

## **Aerospace Ceramics: Global Markets to 2029**

Market Research Report | 2025-04-29 | 140 pages | BCC Research

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### **Report description:**

#### Description

#### Report Scope

This report analyzes the global market for aerospace ceramics, reflecting the latest data, trends and market projections.

Aerospace ceramics are advanced materials that exhibit superior thermal and electrical performance and lightweight properties, leading to enhanced aircraft performance, including fuel efficiency, greater speed, range and payload capacity. They are primarily found in thermal protection shields, engine and exhaust systems, and structures for aircraft.

For this analysis, the global market for aerospace ceramics is segmented by:

- Composition: ceramic matrix composites (CMCs), oxides ceramics (alumina, zirconia) and non-oxide ceramics (silicon carbide, silicon nitride, boron carbide).
- Application: structural, thermal and electrical.
- End use: commercial aviation (commercial passenger and commercial transport), defense and military aerospace, commercial space industry, and others (helicopter, general aviation).
- Region: North America, Europe, Asia-Pacific, South America, the Middle East and Africa.

The report focuses on aerospace ceramics for the commercial aviation and space exploration sector with a focus on structural, thermal and electrical applications. Structural applications include engine components, such as turbine blades and nozzles, airframes, landing gear and structural reinforcements. Thermal applications include thermal protection systems (TPS), heat shields, thermal barrier coatings, insulation in engines and re-entry systems, and hypersonic vehicle exteriors. Electrical applications include electronic components such as capacitors, antennas and sensors, avionics and substrates. The base year for the market study is 2023, with estimates and forecasts for 2024 to 2029. Market estimates are in U.S. dollars (millions).

Forecasts for growth rates are based on expected industry capacity additions, feedback from key companies, revenue reports of major companies, and anticipated regulatory updates. Data from major ceramic associations such as the Australian Ceramics Association, Contemporary Ceramic Studios Association, European Ceramic Industry Association, British Ceramic Confederation, Ceramics Southern Africa, Midwest Ceramic Association and the Association of British Ceramic Distributors were used to anticipate

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the market dynamics and further triangulate the market size.

#### Report Includes

- 48 data tables and 55 additional tables
- An overview of the current and future global markets for aerospace ceramics
- An analysis of global market trends, with market revenue data from 2023, estimates for 2024, forecasts for 2028, and projected CAGRs through 2029
- Estimates of the size and revenue prospects of the global market, along with a market share analysis by composition, application, end user and region
- Identification of the trends that will affect the use of aerospace ceramics, as well as their major source markets
- Coverage of technologies that are currently used or in the future could be used in aerospace ceramics, and an assessment of the potential impact of aerospace ceramics on the global market
- Facts and figures pertaining to market dynamics, technological advances, regulations, and the impact of macroeconomic factors
- Analysis of the industry structure, including companies' market shares and rankings, strategic alliances, M&A activity and a venture funding outlook
- Overview of sustainability trends and ESG developments, with emphasis on consumer attitudes, and the ESG scores and practices of leading companies
- Profiles of the leading companies, including Saint-Gobain, 3M, Kyocera Corp., Morgan Advanced Materials Plc., and Hexcel Corp.

#### Executive Summary

##### Summary:

The global market for aerospace ceramics was valued at \$5.3 billion in 2024. It is expected to grow from \$5.6 billion in 2024 to \$8.2 billion by 2029, at a compound annual growth rate (CAGR) of 8.0% from 2024 through 2029.

Aerospace ceramics are non-metallic crystalline compounds used in aircraft engines, thermal protection shields and other aerospace parts. Their light weight, corrosion resistance, low density, electrical insulation, and ability to withstand high temperatures and vibrations make them an ideal material for commercial, military and space aircraft. Advanced ceramics' ultra-high temperature capabilities make them a highly popular material in propulsion engines and aircraft structural applications. For instance, zirconia-based TBCs have revolutionized turbine engine industries by enhancing the durability of turbine engine hot-section components. Aerospace ceramics also enable high speed, low fuel consumption, larger payloads and longer space-time, thus creating lucrative opportunities for advanced ceramics manufacturers in the modern aviation industry.

Ceramics play a key role in modern aviation engines, in which turbine blades and vanes are subject to high temperatures and pressures. These materials enable engines to run more efficiently even at extreme temperatures, as they are more thermally resistant than conventional metal alloys.

Additionally, ceramics are utilized in heat-resistant tiles that protect spacecraft from intense heat when they reenter the Earth's atmosphere. These tiles can absorb and release tremendous heat from air friction because they are frequently composed of silica or ceramics reinforced with carbon fiber. Moreover, the growing prevalence of CMCs that combine the high-temperature resistance of ceramics with the toughness and ductility of fibers or polymers is witnessing high consumption in structural applications, vital engine components and exhaust systems. They significantly improve fracture resistance and help overcome the inherent brittleness of ceramics.

The NASA's advanced materials and processing branch, which investigates developing new materials in space exploration, is an interesting global initiative for aerospace ceramics. This involves a variety of materials, such as metals, ceramics, polymers, composites and nanomaterials relevant to load-bearing structures or instrumentation equipment. NASA is currently looking for

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ideas from American businesses to create cutting-edge materials and components in space that could improve life on Earth and expand the economy of low Earth orbit. In addition, the European research and innovation program Clean Sky 2 develops innovative technologies for a more ecologically friendly aviation industry. These efforts at a global scale will support the development of advanced ceramics in the coming years.

## **Table of Contents:**

Table of Contents	
Chapter 1 Executive Summary	
Market Outlook	
Scope of Report	
Market Summary	
Key Takeaways	
Chapter 2 Market Overview	
Overview	
Benefits of Aerospace Ceramics	
Properties of Aerospace Ceramics	
Technological Background of CMCs	
Value Chain Analysis	
Sourcing of Raw Materials	
Material Processing	
Component Production	
Quality Testing and Certification	
Distribution and Logistics	
End-Use Industries	
Recycling/Reuse and Disposal	
Regulatory Framework	
Chapter 3 Market Dynamics	
Market Dynamics	
Market Drivers	
Growth of Air Traffic	
Stringent Environmental Regulations	
Demand for Ceramic-Based Coatings	
Expansion of Military and Defense Programs	
Market Restraints	
Production and Processing Costs	
Supply Chain Vulnerabilities	
Market Opportunities	
Space Exploration and Satellite Deployments	
Prevalence of Urban Air Mobility (UAM)	
Market Challenges	
Technological Challenges	
Competition With Substitute Materials	
Chapter 4 Emerging Technologies and Developments	
Overview	
Aerospace Industry Trends	
Aerial Mobility	
Artificial Intelligence	

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Additive Manufacturing  
Plasma-Assisted Surface Engineering  
Nanostructured Ceramics  
Patent Analysis  
Key Takeaways  
Patent Grants Related to Aerospace Ceramics  
Chapter 5 Market Segment Analysis  
Segmentation Breakdown  
Market Analysis by Composition  
Ceramic Matrix Composites  
Oxide Ceramics  
Non-Oxide Ceramics  
Market Analysis by Application  
Structural Applications  
Thermal Applications  
Electrical Applications  
Market Analysis by End Use  
Commercial Aviation  
Defense and Military Aerospace  
Commercial Space Industry  
Other End Uses  
Geographic Breakdown  
Market Analysis by Region  
North America  
Europe  
Asia-Pacific  
South America  
Middle East and Africa  
Chapter 6 Competitive Intelligence  
Industry Structure  
Company Market Shares  
Strategic Analysis  
Chapter 7 Sustainability in the Aerospace Ceramics Industry: ESG Perspective  
ESG in the Aerospace Ceramics Industry  
Sustainability Trends in the Industry  
ESG Practices  
Status of ESG in the Aerospace Ceramics Industry  
ESG Score Analysis  
Risk Scale, Exposure Scale and Management Scale  
Risk Scale  
Exposure Scale

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Management Scale  
Future of ESG: Emerging Trends and Opportunities  
Concluding Remarks  
Chapter 8 Appendix  
Methodology  
References  
Abbreviations  
Company Profiles  
3M  
ADVANCED CERAMIC MATERIALS  
APPLIED CERAMICS INC.  
CERAMCO INC.  
CERAMTEC GMBH  
COORSTEK INC.  
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