

Zirconium Dioxide Market - Global Industry Size, Share, Trends, Opportunity, and Forecast, 2018-2028 Segmented By Product Type (Partially Stabilized, Fully Stabilized, Toughened Ceramic, Others), By Application (Dental, Electronic, Automobile, Industrial Catalyst, Others), By Region and Competition

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Abstracts

Global Zirconium Dioxide Market has valued at USD78.23 million in 2022 and is anticipated to project robust growth in the forecast period with a CAGR of 4.83% through 2028. Zirconium dioxide, also known as zirconia, is a remarkable white crystalline oxide renowned for its exceptional thermal stability, remarkable toughness, and outstanding resistance to corrosion. These highly sought-after properties render zirconium dioxide an optimal material for a plethora of applications across multiple industries.

One of the key applications of zirconium dioxide lies in solid oxide fuel cells, where its remarkable oxygen ion conductivity greatly contributes to the overall performance and efficiency of these energy conversion devices. As a result, the demand for zirconium dioxide from the electronics industry continues to soar, as manufacturers strive to meet the increasing need for high-quality materials that can support the ever-advancing technological landscape.

Furthermore, the North American market for zirconium dioxide is experiencing rapid expansion, with experts projecting a valuation surpassing \$133.94 million by 2031. This growth can be primarily attributed to the region's robust electronics and automotive industries, both of which heavily rely on the utilization of top-notch zirconium dioxide for a wide range of applications.

In conclusion, the global zirconium dioxide market is confidently trading on a robust growth path, propelled by its wide-ranging applications spanning various industries. With ongoing technological advancements and an escalating demand for superior materials, the market for zirconium dioxide is poised for substantial expansion in the forthcoming years, promising exciting opportunities and innovation across multiple sectors.

Key Market Drivers

Growing Demand of Zirconium Dioxide from Electronic Industry

Zirconium dioxide, also known as zirconia, is gaining increasing popularity in the electronics industry due to its remarkable properties. Notably, it exhibits excellent microbial resistance and high electrical conductivity, which make it an ideal material for a wide range of electronic applications.

One specific area where zirconium dioxide finds extensive use is in solid oxide fuel cells (SOFCs). These innovative fuel cells generate electricity by directly oxidizing a fuel, and zirconium dioxide plays a critical role as the electrolyte layer within them. Its exceptional oxygen ion conductivity enables efficient operation of SOFCs, contributing to their high performance and reliability.

The surging demand for zirconium dioxide in the electronics industry is a major driver behind the growth of the global zirconium dioxide market. As electronic devices continue to advance and become more ubiquitous in our daily lives, the need for superior materials like zirconium dioxide that can enhance their overall performance and durability is becoming increasingly imperative.

However, this trend presents both opportunities and challenges for market players. On one hand, it opens up potential avenues for increased sales and market share. On the other hand, it necessitates companies to keep up with the rapid pace of technological advancements and continuously innovate to cater to the evolving needs of the electronics industry.

In conclusion, the growing demand for zirconium dioxide from the electronics sector is not only a key driver of the global zirconium dioxide market, but it also has a profound impact on shaping its future. As this trend persists, zirconium dioxide will undoubtedly play a critical role in revolutionizing the materials landscape of the electronics industry.

Growing Demand of Zirconium Dioxide from Automotive Industry

In the automotive industry, zirconium dioxide (ZrO₂) plays a crucial and multifaceted role in enhancing the efficiency and performance of vehicles. This remarkable material is primarily utilized in the manufacturing of oxygen sensors, also known as lambda sensors, which are vital components in modern automobiles. These sensors, coated with zirconium dioxide, serve the fundamental purpose of measuring the proportion of oxygen in exhaust gases, enabling the engine control unit (ECU) to precisely adjust the air-fuel mixture for optimal combustion. By doing so, not only does this improve fuel efficiency, but it also helps vehicles meet stringent emission regulations, contributing to a cleaner and greener environment.

The rising demand for zirconium dioxide in the automotive sector has significantly contributed to the growth of the global zirconium dioxide market. As more stringent emission norms are being implemented worldwide to combat the adverse effects of pollution, the need for efficient oxygen sensors in vehicles is progressively increasing. Consequently, this drives up the demand for zirconium dioxide as the automotive industry seeks to comply with these regulations and improve sustainability.

Moreover, the ongoing trend towards vehicle electrification presents another avenue for the utilization of zirconium dioxide. Its exceptional high oxygen ion conductivity makes it a promising material for solid oxide fuel cells (SOFCs), which are critical components in electric vehicles. These fuel cells enable the efficient conversion of chemical energy into electrical energy, offering a clean and sustainable power source for electric vehicles. With the increasing adoption of electric vehicles and the continuous advancements in solid oxide fuel cell technology, the demand for zirconium dioxide is expected to further bolster the market growth in the foreseeable future.

In conclusion, the rising demand for zirconium dioxide in the automotive industry plays a crucial role in driving the growth of the global zirconium dioxide market. This trend is expected to continue, shaping the future landscape of the zirconium dioxide market as more emphasis is placed on sustainability, emission reduction, and the electrification of vehicles. The versatility and effectiveness of zirconium dioxide in enhancing vehicle efficiency and reducing harmful emissions position it as a key material in the automotive industry's pursuit of a greener and more sustainable future.

Key Market Challenges

Volatility in Price of Raw Materials

Zirconium dioxide, commonly known as zirconia, is a versatile material derived from the mineral zircon. With its exceptional properties and wide range of applications, zirconia has gained significant attention in various industries. However, the production of zirconia is not without challenges.

The price of zircon, a crucial raw material for zirconia production, is susceptible to fluctuations influenced by several factors. These factors include supply-demand dynamics, geopolitical issues, and economic conditions. Such price fluctuations can have a profound impact on the cost of producing zirconium dioxide, leading to unstable profit margins for manufacturers. Consequently, this volatility poses a significant hurdle for investment in the sector and hampers the growth of the zirconium dioxide market.

Moreover, the challenge of raw material price volatility is not unique to the zirconium dioxide market alone. Numerous industries worldwide face similar issues, as they heavily rely on specific raw materials. Stable raw material markets are of utmost importance for industries to effectively address the challenges associated with securing supply chains and maintaining consistent production.

In recent years, various industries dependent on these raw materials have expressed concerns due to price spikes, volatility, and concentration of production. The need for a more stable and sustainable raw material market has become increasingly evident, as it directly impacts the overall stability and growth of industries across the globe.

Key Market Trends

Growing Advancements in Dental Implants

Zirconium dioxide, commonly known as zirconia, is a remarkable material for dental implants due to its exceptional biocompatibility, strength, and aesthetic appeal. Its white color closely resembles natural teeth, making it a preferred choice over traditional titanium implants for many patients and dentists alike. Moreover, the excellent biocompatibility of zirconium dioxide significantly reduces the risk of allergic reactions, promoting better integration with the surrounding tissues and facilitating faster healing.

The field of dental implants is witnessing several advancements that are revolutionizing the future of dental care. One such advancement is the emergence of smart dental implants, equipped with sensors that provide real-time feedback on oral health. These

intelligent implants have the ability to detect and identify potential issues, such as infections, at an early stage, enabling timely intervention and improved patient outcomes. On the other hand, the surging adoption of zirconia dental implants is another notable development in the field. Zirconia implants offer not only superior aesthetic appeal but also exceptional biocompatibility, ensuring a harmonious integration with the oral environment.

These advancements in dental implant technologies have significant implications for the global zirconium dioxide market. As the demand for zirconia dental implants continues to rise, the market for zirconium dioxide is expected to witness substantial growth. The increasing awareness among patients about the benefits of zirconia implants, coupled with the growing preference of dentists for this advanced material, further fuels the demand for zirconium dioxide.

In conclusion, the growing advancements in dental implants represent a key trend in the global zirconium dioxide market. With the continued development of innovative implant technologies and materials, the demand for zirconium dioxide in the dental sector is set to rise, contributing to the overall growth of the global market. The remarkable properties of zirconium dioxide, combined with its aesthetic appeal and biocompatibility, position it as a pivotal material in the field of dental implantology.

Segmental Insights

Product Type Insights

Based on the category of product type, the fully stabilized segment emerged as the dominant player in the global market for Zirconium Dioxide in 2022. Fully stabilized zirconia, a ceramic material, exhibits exceptional mechanical properties, including high strength, toughness, and wear resistance. These remarkable characteristics make it a highly sought-after material for a wide range of applications. In the field of dentistry, fully stabilized zirconia is extensively used for dental implants due to its outstanding biocompatibility, aesthetic appeal, and long-term durability.

Moreover, in the automotive industry, it is utilized in the manufacturing of advanced sensors, benefiting from its excellent thermal and chemical stability. Additionally, in the realm of industrial ceramics, fully stabilized zirconia finds its application in various high-temperature environments, where its exceptional mechanical properties and resistance to corrosion and abrasion are highly valued. The versatility and dominance of fully stabilized zirconia in diverse industries are a testament to its immense potential and

importance in modern materials science.

Application Insights

The dental segment is projected to experience rapid growth during the forecast period. Zirconium dioxide, commonly known as zirconia, is a highly favored material in dentistry owing to its exceptional properties. With its remarkable chemical inertness, zirconia ensures a safe and reliable choice for various oral applications. Moreover, apart from its biocompatibility, zirconia offers outstanding aesthetics, closely resembling the appearance of natural teeth. Its strong mechanical properties guarantee long-lasting durability and resilience.

The ever-evolving landscape of dental practices, coupled with continuous advancements in dental materials and technologies, has significantly enhanced the prominence of zirconia in dentistry. As a result, zirconia has emerged as a widely recognized and extensively utilized material for fabricating dental crowns and bridges. Its exceptional strength combined with its captivating visual appeal makes it an ideal choice for achieving both functional and aesthetic outcomes.

Regional Insights

Asia Pacific emerged as the dominant player in the Global Zirconium Dioxide Market in 2022, holding the largest market share in terms of both value and volume. Rapid industrialization and urbanization are key drivers for the growth of the zirconium dioxide market in the Asia Pacific region. As countries in this region continue to experience significant economic expansion, the demand for zirconium dioxide is expected to rise even further. This is especially true in industries such as ceramics, refractories, foundries, and others, where zirconium dioxide plays a vital role in enhancing the performance and durability of various products.

The Asia Pacific region has emerged as a significant consumer of zirconium dioxide, driven by its growing application in key industries. For instance, the demand for zirconium dioxide in ceramics has witnessed a substantial increase due to the rising need for high-quality and durable ceramic products in construction, automotive, and electronics sectors. Similarly, foundries are increasingly adopting zirconium dioxide as a key component in the production of high-performance castings, fueled by the growing demand for precision components in various manufacturing processes.

With the advancements in technology and infrastructure development in the Asia Pacific

region, the demand for zirconium dioxide is expected to soar even higher. The expansion of industries such as aerospace, defense, and healthcare further contributes to the market's growth, as zirconium dioxide finds extensive use in these sectors for its exceptional thermal and chemical resistance properties.

Overall, the Asia Pacific zirconium dioxide market is witnessing robust growth, driven by rapid industrialization, urbanization, and the increasing need for high-performance materials in various industries. As the region continues to develop and diversify its economy, the demand for zirconium dioxide is anticipated to remain strong, making it a lucrative market for manufacturers and suppliers in the coming years.

Key Market Players

ZIRCOMET LIMITED

Iluka Resource Limited

Kenmare Resources Plc

H.C. Starck GmbH

American Elements Corp

Tronox Limited

Saint-Gobain Zirpro Handan Co Ltd

Neo Materials Technologies Inc.

Eramet SA

Tosoh Corporation

Report Scope:

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

Zirconium Dioxide Market, By Product Type:

Partially Stabilized

Fully Stabilized

Toughened Ceramic

Others

Zirconium Dioxide Market, By Application:

Dental

Electronic

Automobile

Industrial Catalyst

Others

Zirconium Dioxide Market, By Region:

North America

United States

Canada

Mexico

Europe

France

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

Kuwait

Turkey

Egypt

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the Global Zirconium Dioxide Market.

Available Customizations:

Global Zirconium Dioxide Market report with the given market data, Tech Sci 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).

Contents

1. PRODUCT OVERVIEW

- 1.1. Market Definition
- 1.2. Scope of the Market
 - 1.2.1. Markets Covered
 - 1.2.2. Years Considered for Study
 - 1.2.3. Key Market Segmentations

2. RESEARCH METHODOLOGY

- 2.1. Objective of the Study
- 2.2. Baseline Methodology
- 2.3. Key Industry Partners
- 2.4. Major Association and Secondary Sources
- 2.5. Forecasting Methodology
- 2.6. Data Triangulation & Validation
- 2.7. Assumptions and Limitations

3. EXECUTIVE SUMMARY

- 3.1. Overview of the Market
- 3.2. Overview of Key Market Segmentations
- 3.3. Overview of Key Market Players
- 3.4. Overview of Key Regions/Countries
- 3.5. Overview of Market Drivers, Challenges, Trends

4. GLOBAL ZIRCONIUM DIOXIDE MARKET OUTLOOK

- 4.1. Market Size & Forecast
 - 4.1.1. By Value & Volume
- 4.2. Market Share & Forecast
 - 4.2.1. By Product Type (Partially Stabilized, Fully Stabilized, Toughened Ceramic, Others)
 - 4.2.2. By Application (Dental, Electronic, Automobile, Industrial Catalyst, Others)
 - 4.2.3. By Region
 - 4.2.4. By Company (2022)
- 4.3. Market Map

- 4.3.1. By Product Type
- 4.3.2. By Application
- 4.3.3. By Region

5. ASIA PACIFIC ZIRCONIUM DIOXIDE MARKET OUTLOOK

- 5.1. Market Size & Forecast
 - 5.1.1. By Value & Volume
- 5.2. Market Share & Forecast
 - 5.2.1. By Product Type
 - 5.2.2. By Application
 - 5.2.3. By Country
- 5.3. Asia Pacific: Country Analysis
 - 5.3.1. China Zirconium Dioxide Market Outlook
 - 5.3.1.1. Market Size & Forecast
 - 5.3.1.1.1. By Value & Volume
 - 5.3.1.2. Market Share & Forecast
 - 5.3.1.2.1. By Product Type
 - 5.3.1.2.2. By Application
 - 5.3.2. India Zirconium Dioxide Market Outlook
 - 5.3.2.1. Market Size & Forecast
 - 5.3.2.1.1. By Value & Volume
 - 5.3.2.2. Market Share & Forecast
 - 5.3.2.2.1. By Product Type
 - 5.3.2.2.2. By Application
 - 5.3.3. Australia Zirconium Dioxide Market Outlook
 - 5.3.3.1. Market Size & Forecast
 - 5.3.3.1.1. By Value & Volume
 - 5.3.3.2. Market Share & Forecast
 - 5.3.3.2.1. By Product Type
 - 5.3.3.2.2. By Application
 - 5.3.4. Japan Zirconium Dioxide Market Outlook
 - 5.3.4.1. Market Size & Forecast
 - 5.3.4.1.1. By Value & Volume
 - 5.3.4.2. Market Share & Forecast
 - 5.3.4.2.1. By Product Type
 - 5.3.4.2.2. By Application
 - 5.3.5. South Korea Zirconium Dioxide Market Outlook
 - 5.3.5.1. Market Size & Forecast

- 5.3.5.1.1. By Value & Volume
- 5.3.5.2. Market Share & Forecast
 - 5.3.5.2.1. By Product Type
 - 5.3.5.2.2. By Application

6. EUROPE ZIRCONIUM DIOXIDE MARKET OUTLOOK

- 6.1. Market Size & Forecast
 - 6.1.1. By Value & Volume
- 6.2. Market Share & Forecast
 - 6.2.1. By Product Type
 - 6.2.2. By Application
 - 6.2.3. By Country
- 6.3. Europe: Country Analysis
 - 6.3.1. France Zirconium Dioxide Market Outlook
 - 6.3.1.1. Market Size & Forecast
 - 6.3.1.1.1. By Value & Volume
 - 6.3.1.2. Market Share & Forecast
 - 6.3.1.2.1. By Product Type
 - 6.3.1.2.2. By Application
 - 6.3.2. Germany Zirconium Dioxide Market Outlook
 - 6.3.2.1. Market Size & Forecast
 - 6.3.2.1.1. By Value & Volume
 - 6.3.2.2. Market Share & Forecast
 - 6.3.2.2.1. By Product Type
 - 6.3.2.2.2. By Application
 - 6.3.3. Spain Zirconium Dioxide Market Outlook
 - 6.3.3.1. Market Size & Forecast
 - 6.3.3.1.1. By Value & Volume
 - 6.3.3.2. Market Share & Forecast
 - 6.3.3.2.1. By Product Type
 - 6.3.3.2.2. By Application
 - 6.3.4. Italy Zirconium Dioxide Market Outlook
 - 6.3.4.1. Market Size & Forecast
 - 6.3.4.1.1. By Value & Volume
 - 6.3.4.2. Market Share & Forecast
 - 6.3.4.2.1. By Product Type
 - 6.3.4.2.2. By Application
 - 6.3.5. United Kingdom Zirconium Dioxide Market Outlook

- 6.3.5.1. Market Size & Forecast
 - 6.3.5.1.1. By Value & Volume
- 6.3.5.2. Market Share & Forecast
 - 6.3.5.2.1. By Product Type
 - 6.3.5.2.2. By Application

7. NORTH AMERICA ZIRCONIUM DIOXIDE MARKET OUTLOOK

- 7.1. Market Size & Forecast
 - 7.1.1. By Value & Volume
- 7.2. Market Share & Forecast
 - 7.2.1. By Product Type
 - 7.2.2. By Application
 - 7.2.3. By Country
- 7.3. North America: Country Analysis
 - 7.3.1. United States Zirconium Dioxide Market Outlook
 - 7.3.1.1. Market Size & Forecast
 - 7.3.1.1.1. By Value & Volume
 - 7.3.1.2. Market Share & Forecast
 - 7.3.1.2.1. By Product Type
 - 7.3.1.2.2. By Application
 - 7.3.2. Mexico Zirconium Dioxide Market Outlook
 - 7.3.2.1. Market Size & Forecast
 - 7.3.2.1.1. By Value & Volume
 - 7.3.2.2. Market Share & Forecast
 - 7.3.2.2.1. By Product Type
 - 7.3.2.2.2. By Application
 - 7.3.3. Canada Zirconium Dioxide Market Outlook
 - 7.3.3.1. Market Size & Forecast
 - 7.3.3.1.1. By Value & Volume
 - 7.3.3.2. Market Share & Forecast
 - 7.3.3.2.1. By Product Type
 - 7.3.3.2.2. By Application

8. SOUTH AMERICA ZIRCONIUM DIOXIDE MARKET OUTLOOK

- 8.1. Market Size & Forecast
 - 8.1.1. By Value & Volume
- 8.2. Market Share & Forecast

- 8.2.1. By Product Type
- 8.2.2. By Application
- 8.2.3. By Country
- 8.3. South America: Country Analysis
 - 8.3.1. Brazil Zirconium Dioxide Market Outlook
 - 8.3.1.1. Market Size & Forecast
 - 8.3.1.1.1. By Value & Volume
 - 8.3.1.2. Market Share & Forecast
 - 8.3.1.2.1. By Product Type
 - 8.3.1.2.2. By Application
 - 8.3.2. Argentina Zirconium Dioxide Market Outlook
 - 8.3.2.1. Market Size & Forecast
 - 8.3.2.1.1. By Value & Volume
 - 8.3.2.2. Market Share & Forecast
 - 8.3.2.2.1. By Product Type
 - 8.3.2.2.2. By Application
 - 8.3.3. Colombia Zirconium Dioxide Market Outlook
 - 8.3.3.1. Market Size & Forecast
 - 8.3.3.1.1. By Value & Volume
 - 8.3.3.2. Market Share & Forecast
 - 8.3.3.2.1. By Product Type
 - 8.3.3.2.2. By Application

9. MIDDLE EAST AND AFRICA ZIRCONIUM DIOXIDE MARKET OUTLOOK

- 9.1. Market Size & Forecast
 - 9.1.1. By Value & Volume
- 9.2. Market Share & Forecast
 - 9.2.1. By Product Type
 - 9.2.2. By Application
 - 9.2.3. By Country
- 9.3. MEA: Country Analysis
 - 9.3.1. South Africa Zirconium Dioxide Market Outlook
 - 9.3.1.1. Market Size & Forecast
 - 9.3.1.1.1. By Value & Volume
 - 9.3.1.2. Market Share & Forecast
 - 9.3.1.2.1. By Product Type
 - 9.3.1.2.2. By Application
 - 9.3.2. Saudi Arabia Zirconium Dioxide Market Outlook

- 9.3.2.1. Market Size & Forecast
 - 9.3.2.1.1. By Value & Volume
- 9.3.2.2. Market Share & Forecast
 - 9.3.2.2.1. By Product Type
 - 9.3.2.2.2. By Application
- 9.3.3. UAE Zirconium Dioxide Market Outlook
 - 9.3.3.1. Market Size & Forecast
 - 9.3.3.1.1. By Value & Volume
 - 9.3.3.2. Market Share & Forecast
 - 9.3.3.2.1. By Product Type
 - 9.3.3.2.2. By Application
- 9.3.4. Egypt Zirconium Dioxide Market Outlook
 - 9.3.4.1. Market Size & Forecast
 - 9.3.4.1.1. By Value & Volume
 - 9.3.4.2. Market Share & Forecast
 - 9.3.4.2.1. By Product Type
 - 9.3.4.2.2. By Application

10. MARKET DYNAMICS

- 10.1. Drivers
- 10.2. Challenges

11. MARKET TRENDS & DEVELOPMENTS

- 11.1. Recent Developments
- 11.2. Product Launches
- 11.3. Mergers & Acquisitions

12. GLOBAL ZIRCONIUM DIOXIDE MARKET: SWOT ANALYSIS

13. PORTER'S FIVE FORCES ANALYSIS

- 13.1. Competition in the Industry
- 13.2. Potential of New Entrants
- 13.3. Power of Suppliers
- 13.4. Power of Customers
- 13.5. Threat of Substitute Product

14. COMPETITIVE LANDSCAPE

14.1. ZIRCOMET LIMITED

- 14.1.1. Business Overview
- 14.1.2. Company Snapshot
- 14.1.3. Products & Services
- 14.1.4. Current Capacity Analysis
- 14.1.5. Financials (In case of listed)
- 14.1.6. Recent Developments
- 14.1.7. SWOT Analysis

14.2. Iluka Resource Limited

14.3. Kenmare Resources Plc

14.4. H.C. Starck GmbH

14.5. American Elements Corp

14.6. Tronox Limited

14.7. Saint-Gobain Zirpro Handan Co Ltd

14.8. Neo Materials Technologies Inc.

14.9. Eramet SA

14.10. Tosoh Corporation

15. STRATEGIC RECOMMENDATIONS

16. ABOUT US & DISCLAIMER

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