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Smart Materials Market Research Report- Forecast till 2032

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Description:

Global Smart Materials Market Overview

Smart Materials Market Size was valued at USD 39.1 billion in 2022. The smart materials market industry is projected to grow from USD 44.5 Billion in 2023 to USD 127.1 billion by 2032, exhibiting a compound annual growth rate (CAGR) of 14.00% during the forecast period (2023 - 2032). Growing investments in medical tools in the healthcare sector and bionics, as well as a thriving artificial organ industry, are the key market drivers enhancing the market growth.

Smart Materials Market Overview

Source: Secondary Research, Primary Research, MRFR Database and Analyst Review

Smart Materials Market Trends

Rising Actuator Demand in a Variety of End-Use Industries is propelling market growth

Rising Actuator Demand in a Variety of End-Use Industries is driving the market CAGR for Smart Materials. Actuators are in high demand in a variety of industries, including automotive, electronics, information and telecommunications, aerospace and defence, and healthcare. The actuators control and move a mechanism or system. It needs a control signal and an energy source to function. For diverse purposes, several types of actuators, such as hydraulic actuators, pneumatic actuators, electrical actuators, thermal actuators, and mechanical actuators, are produced employing electrostrictive material.

For instance, mechanical actuators are employed in rack and pinion steering systems. The demand for electrostrictive materials is increasing as the demand for robots in the industrial automation sector rises. According to Statista, the actuator market was worth roughly USD 49.2 billion in 2019 and is predicted to reach USD 74.5 billion by 2024.

In addition, smart materials are gaining popularity in the healthcare industry due to their benefits and features. These materials are used in biomedical devices due to their biocompatibility and biodegradability. The growing use of smart materials such as sensors and actuators to produce smart medical devices and provide a better understanding of piezoelectricity within the medical industry is propelling the market forward. Additionally, increased investments in medical devices in the healthcare industry are a driving market growth.

For instance, the government of India announced incentive plans of at least USD 4.9 billion over a five-year period in May 2020 to further facilitate investments in the production of medical devices, which will involve the use of smart materials. This information comes from the India Brand Equity Foundation (IBEF). Thus, throughout the forecast period, all of the aforementioned factors are anticipated to drive the market revenue for smart materials in the healthcare sector.

Smart Materials Market Segment Insights

Smart Materials Product Insights

The smart materials market segmentation, based on product includes piezoelectric materials,

shape memory materials, electrostrictive materials and magnetostrictive materials. In 2022, the Piezoelectric Materials segment held the largest market share of 36% in the Smart Materials market. Piezoelectric smart materials have the ability to convert mechanical pressure operating on them into electrical signals, which is known as the direct piezoelectric effect, and electrical signals to mechanical signals, which is known as the converse piezoelectric effect. Piezoelectricity requires a lack of centre of symmetry in the material, as well as a crystal lattice structure. Piezoelectric smart materials are used in a variety of applications in the electrical and electronics industries, such as transducers, actuators, motors, and sensors. Piezoelectric smart materials are also used as electroactive scaffolds for tissue repair and regeneration in tissue engineering.

Smart Materials Application Insights

The smart materials market segmentation, based on application, includes actuators & motors, transducers, sensors and structural materials. The sensors segment is expected to account for a significantly large revenue share over the forecast period due to the growing adoption of smart materials in piezoelectric sensors. Piezoelectric sensors are widely used in healthcare, defense, automotive, and aerospace applications. A piezoelectric sensor is a smart device that uses the piezoelectric effect to transform changes in pressure, strain, temperature, acceleration, or force into an electric charge. These sensors provide a number of benefits such as availability in the right shape, good frequency response, little phase shift, and small size. It is also used in industrial applications to build sonar equipment and pressure sensors.

Figure1: Smart Materials Market, by application, 2022 & 2032 (USD billion)

Smart Materials Market, by application, 2022 & 2032

Source: Secondary Research, Primary Research, MRFR Database and Analyst Review

Smart Materials Regional Insights

By Region, the study provides the market insights into North America, Europe, Asia-Pacific and Rest of the World. In 2022, North America held the largest economic share in the market for smart materials as a result of the region's expanding use of smart materials in the aerospace and defense sectors, particularly in the United States and Canada. Government spending on aerospace and defence is rising, which presents a significant market opportunity for smart materials in this area.

Further, the major countries studied in the market report are The U.S., Canada, Germany, France, the UK, Italy, Spain, China, Japan, India, Australia, South Korea, and Brazil.

Figure2: SMART MATERIALS MARKET SHARE BY REGION 2022 (%)

SMART MATERIALS MARKET SHARE BY REGION 2022

Source: Secondary Research, Primary Research, MRFR Database and Analyst Review

Europe smart materials market accounts for the second-largest market share due to the rise in the exports and consumer base of the region. Further, the German smart materials market held the largest market share, and the UK smart materials market was the fastest-growing market in the European region.

The Asia-Pacific Smart Materials Market is expected to grow at the fastest CAGR from 2023 to 2032. This is due to the growing development of electronics and automobile industries in several countries across the region. Moreover, China's smart materials market held the largest market share, and the Indian smart materials market was the fastest-growing market in the Asia-Pacific region.

Smart Materials Key Market Players & Competitive Insights

Leading market players are extensively investing in research and development in order to extend their product lines, which will help the smart materials market grow even more. Market participants are also engaging in a number of strategic initiatives to grow their worldwide presence, with significant market developments including new product launches, contractual agreements, mergers and acquisitions, increased investments, and collaboration with other organizations. To expand and survive in a more competitive and expanding market climate, the smart materials industry must provide cost-effective products.

Manufacturing locally to reduce operational costs is one of the primary business strategies employed by manufacturers in the smart materials industry to serve customers and expand the market sector. In recent years, the smart materials industry has provided some of the most significant benefits to medicine. Major players in the smart materials market are TDK Corporation (Japan), Noliac A/S (Denmark), and Wright Medical Group, Inc. (U.S.). Channel Technologies Group (U.S.). LORD Corporation (U.S.) and others are attempting to improve market demand by investing in research and development operations.

TDK Corporation is a Japanese multinational electronics corporation that makes electronic components as well as recording and data storage media. Its motto is "Contribute to culture

and industry through creativity." "TDK" is an abbreviation for the company's original Japanese name: Tokyo Denki Kagaku Kgy K.K. (Tokyo Electric Chemical Industry Co., Ltd.). The company is traded on the Tokyo Stock Exchange and is a component of the Nikkei 225 and TOPIX indices. On December 7, 1935, Kenzo Saito created TDK in Tokyo, Japan, to manufacture the iron-based magnetic substance ferrite, which had recently been invented by Yogoro Kato and Takeshi Takei. They began producing magnetic tape in 1952 and 1957, respectively, with tiny cassette tapes following in 1966. In May 2022, TDK Corporation announced an investment in XCOM Labs, a wireless technology developer based in the United States, through its subsidiary Ventures, Inc. The money will be used to create 5G and wireless communications systems with an emphasis on bandwidth capacity, latency reduction, and compute load balancing.

Kyocera Corporation is a Japanese multinational ceramics and electronics firm located in Kyoto, Japan. Kazuo Inamori created Kyoto Ceramic Company, Limited in 1959, and it was renamed in 1982. It makes industrial ceramics, solar power producing systems, telecommunications equipment, office document imaging equipment, electronic components, semiconductor packages, cutting tools, and components for medical and dental implant systems. Kyocera's first product was a ceramic insulator known as a "kelcima" for use in television picture tubes. The company quickly modified its methods to produce an expanding range of ceramic components for electronic and structural applications. In March 2022, Kyocera Corporation has finalized the acquisition of AVX Corp., a U.S.-based electronic component manufacturing company. Kyocera formerly owned about 72% of AVX's outstanding shares. Following the completion of the merger, AVX became a wholly owned subsidiary of Kyocera.

Key Companies in the smart materials market include

- APC International (U.S.)
- Harris Corporation (U.S.)
- CeramTec (Germany)
- Kyocera Corporation (Japan)
- TDK Corporation (Japan)
- Noliac A/S (Denmark)
- Wright Medical Group Inc. (U S.)
- Channel Technologies Group (U S.)
- LORD Corporation (US.)

Smart Materials Industry Developments

In February 2021, CTS Corporation and Entekno Materials of Turkey have announced that they have received Eurostars funding to develop an environmentally friendly lead-free piezoelectric ceramic smart material. This substance was created with the intention of replacing lead-based materials.

In April 2021, Evonik has introduced a new photopolymer product range for 3D printing that includes colour phase transition materials. This new photopolymer range is comprised of ready-to-use, high-performance formulations that combine Evonik's experience in 3D printing with smart materials and its innovative growth field.

In February 2020, Hexagon announced the debut of a new smart material, Intergraph Smart® Materials 10, which marked a significant milestone in the company's product history.

This is the largest update to Hexagon's market-leading materials and contract management system in Smart Materials history.

Smart Materials Market Segmentation

Smart Materials Market Product Outlook

- Piezoelectric Materials
- Shape Memory Materials
- Electrostrictive Materials
- Magnetostrictive Materials

Smart Materials Market Application Outlook

- Actuators & Motors
- Transducers
- Sensors
- Structural Materials

Smart Materials Regional Outlook

- North America
 - US
 - Canada
- Europe
 - Germany
 - France
 - UK
 - Italy
 - Spain

- Rest of Europe
- Asia-Pacific
 - China
 - Japan
 - India
 - Australia
 - South Korea
 - Australia
 - Rest of Asia-Pacific
- Rest of the World
 - Middle East
 - Africa
 - Latin America

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