerable to geopolitical shifts and logistical interruptions. This reliance generates manufacturing bottlenecks that hinder suppliers from maintaining steady output levels. Consequently, manufacturers confront unpredictable cost structures and production delays, which directly impede the fulfillment of long-term agreements and reduce overall market confidence.

The severity of this disruption is evident in the instability of material flows required for component fabrication. According to SEMI, global shipments of silicon wafer area fell by 13.2 percent year-over-year in the first quarter of 2024. This contraction in the availability of fundamental semiconductor materials demonstrates how rigidities in the supply chain directly limit volume throughput. Such fluctuations compel market participants to operate with reduced efficiency, thereby constraining the sector's growth potential despite the persistent underlying demand for energy-efficient lighting solutions.

Market Trends

The transition toward Gallium Nitride-on-Silicon wafers for Micro-LED production marks a pivotal structural shift designed to surmount the scalability constraints associated with conventional sapphire substrates. By employing large-diameter silicon wafers, producers can substantially decrease process costs and edge effects while achieving seamless integration with standard CMOS foundries, which is essential for high-volume consumer electronics. This evolution is being hastened by significant industrial investment to support mass transfer capabilities; for example, according to Yicai Global, Jade Bird Display (JBD) obtained over 1 billion yuan ($140 million) in Series B2 funding in October 2025 expressly to expand its manufacturing capacity for silicon-integrated Micro-LED display technologies.

At the same time, the widespread application of KSF/PFS narrow-band red phosphors is transforming the spectral performance of LED packages by separating color quality from efficiency losses. In contrast to traditional nitride phosphors, KSF materials generate extremely narrow red emissions that optimize color rendering indices without wasting energy in the infrared spectrum, thereby boosting total system efficiency. This material innovation is rapidly gaining traction in the high-power sector; according to Cree LED, the company launched its Pro9 components in March 2025, utilizing this phosphor technology to provide up to 10% greater efficacy at 90 CRI relative to standard LED alternatives.

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Key Market Players

AkzoNobel N.V.

Cree, Inc.

Epistar Corporation

Hitachi Metals, Ltd.

Koninklijke Philips N.V.

Nichia Corporation

Osram Licht AG

Sumitomo Electric Industries

Report Scope

In this report, the Global LED Materials Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

LED Materials Market, By Substrate Material Type

Silicon Carbide

Silicon & Sapphire

LED Materials Market, By Wafer Type

Gallium Arsenide Vs Gallium Nitride

LED Materials Market, By Epitaxy Material

Trimethylgallium Vs Trimethylaluminum

LED Materials Market, By Application

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General Lighting

Automotive Lighting & Others

LED Materials Market, By General Lighting Type

Residential Lighting

Industrial Lighting

Outdoor Lighting & Other General Lighting Application

LED Materials Market, By Automotive Lighting Type

Interior Lighting

Exterior Lighting

Backlighting

Televisions

Monitors & Handheld Devices

LED Materials Market, By Region

North America

United States

Canada

Mexico

Europe

France

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United Kingdom

Italy

Germany

Spain

Asia Pacific

China

India

Japan

Australia

South Korea

South America

Brazil

Argentina

Colombia

Middle East & Africa

South Africa

Saudi Arabia

UAE

Competitive Landscape

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Company Profiles: Detailed analysis of the major companies present in the Global LED Materials Market.

Available Customizations:

Global LED Materials Market report with the given market data, TechSci Research offers customizations according to a company's specific needs. The following customization options are available for the report:

Company Information

Detailed analysis and profiling of additional market players (up to five).

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