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Polymer Chameleon Market Assessment, By Product Type [Temperature-responsive Polymer, Photo-responsive Polymer, Shape Memory Polymer, Electroactive Magnetically-responsive Polymer, Ph-responsive Polymer, Enzyme-responsive Polymer, Self-healing Polymer], By Application [Drug Delivery, Medical Devices, Electronic Components, Others], By End-use Industry [Textile & Apparel, Pharmaceutical & Healthcare, Automotive, Electrical & Electronics, Others] By Region, Opportunities and Forecast, 2017-2031F

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Abstracts

Global polymer chameleon market is projected to witness a CAGR of 8.2% during the forecast period 2024-2031, growing from USD 751.4 million in 2023 to USD 1411.53 million in 2031. The robust growth of the textile industry is amplifying the polymer chameleon industry revenue advancement. According to the recent data published by the India Brand Equity Foundation (IBEF), in 2021, the textile industry in India was valued at USD 223 billion, and it will reach USD 250 billion by the end of 2030.

The pharmaceutical industry held a significant share in the global polymer chameleon sector. For According to the latest statistics published by the European Federation of Pharmaceutical Industries and Associations (EFPIA), in 2021, the total investments in European Union pharmaceutical research and development (R&D) were USD 44,695.74 million, and in 2022, it was USD 46,860.7 million, representing a year-on-year growth rate of 4.62%.

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The pharmaceutical industry is growing due to several factors, including the need to treat age-related and chronic diseases, changes in clinical practice, and the increasing demand for drugs. Hence, the robust growth of the pharmaceutical industry is spurring the adoption of polymer chameleons to ensure efficient drug delivery, thereby accelerating the market growth. In addition, recent technological advancements, changing consumer behaviors, infrastructure investment, and increasing demand from the logistics industry are key trends propelling the growth of the automotive sector. Therefore, the increase in the automotive demand is spurring the utilization of polymer chameleons to ensure lightweight components.

The propelling textile industry is anticipated to create a favorable market landscape for polymer chameleons during the projected forecast period. For instance, China aims to develop a novel, high-tech-driven, and advanced textile and apparel industry while engaging in more value-added functions in the supply chain. Nevertheless, the availability of various substitute products for polymer chameleons are posing a major bottleneck for the market growth.

The Booming Pharmaceutical and Medical Industries are Augmenting Traction for Market Growth

Polymer chameleons can play a significant role in customized prostheses, including the substitution of intervertebral plates, vascular inserts, and intraocular inserts. The healthcare industry is constantly researching polymer chameleons in drug delivery products for specialized applications and the increasing emphasis on smart materials and longer shelf life are driving the use of polymer chameleons, especially in healthcare. The pharmaceutical industry is growing across the globe and there is a surge in demand for polymer chameleons in drug delivery systems for specific applications.

For instance, according to the recent data published by the European Federation of Pharmaceutical Industries and Associations (EFPIA), the pharmaceutical industry at the global level was valued at USD 1,256.8 billion in 2021, and it reached USD 1,287.7 billion in 2022. In 2022, the global pharmaceutical industry registered a year-on-year growth rate of 2.5%. Moreover, according to the recent statistics published by IQVIA Inc., a biopharmaceutical company, that has a presence across prominent regions such as North America, Asia-Pacific, and Europe, the medicines sector at the global level will reach USD 1.9 trillion by 2027. Hence, the booming pharmaceutical industry is boosting the demand for polymer chameleons as R&D activities for new drug manufacturing are

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increasing.

Bolstering Automotive Industry is Supplementing the Growth of the Polymer Chameleon Market

Polymer chameleons are eco-sensitive and stimuli-responsive materials that undergo rapid changes in their microstructure in response to environmental stimuli such as pH, heat, light, and chemical species. They have diverse applications in various industries, including the automotive industry. Polymer chameleons are used in applications such as tuneable automotive brackets, intravascular delivery systems, grippers, and hood/seat assembly vehicles in the automotive sector. They also find usage in vehicle interiors, undercarriages, and under the hood. The rising focus on green technologies and sustainability is expected to increase usage in the automotive industry over the forecast period.

For instance, according to the recent report published by the International Energy Agency (IEA), in 2021, the demand for light commercial and electric vehicles at the global level was 163,157, and in 2022, it reached more than 310,000 units, an increase of 90%. Likewise, in 2021, the demand for electric cars in China was 3.3 million units and in 2022, it was 8.0 million units. In 2022, the year-on-year electric car demand growth rate in China was 142%. Therefore, the bolstering of the automotive industry due to the rising trend for electric vehicles is favoring market growth.

Development of New and Innovative Polymer Chameleons with Distinct Characteristics and Functions

Polymer chameleons are eco-sensitive and stimuli-responsive materials that provide a high degree of versatility, making them ideal for applications such as deployable components, dynamic configurable parts, and reusable custom. Therefore, the major applications of polymer chameleons include smart drug delivery systems and implants, bio-separation, textile engineering, and automotive. As a result, players operating in the polymer chameleon domain are investing in developing a new range of products.

For exemplifier, BASF SE recently launched a new readily biodegradable, anti-redeposition polymer called BVERDE GP 790 L. This modified polysaccharide provides the performance of acrylate and is designed to meet customers' growing need for products with greater sustainability. Henceforth, the recent product innovations backed with superior characteristics will create a favorable growth potential for the market growth during the projected forecast period.

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Dominance of the Asia-Pacific in the Global Polymer Chameleons Market

The growth in the Asia-Pacific can be attributed to the increasing textile sector in countries, such as India, Japan, and China, as well as the rising demand from the automotive and healthcare industries. The use of polymer chameleons in various applications, such as textile engineering, bio-separation, automotive, transportation, smart drug delivery systems, and implants, also contributes to the market growth.

For instance, in June 2023, Renault, a global manufacturer of automobiles, announced its plan to expand in the Asian market, with the development of a new electric vehicle manufacturing facility in South Korea by 2026. In addition, according to the Indian Pharmaceutical Market 2022 Annual Insights Report by IQVIA, the industry registered a 7% growth at the MAT level in 2022, with chronic therapies outperforming acute therapies. Indian companies reflected a faster growth rate than MNCs, and metros and Class I markets reflected better growth than extra-urban markets. Hence, the revenue advancement of the end-use industries, such as automotive and pharmaceutical, in the Asia-Pacific region is augmenting the growth of the polymer chameleon market in the region.

Impact of COVID-19

The COVID-19 pandemic in 2020 resulted in revenue losses for multiple end-use industries such as automotive, textile, and electrical and electronics. For instance, according to the data published by the Japan Electronics and Information Technology Industries Association (JEITA), in 2019, electrical and electronics production in Japan was valued at USD 96,643.61 million and in 2020, it was USD 93,389.82 million. In 2020, the electrical and electronics industry declined by 5.4% as opposed to 2019. Hence, the production decline in the electrical and electronics industry retained the growth of the polymer chameleon market in 2020.

Nevertheless, the demand for pharmaceutical products registered an exponential demand in 2020, which led to an increase in the segmental revenue growth of the market. Likewise, the increase in the R&D activities, strong investment opportunities, and rise in production activities benefited the growth of the polymer chameleon market.

Impact of Russia Ukraine War

Russia is among the leading export partners of automotive components, which is vital in

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the production of automobiles production for the European Union countries. The Russia-Ukraine war impacted the supply of essential automotive materials, ultimately impacting polymer chameleon prices. Furthermore, the production of automobiles registered a decline in regions such as Russia, Ukraine, and the European Union.

For instance, according to the latest data published by the Organisation Internationale des Constructeurs d'Automobiles (OICA), the European production of automotive was 16,338,165 units in 2021 and 16,216,888 in 2022, a decline of about 1%. As a result, the decline in automotive production in Europe, Russia, and Ukraine, owing to supply chain constraints posed by the Russia-Ukrainian war, restrained the global polymer chameleon market growth in the first half of 2022.

Key Players Landscape and Outlook

The prominent players holding a strong market share in the polymer chameleon industry include Arkema S.A., Merck KGaA, The Lubrizol Corporation, CellSeed Inc., BASF SE, SMP Technologies Inc., Spintech Holdings Inc., Covestro AG, Akzo Nobel N.V., and Dow. These players are actively leveraging their technological potential to develop a new range of products.

In October 2023, Evonik launched a new polymer chameleon product. The company introduced the world's first PA12 powder for 3D printing based on bio-circular raw material designed to drive the circular plastics economy in additive manufacturing. This innovative product, named INFINAM eCO PA12, substitutes 100 percent of fossil feedstock with bio-circular raw material from waste cooking oil, leading to a 74% reduction in carbon dioxide (CO2) emissions compared to its castor oil-based polyamides. This launch demonstrates Evonik's commitment to sustainable 3D printing and developing high-performance materials for industrial use.

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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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