

Advanced Ceramics Market – Global Industry Size, Share, Trends, Opportunity, and Forecast 2018-2028 Segmented By Material (Alumina, Zirconia, Silicon, Titanate and Others), By Class (Monolithic Ceramics, Ceramic Coatings and Ceramic Matrix Composites), By End User (Electrical & Electronics, Transportation, Medical and Others), By Region and Competition

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Abstracts

Global Advanced Ceramics Market is expected to grow at a robust pace in the forecast period 2024-2028. Over the forecast period, it is anticipated that growing use of advanced ceramics in a variety of applications, along with expansion in the medical and telecom industries, shall boost the market growth.

Ceramic materials are a diverse group of materials known for their unique properties and applications. They are usually made from inorganic compounds such as oxides, nitrides and carbides and are known for their high strength, hardness and resistance to heat and corrosion. Ceramic materials have been used for thousands of years, but their uses have expanded significantly in modern times, making them an integral part of many modern technologies. Ceramic materials are known for their unique properties that make them ideal for a wide variety of applications. They are very hard and strong, with high wear and corrosion resistance. It is an excellent insulator, both electrically and thermally, and can withstand high temperatures without decomposing. Additionally, ceramics are biocompatible, making them ideal for use in medical devices and implants. These properties make ceramics an integral part of many modern technologies, from aerospace to electronics to healthcare.

Growing Usage of Advanced Ceramics in Healthcare Sector

Bio ceramics refers to a class of ceramic materials used to repair or replace damaged bone tissue. They offer many advantages such as biocompatibility, non-toxicity, and dimensional stability endodontic applications. Bio ceramics are mainly used as medical implants, in loose form or as coatings and fillers. Orthopedic surgeries using bio ceramic implants surgically include hard tissue replacements such as hips, knees, joints, skulls, jaws, and spines. With the aging of the world population, the use of bio ceramics has become popular.

Advanced ceramic materials are represented by dental ceramics, including orthodontic appliances (such as braces), prosthetics (such as crowns and bridges), and implants (such as all-ceramic root implants). Materials currently used in common dental ceramic systems are silica, leucite, lithium disilicate, alumina, and zirconia-based materials. It has excellent toughness, strength, fatigue resistance, as well as excellent wear resistance and biocompatibility. In addition, ceramic materials aesthetically match the natural color of teeth and perform better than traditional metal products. Additionally, these advanced ceramics are lighter than most metals, making them suitable for medical applications and capable of withstanding a combination of extreme conditions for extended periods of time. This drives market demand for the Advanced Ceramics Material Market.

Role of Advanced Ceramics in Aerospace Industry:

Advanced ceramics have some properties superior to metal-based systems when used as engineering materials. These properties include high wear resistance, excellent high temperature strength, chemical inertness, high processing speed, and dimensional stability. Its hardness, physical stability, extreme heat resistance, chemical inertness, excellent electrical properties, and suitability for mass production make it one of the most versatile materials. Advanced ceramics are used in aerospace, where turbine blades are used to withstand conditions of extreme temperatures and pressures. These favorable properties make high-performance ceramics the best alternatives to metals and plastics. Additionally, these advanced ceramics are lighter than most metals, making them suitable for medical applications and capable of withstanding a combination of extreme conditions for extended periods of time, thus driving market demand for the Advanced Ceramic Material.

Usage in Automotive Industry

Recent advancements in battery technology place new demands on thermal

management systems. Next-generation hybrid vehicles can use ceramic materials for various substrates in batteries, electric motors, charger thermal management, and high and low voltage circuit carriers. Additionally, precision-machined ceramic shafts and bearings would be used in next-generation hybrid vehicle water cooling pumps to cool critical engine electronics and lithium-ion batteries. Ceramic products not only have excellent chemical resistance to glycol-based coolants and a long service life, but contribute to improved fuel efficiency and quietness due to their light weight. For example, boron carbide ceramics are used in automotive brake pads, and silicon carbide ceramics are used in high performance brake discs due to their ability to withstand extreme temperatures.

Use in Electronic Industry

A substrate is a thin, flat fired material. Ceramics have excellent thermal and dielectric properties, making them suitable materials for substrates. There are three types of ceramic substrate materials which are widely used namely are aluminum oxide (Al_2O_3), aluminum nitride (AlN), and beryllium oxide (BeO). Ceramic substrates have the advantages of low dielectric constant and dielectric loss, high thermal conductivity and high chemical stability. Ceramic electronic sensors are often used in machines and systems that meet high requirements as ceramic materials combine high strength, thermal stability, and corrosion resistance. It mainly monitors non-electrical variables such as temperature, pressure, flow, distance, acceleration, moisture content and gas concentration, and converts these variables to electrical signals for processing in downstream electronics. Quartz glass is the most widely used ceramic in the semiconductor industry. Applications in the semiconductor industry include silicon ingot pulling crucibles, silicon epitaxial deposition reactors, wafer carriers, single wafer processing equipment, wet etch tanks, and complex machined parts. Aluminum oxide is electrically and thermally insulating. Widely used in semiconductor wafer processing equipment. Silicon nitride ceramic ball bearings are one of the traditional applications in the semiconductor industry.

Market Segmentation

The Global Advanced Ceramics Market is segmented based on material, class, end user, and region. Based on material, the market is bifurcated into alumina, zirconia, silicon, titanate, and others. Based on class, the market is bifurcated into monolithic ceramics, ceramic coatings, and ceramic matrix composites. Based on end user, the market is bifurcated into electrical & electronics, transportation, medical, and others. Based on region, the market is further bifurcated into North America, Asia-Pacific,

Europe, South America, Middle East & Africa.

Market players

The main market players in the Global Advanced Ceramics Market are Ceramtec GmbH, Kyocera Corporation, Rauschert Steinbach GmbH, Blasch Precision Ceramics Inc., Saint-Gobain Ceramic Materials, Morgan Advanced Materials PLC, Coorstek Inc., Ceradyne Inc., Rauschert Steinbach GmbH, Blasch Precision Ceramics Inc.

Report Scope:

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

Advanced Ceramics Market, By Material:

Alumina

Zirconia

Silicon

Titanate

Others

Advanced Ceramics Market, By Class:

Monolithic Ceramics

Ceramic Coatings

Ceramic Matrix Composites

Advanced Ceramics Market, By End User:

Electrical & Electronics

Transportation

Medical

Others

Advanced Ceramics Market, By Region:

North America

United States

Canada

Mexico

Asia-Pacific

India

Japan

South Korea

Australia

China

Europe

Germany

United Kingdom

France

Italy

Spain

South America

Brazil

Argentina

Colombia

Middle East

Saudi Arabia

South Africa

UAE

Competitive Landscape

Company Profiles: Detailed analysis of the major companies present in the Global Advanced Ceramics Market.

Available Customizations:

Global Advanced Ceramics 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 ten).

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