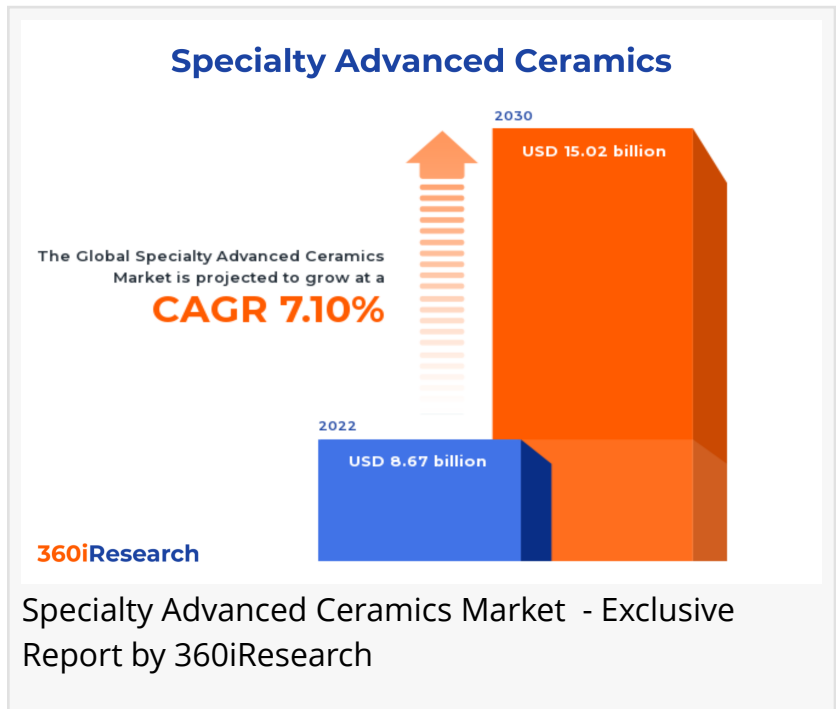


Specialty Advanced Ceramics Market worth \$15.02 billion by 2030 - Exclusive Report by 360iResearch

The Global Specialty Advanced Ceramics Market to grow from USD 8.67 billion in 2022 to USD 15.02 billion by 2030, at a CAGR of 7.10%.

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EINPresswire.com/ -- The "[Specialty Advanced Ceramics Market](#) by Material (Alumina, Aluminium Nitride, Magnesium Silicate), Type (Functional Ceramics, Structural Ceramics), Processing Method, End-User - Global Forecast 2023-2030" report has been added to 360iResearch.com's offering.



The Global Specialty Advanced Ceramics Market to grow from USD 8.67 billion in 2022 to USD 15.02 billion by 2030, at a CAGR of 7.10%.

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The specialty advanced ceramics market comprises various high-performance engineered materials derived from inorganic, high-purity compounds through specialized manufacturing processes. These are produced using highly refined and purified powders and are synthetically produced using high temperatures or chemical reactions in several cases. Advanced ceramics are applied for various purposes due to their permeability, magnetism, insulation, and conduction. Technological advancements in material science for improved performance characteristics required by applications from end-use industries to develop innovative products have contributed to market expansion. However, high production costs limiting widespread adoption and low ductility of advanced ceramic materials, making them difficult to machine and process into desired finished components, restrains the market growth. Moreover, developing

new compositions or additives to enhance advanced ceramics and increasing applications in industries such as medicine, renewable energy, electronics, and aerospace & defense are expected to bolster the market growth.

Material: Burgeoning use of corrosion resistance alumina for medical implants

Alumina is an advanced ceramic material with properties such as electrical insulation, wear resistance, high thermal conductivity, and corrosion resistance. It is preferred in electrical insulators, spark plugs, and medical implants. Aluminum nitride and silicon carbide have high thermal conductivity and insulation. It is used in microelectronics and semiconductor industries where heat dissipation is critical. Magnesium silicate ceramics possess low dielectric constant and low dielectric loss tangent properties, suitable for microwave communication systems and integrated circuit packaging. Pyrolytic boron nitride material exhibits high thermal stability, chemical resistance, and good electrical insulation properties, preferred for semiconductor processing, crucibles, and insulators. Silicon nitride material exhibits properties such as fracture toughness and resistance to thermal shock, which are used for ball bearings, cutting tools, and engine components. Titanate exhibits piezoelectric properties and high dielectric constant and is used in capacitors, sensors, actuators, and transducers. Zirconia offers high strength, hardness, and wear resistance, which are preferred for dental implants, cutting tools, and fuel cell components.

Type: Growing popularity of functional ceramics due to increasing demand electric vehicles (EVs)

Functional ceramics are known for their unique electrical, magnetic, optical, and thermal properties, making them ideal for various applications in electronic devices and systems. Structural ceramics exhibit exceptional mechanical properties such as hardness, wear resistance, and fracture toughness, making them suitable for load-bearing applications requiring a high strength-to-weight ratio and corrosion resistance. Functional ceramics are primarily driven by their unique properties, enabling use in electronic devices and systems with emerging trends such as electrical vehicles (EVs) and renewable energy sources fueling growth. Moreover, structural ceramics benefit from increased adoption across diverse industries owing to their superior mechanical properties and corrosion resistance.

End-User: Emerging applications of specialty advanced ceramics for medical devices due to their favorable properties and biocompatibility

Specialty advanced ceramics play a crucial role in the aerospace & defense industries, where they are utilized for their remarkable properties, such as lightweight, durability, resistance to extreme temperatures, and excellent thermal insulation. High-performance engine pistons produced from advanced ceramics withstand higher temperatures and pressures, enhancing fuel efficiency and engine power performance. Specialty advanced ceramics are preferred in high-power laser windows due to their exceptional mechanical strength, chemical stability, and impressive transparency across a wide range of wavelengths. Advanced ceramic matrix composites have emerged as an ideal solution that can maintain structural integrity under high

temperatures for the heat generated by jet engines. Optical lenses used in military aircraft systems use advanced ceramics that exhibit excellent transparency, durability, and resistance to harsh environmental conditions such as sand, dust, and extreme temperatures. Missile radomes are protective enclosures that house radar or electronic guidance systems in missiles, which use specialty advanced ceramics for low dielectric constants and minimal signal attenuation. Advanced ceramic materials are employed in spacecraft heat shield designs to safeguard crewed vehicles and delicate equipment from thermal damage. The automotive & transportation sector utilizes specialty advanced ceramics for applications, including exhaust gas sensors, spark plugs, and brake discs, owing to their superior wear resistance and thermal conductivity. Chemical manufacturing requires materials that withstand corrosive environments with low maintenance costs. Specialty advanced ceramics fulfill these criteria through their chemical stability and resistance to wear. Specialty advanced ceramics are widely used in CMP components such as pad conditioners, slurry particles, and polishing pads owing to their exceptional hardness, wear resistance, and chemical stability. These characteristics enable precise material removal during planarization while minimizing defects and improving yield rates. In addition, as electronic devices become faster and more complex, high-frequency insulators produced from specialty advanced ceramics gain importance in maintaining signal integrity and preventing interference between different circuits. These insulators exhibit low dielectric loss tangent values at high frequencies, which minimize signal losses across connections. Ion implantation is a vital step in semiconductor fabrication that involves bombarding wafers with ion beams to alter the electrical properties of the material. Specialty advanced ceramics are employed in various ion implantation components, including beamline components, focus electrodes, and chamber liners. Moreover, ceramic materials exhibit low thermal expansion coefficients, which help prevent distortion of mask patterns during the semiconductor lithography process, leading to precise feature replication on wafers. The energy and power sector, in the specialty advanced ceramics, leverages the unique properties of advanced ceramics to enhance performance, reliability, and safety in various energy generation and conversion systems. The major uses of advanced ceramics in the nuclear industry are in the fabrication of fuel pellets and cladding materials for nuclear reactors. Fuel pellets are typically made from uranium dioxide (UO_2), a ceramic material known for its high melting point, excellent thermal conductivity, and radiation damage resistance. Zirconium-based alloys are commonly used for cladding due to their low neutron absorption cross-section, corrosion resistance, and mechanical strength. Advanced ceramics play a crucial role in the development of high-performance thermoelectric modules, contributing to increased efficiency and thermal stability. Bismuth telluride (Bi_2Te_3)-based compounds are widely used for low-temperature applications, while materials including lead telluride (PbTe) or antimony telluride (Sb_2Te_3) show promise at higher temperatures. Dental implants represent a significant subsegment of specialty advanced ceramics in the medical devices sector. Dental implants are artificial tooth roots produced from biocompatible materials such as zirconia and titanium that provide a strong foundation for fixed or removable teeth. Another major subsegment within medical devices utilizing specialty advanced ceramics is medical prosthetics. Advanced ceramic materials such as zirconia, alumina, and hydroxyapatite find applications in various types of prosthetic devices, including hip joint replacements, spinal fusion cages, bone scaffolds for tissue regeneration, cochlear implants for hearing impairment

treatments, and many more. The high-performance ceramic materials exhibit unique properties such as excellent heat resistance, chemical stability, and hardness, making them ideal for a diverse range of optics industrial manufacturing applications. Air bearings are advanced components that utilize a thin film of pressurized air to create a virtually frictionless surface between two solid surfaces. These bearings are made from materials such as silicon carbide (SiC) and alumina (Al₂O₃), which possess excellent wear resistance and thermal stability properties. Specialty advanced ceramics play a critical role in the production of electron microscopy components due to their remarkable electrical insulation properties coupled with exceptional mechanical strength and dimensional stability at elevated temperatures. Additionally, with the growing demand for higher load-carrying capacity, increased energy efficiency, and improved durability, specialty advanced ceramic materials such as silicon nitride (Si₃N₄) have emerged as a popular choice for manufacturing precision ball-bearing components.

Regional Insights:

The Americas represents a growing advanced specialty ceramics market owing to robust product adoption in various industries such as aerospace & defense, electronics, medical, and healthcare. Furthermore, increasing investment in R&D with a focus on lowering carbon emissions and improving fuel efficiency has prompted increased demand for lightweight materials such as advanced ceramics. In Europe, strong demand for advanced ceramics is evident due to the thriving manufacturing sector, particularly in the automotive industry. The region hosts several global ceramic product manufacturers, supporting the market growth. The Middle East is experiencing growing industrialization and increasing demand for high-performance materials, including advanced ceramics. The Asia-Pacific region presents immense opportunities to rapidly expand the advanced specialty ceramics market in major economies owing to its extensive manufacturing base and flourishing electronic industry in the region.

FPNV Positioning Matrix:

The FPNV Positioning Matrix is essential for assessing the Specialty Advanced Ceramics Market. It provides a comprehensive evaluation of vendors by examining key metrics within Business Strategy and Product Satisfaction, allowing users to make informed decisions based on their specific needs. This advanced analysis then organizes these vendors into four distinct quadrants, which represent varying levels of success: Forefront (F), Pathfinder (P), Niche (N), or Vital(V).

Market Share Analysis:

The Market Share Analysis offers an insightful look at the current state of vendors in the Specialty Advanced Ceramics Market. By comparing vendor contributions to overall revenue, customer base, and other key metrics, we can give companies a greater understanding of their performance and what they are up against when competing for market share. The analysis also sheds light on just how competitive any given sector is about accumulation, fragmentation dominance, and amalgamation traits over the base year period studied.

Key Company Profiles:

The report delves into recent significant developments in the Specialty Advanced Ceramics Market, highlighting leading vendors and their innovative profiles. These include 3M Company, Active Enterprises, Advanced Ceramic Technology, Advanced Ceramics Corp., Advanced Ceramics Manufacturing, AGC Inc., Alcoa Corporation, Alteo Holding, Ants Ceramics Pvt Ltd., Applied Ceramics, Blasch Precision Ceramics, Inc., Ceramitec Industries, CeramTec GmbH, Coherent Corp., COI Ceramics, Inc., Compagnie de Saint-Gobain, CoorsTek, Inc., Corning Incorporated, Elan Technology, Inc., Elkem ASA, Ferrotec Holdings Corporation, Formlabs Inc., Imerys S.A., Kyocera Corporation, LouwersHanique B.V. by IDEX Corporation, MARUWA Co., Ltd., Maruwai Advanced Ceramics L.P., Materion Corporation, Midlands Industrial Ceramics Group, MO SCI, LLC, Nabaltec AG, NGK Insulators, Ltd. by Morimura Group, Nishimura Advanced Ceramics Co., Ltd., Paul Rauschert GmbH & Co. KG, Precision Ceramics UK Limited, Robert Bosch GmbH, SINTX Technologies, Inc., Toray Industries, Inc., and WONIK QnC Corporation.

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Market Segmentation & Coverage:

This research report categorizes the Specialty Advanced Ceramics Market in order to forecast the revenues and analyze trends in each of following sub-markets:

Based on Material, market is studied across Alumina, Aluminium Nitride, Magnesium Silicate, Pyrolytic Boron Nitride, Silicon Carbide, Silicon Nitride, Titanate, and Zirconia. The Alumina commanded largest market share of 37.10% in 2022, followed by Silicon Carbide.

Based on Type, market is studied across Functional Ceramics and Structural Ceramics. The Structural Ceramics commanded largest market share of 62.01% in 2022, followed by Functional Ceramics.

Based on Processing Method, market is studied across Casting Molding Method, Ceramic Injection Molding, Dry Pressing Method, Extrusion Molding Method, and Isostatic Pressing Method. The Casting Molding Method commanded largest market share of 27.99% in 2022, followed by Dry Pressing Method.

Based on End-User, market is studied across Aerospace & Defense, Automotive & Transportation, Chemical Manufacturing, Electronics & Semiconductor, Energy & Power, Medical Devices, and Optics & Industrial Manufacturing. The Aerospace & Defense is further studied across High-Performance Engines Pistons, High-Power Laser Windows, Jet Turbine Blades, Military Aircraft Lenses, Missile Radomes, and Spacecraft Heat Shields. The Electronics & Semiconductor is further studied across CMP (Chemical Mechanical Planarization) Components, High-Frequency Insulators, Ion Implantation Components, and Semiconductor Lithography

Masks. The Energy & Power is further studied across Nuclear Reactors Fuel Pellets & Cladding and Thermoelectric Modules. The Medical Devices is further studied across Dental Implants and Medical Prosthetics. The Optics & Industrial Manufacturing is further studied across Air bearing Components, Electron Microscopy Components, and Precision Ball Bearings. The Electronics & Semiconductor commanded largest market share of 26.21% in 2022, followed by Automotive & Transportation.

Based on Region, market is studied across Americas, Asia-Pacific, and Europe, Middle East & Africa. The Americas is further studied across Argentina, Brazil, Canada, Mexico, and United States. The United States is further studied across California, Florida, Illinois, New York, Ohio, Pennsylvania, and Texas. The Asia-Pacific is further studied across Australia, China, India, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, Taiwan, Thailand, and Vietnam. The Europe, Middle East & Africa is further studied across Denmark, Egypt, Finland, France, Germany, Israel, Italy, Netherlands, Nigeria, Norway, Poland, Qatar, Russia, Saudi Arabia, South Africa, Spain, Sweden, Switzerland, Turkey, United Arab Emirates, and United Kingdom. The Americas commanded largest market share of 40.65% in 2022, followed by Europe, Middle East & Africa.

Key Topics Covered:

1. Preface
2. Research Methodology
3. Executive Summary
4. Market Overview
5. Market Insights
6. Specialty Advanced Ceramics Market, by Material
7. Specialty Advanced Ceramics Market, by Type
8. Specialty Advanced Ceramics Market, by Processing Method
9. Specialty Advanced Ceramics Market, by End-User
10. Americas Specialty Advanced Ceramics Market
11. Asia-Pacific Specialty Advanced Ceramics Market
12. Europe, Middle East & Africa Specialty Advanced Ceramics Market
13. Competitive Landscape
14. Competitive Portfolio
15. Appendix

The report provides insights on the following pointers:

1. Market Penetration: Provides comprehensive information on the market offered by the key players
2. Market Development: Provides in-depth information about lucrative emerging markets and analyzes penetration across mature segments of the markets
3. Market Diversification: Provides detailed information about new product launches, untapped geographies, recent developments, and investments

4. Competitive Assessment & Intelligence: Provides an exhaustive assessment of market shares, strategies, products, certification, regulatory approvals, patent landscape, and manufacturing capabilities of the leading players
5. Product Development & Innovation: Provides intelligent insights on future technologies, R&D activities, and breakthrough product developments

The report answers questions such as:

1. What is the market size and forecast of the Specialty Advanced Ceramics Market?
2. Which are the products/segments/applications/areas to invest in over the forecast period in the Specialty Advanced Ceramics Market?
3. What is the competitive strategic window for opportunities in the Specialty Advanced Ceramics Market?
4. What are the technology trends and regulatory frameworks in the Specialty Advanced Ceramics Market?
5. What is the market share of the leading vendors in the Specialty Advanced Ceramics Market?
6. What modes and strategic moves are considered suitable for entering the Specialty Advanced Ceramics Market?

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