Catalyst Market - Global Industry Size, Share, Trends, Opportunity & Forecast, Segmented By Raw Material (Chemical Compounds, Metals, Zeolites, Others), By Product (Heterogeneous Catalyst, Homogeneous Catalyst), By Application (Petroleum Refining, Chemical Synthesis, Polymers and Petrochemicals, Environmental, Others), By Region, & Competition, 2020-2030F

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Report description:

Market Overview
The Catalyst market was valued at USD 32.52 Billion in 2024 and is expected to reach USD 42.55 Billion by 2030 with a CAGR of 4.58%. The Global Catalyst Market serves as a fundamental enabler of critical industrial operations across diverse sectors, including refining, petrochemicals, automotive, pharmaceuticals, and emissions control. Catalysts are indispensable for enhancing reaction kinetics, maximizing yield, and reducing energy intensity positioning them as a strategic asset in both legacy production systems and the next generation of sustainable technologies.
Increasingly, the market is shifting away from a commodity-focused framework toward a value-oriented, performance-driven model, where customized catalyst solutions are developed to address efficiency, environmental compliance, and complex reaction requirements. This transformation is being accelerated by rising regulatory pressures, the demand for cleaner processes, and the need for advanced process optimization in high-value chemical production.
Key Market Drivers
Rising Automotive Production and Electrification Trends
The global automotive industry is undergoing a dynamic transformation, marked by steady growth in vehicle production and an accelerating shift toward electrification and cleaner mobility solutions. This dual trend is emerging as a significant driver for the catalyst market, influencing demand patterns across both traditional internal combustion engine (ICE) vehicles and next-generation electric and hybrid vehicles. Catalysts play a vital role in emissions control, battery material processing, and fuel

cell technologies, positioning the automotive sector as a key growth engine for the global catalyst industry. Despite the rise of electric vehicles, ICE-powered vehicles continue to dominate global automobile sales, particularly in developing and emerging economies such as India, Indonesia, Brazil, and parts of Africa. Global sales of internal combustion engine (ICE) vehicles reached approximately 69.2 million units, reflecting the continued dominance of conventional powertrains in overall automotive demand despite growing momentum in electrification. Catalytic converters are essential for ICE vehicles to comply with increasingly stringent emission regulations worldwide. These systems use platinum group metal (PGM)-based catalysts to convert harmful pollutants such as nitrogen oxides (NOx), carbon monoxide (CO), and unburned hydrocarbons into less harmful substances. The demand for three-way catalysts (TWCs) in gasoline engines and selective catalytic reduction (SCR) and diesel oxidation catalysts (DOCs) in diesel engines remains strong, especially in markets enforcing newer emission norms such as Euro 6, Bharat Stage VI, and China VI. As automakers continue to ramp up production to meet rising consumer demand, especially in populous regions, the need for advanced emission control catalysts grows in parallel.

Governments worldwide are implementing tighter vehicle emission standards, compelling automotive manufacturers to adopt high-performance catalyst systems that ensure compliance without compromising fuel efficiency or engine performance. In response, the automotive sector is increasingly investing in next-generation catalyst technologies that offer greater thermal stability, broader operating temperature ranges, and enhanced conversion efficiency. Regulatory pressure is also driving innovation in low-PGM or PGM-free catalyst materials, expanding the scope of the catalyst market and attracting R&D investment. This regulatory environment acts as a long-term catalyst market growth enabler, especially as countries aim to combat urban air pollution and meet climate goals.

In 2024, global electric vehicle (EV) sales are projected to exceed 17 million units, accounting for over 20% of total new car sales a clear signal of accelerating consumer adoption and market shift toward electrified mobility. Industry forecasts indicate that EV sales will surpass 20 million units by 2025, underscoring the rapid scaling of electric vehicle penetration across key markets. While battery electric vehicles (BEVs) do not use traditional exhaust catalysts, the overall electrification trend including plug-in hybrid (PHEVs) and hybrid electric vehicles (HEVs) continues to support catalyst demand. Hybrid vehicles, which combine an electric motor with a conventional ICE, still require full emission control systems, often operating under more dynamic engine conditions. This creates demand for more robust and adaptable catalyst solutions. Additionally, the production of lithium-ion batteries used in EVs involves catalytic processes in the manufacturing of cathode materials (e.g., lithium cobalt oxide, nickel manganese cobalt oxide), where transition metal catalysts are employed to enhance reaction efficiency and product purity. Fuel cell electric vehicles (FCEVs) though still a niche use platinum-based catalysts in proton exchange membrane (PEM) fuel cells to enable electrochemical reactions that generate electricity from hydrogen. Therefore, the electrification trend, rather than reducing catalyst demand, is diversifying it expanding the market into new applications beyond emission control.

Key Market Challenges

Volatility in Raw Material Prices and Limited Availability

A major challenge facing the global catalyst industry is the high cost and price volatility of key raw materials, particularly platinum group metals (PGMs) like platinum, palladium, and rhodium, as well as rare earth elements such as cerium and lanthanum. These materials are essential components in a wide range of catalysts, including automotive emission control catalysts, petrochemical catalysts, and hydrogenation catalysts. Supply of these critical metals is highly concentrated in a few countries, making the market vulnerable to geopolitical tensions, trade restrictions, and supply chain disruptions. Price fluctuations not only affect profit margins for catalyst manufacturers, but also increase operating costs for end-users in refining, automotive, and chemical sectors.

This unpredictability complicates long-term planning and investment decisions, especially for companies in cost-sensitive markets. Additionally, the limited global availability of certain rare elements raises concerns over resource sustainability and supply security, prompting the need for recycling, substitution, or innovation in catalyst design.

Key Market Trends

Integration of Artificial Intelligence (AI) and Machine Learning in Catalyst Design

The incorporation of artificial intelligence (AI) and machine learning (ML) into catalyst research and development is revolutionizing the way catalysts are discovered and optimized.

AI models are increasingly being used to predict catalytic behavior, reaction mechanisms, and material compatibility based on

vast chemical data sets. This data-driven approach allows for faster screening of catalyst candidates, reducing the time and cost associated with traditional trial-and-error methods in laboratories. Companies and research institutions are now leveraging computational chemistry and predictive analytics to design catalysts with enhanced selectivity, durability, and activity tailored to specific industrial processes.

As AI becomes more accessible and powerful, it is expected to enable rapid innovation cycles, drive custom catalyst development, and ultimately transform catalyst manufacturing into a more efficient, knowledge-intensive process.

Key Market Players

-Albemarle Corporation
-Topsoe A/S
-BASF SE
-Evonik Industries AG
-LyondellBasell Industries Holdings B.V.
-Arkema
-The Dow Chemical Company
-Johnson Matthey
-Clariant
-Exxon Mobil Corporation

Report Scope:

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

-Catalyst Market, By Raw Material:
o Chemical Compounds
o Metals
o Zeolites
o Others
-Catalyst Market, By Product:
o Heterogeneous Catalyst
o Homogeneous Catalyst
-Catalyst Market, By Application:
o Petroleum Refining
o Chemical Synthesis
o Polymers and Petrochemicals
o Environmental
o Others
-Catalyst Market, By Region:
o North America
 United States
 Canada
 Mexico
o Europe
 France
 United Kingdom
 Italy
 Germany
 Spain
o Asia-Pacific
 China

 India
 Japan
 Australia
 South Korea
o South America
 Brazil
 Argentina
 Colombia
o Middle East & Africa
 South Africa
 Saudi Arabia
 UAE
Competitive Landscape
Company Profiles: Detailed analysis of the major companies present in the Global Catalyst Market.
Available Customizations:
Global Catalyst 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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