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# Advanced Ceramics

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US Industry Study with Forecasts for **2012 & 2017**

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Study #2433 | December 2008 | \$4600 | 243 pages

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*Advanced ceramics will continue to penetrate applications such as capacitors, cutting tools, orthopedic joint implants, and membranes, where they are valued for their performance.*

## US demand to increase 3.8% yearly through 2012

Demand for advanced ceramics in the United States is forecast to increase 3.8 percent per year to \$12.6 billion in 2012. Following a few years of contracting demand in the early 2000s, the advanced ceramics industry rebounded between 2003 and 2007. Going forward, growth will decelerate as the industry faces recessionary macroeconomic conditions in the short term. Restraining demand further will be lower requirements for body armor, as the incoming administration's strives to significantly reduce military involvement in Iraq. Nevertheless, advanced ceramics will continue to penetrate applications such as capacitors, cutting tools, orthopedic joint implants, and membranes, where they are valued for their favorable performance characteristics.

## Medical product market to post most rapid gains

The use of advanced ceramics is highly dependent on the health of the electronic components and electrical equipment industries, which combined accounted for 43 percent of total demand in 2007. Although Asia dominates the electronics industry, opportunities still exist in the US. Growth will arise due to materials substitution, as ceramics gain use over alternatives, as is the case with some capacitors. However, the US electronic components industry is projected to remain sluggish, limiting further advanced ceramics demand. Growth in



electrical equipment will remain favorable, albeit decelerating from rates achieved during the 2002 to 2007 period. Permanent magnets will benefit from an acceleration in small car production, where these products are commonly used. Maintenance requirements of the large installed base of insulators will also provide opportunities.

The medical product market will post the most rapid gains, benefiting from the increasing utilization of ceramics in joint implants and dental procedures. Demographic trends will also provide opportunities, as older individuals tend to require more joint replacements or dental work. In joint replacement, ceramics are valued because they are chemically

inert, promote tissue and bone growth, and are not susceptible to attack by the body's immune system. In dental applications, ceramics are valued for their opalescence.

## Ceramic matrix composites to be fastest growing type

Monolithic ceramics (unreinforced ceramics cast directly into final form) represent the dominant and best established segment of the industry. However, ceramic matrix composites and ceramic coatings will achieve the more rapid gains, primarily due to their favorable performance characteristics, such as enhanced strength and durability.

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## Sample Text, Table & Chart

### PRODUCTS

#### Engine Parts

Consumption of monolithic ceramics in engine part application is forecast to increase 3.3 percent in 2007. Gains will benefit from a recovery in production expected to achieve favorable margins in the 2007 period. A projected acceleration in 2007 will also provide opportunities for...

**SAMPLE TEXT**

Engine parts for motor vehicles account for the majority of demand, with aerospace equipment accounting for the remainder. The most widely used ceramic products in automotive production are valve components, sparkplug insulators, seals and piston rings. Other ceramic products -- such as turbochargers and turbine engine rotors -- have been produced, although they are not in commercial production. The most commonly used ceramic materials in engine parts are alumina and silicon nitride.

The development of larger ceramic auto engine parts has been pursued for several decades. For example, the Office of Transportation Technologies (part of the Department of Energy) has been examining the development of ceramic automotive components for nearly 20 years through a program called the Ceramic Technology Project. Originally slated to conduct research designed to make ceramics more durable, the primary focus now is on developing technologies for making ceramics production cheaper. Other government agencies, as well as research organizations and the auto companies themselves, have invested considerable effort in developing ceramic automotive products.

The potential advantages are huge. An all-ceramic engine, for example, would be far lighter than a conventional engine constructed primarily of metal, which would significantly reduce vehicle weight and thereby greatly improve gas mileage. In addition, such an engine would

75

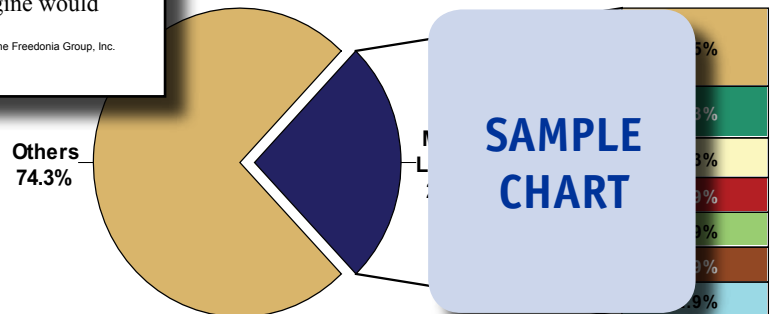
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**TABLE III-4**  
**FERRITE CERAMICS DEMAND**  
 (million dollars)

Item	1997	2002	2007	2012	2017
Manufacturers' Shipments (bil \$)					40
\$ ferrite ceramics/mil \$ shpts					72
Ferrite Ceramics Demand					40
Electrical Products					30
Transportation					30
Other Markets					80
% ferrites					0.6
Advanced Ceramics Demand					00

**SAMPLE TABLE**

**CHART VI-1**  
**CERAMICS MARKET SHARE BY COMPANY, 2007**  
 (\$10.5 billion)

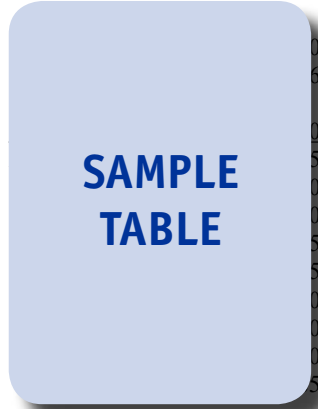


**SAMPLE CHART**

## Sample Profile, Table & Forecast

**TABLE V-1**  
**ADVANCED CERAMICS DEMAND BY MARKET**  
 (million dollars)

Item	1997	2002	2007	2012	2017
Manufacturers' Shipments (bil \$) \$ ceramics/000\$ shpts					
Advanced Ceramics Demand					
Electronic Components					
Electrical Equipment					
Industrial Machinery					
Transportation Equipment					
Chemical & Plastic					
Body Armor					
Environmental					
Medical Products					
Other Markets					



### COMPANY PROFILES

**CerCo LLC**  
 453 West McConkey Street  
 Shreve, OH 44676  
 330-567-2145  
 http://www.ce



Annual Sales:  
 Employment:

Key Products: ings, ceramic  
 grinding medi

CerCo produces and sells kiln furniture, ceramic armor, grinding media and mill linings, wear-resistant ceramic products and advanced structural components for the ceramic, electronic, aerospace, brick and clay, coal, mineral and other industries. The Company is privately held.

The Company participates in the US advanced ceramics industry through the production of structural ceramics, alumina ceramic linings, ceramic grinding media and ceramic coatings. Structural ceramics products from CerCo are designed for use in such applications as ball valve components, mechanical wear, electronics, prototyping, body armor and microwaves. Typical properties of these ceramics products include high mechanical strength; extreme temperature stability; impenetrability to liquid and gas; and resistance to electricity, wear, corrosion and chemicals. Among CerCo's structural ceramics products are ZIRMONITE ceramics for fluid handling applications, as well as DIAMONITE alumina oxide products.

Alumina ceramic linings from the Company are designed to offer resistance to abrasion, corrosion, wear and erosion for such material

"Demand for advanced ceramics in the electrical equipment market is projected to increase 5.0 percent per year to \$2.4 billion in 2012. The electrical equipment market is a relatively mature market for advanced ceramics, and is sensitive to overall economic trends, particularly in industrial machinery manufacture and construction activity. Consequently, demand fell during the recessionary years of the early 2000s, before stabilizing in 2003 and growing through 2007. Going forward, growth will ..."  
 --Section V, pg. 118

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**OTHER STUDIES**

**Metal Powders**

US metal powder demand through 2012 will improve from a flat 2002 to 2007 performance. Gains will be supported by new uses for many types of metal powders (e.g., iron and steel, stainless steel, aluminum, tungsten). An improved outlook for electronics -- which use the most expensive metal powders -- will boost total value demand. This study analyzes the \$3.5 billion US metal powders industry, with forecasts for 2012 and 2017 by product, application and market. It also evaluates market share and profiles industry players.

#2397 ..... 11/2008..... \$4600

**Orthopedic Implants**

US orthopedic implant demand will grow 8.9% annually through 2012. Knees and hips will continue to claim most reconstructive joint replacements. New technologies and surgical techniques will boost demand for spinal implants. Orthobiologics will benefit from breakthroughs in biotechnology and nanotechnology. This study analyzes the \$14.3 billion US orthopedic implant industry, with forecasts for 2012 and 2017 by product and market. It also evaluates company market share and profiles industry players.

#2372 ..... 07/2008..... \$4500

**Advanced Flat Glass**

Demand for advanced flat glass in the US will grow 5% annually through 2012. Ongoing rapid growth in a variety of emerging technologies (e.g., smart glass, self-cleaning glass) and strong gains in laminated glass used as hurricane glass, ballistic glass and burglary resistant glass will help drive gains. This study analyzes the \$5.6 billion US advanced flat glass industry, with forecasts for 2012 and 2017 by product and market. It also considers market environment factors, profiles industry competitors and evaluates their market share.

#2342 ..... 06/2008..... \$4500

**Dental Products & Materials**

US demand for dental products will rise 4.5% per year through 2012, aided by favorable population trends and continued interest in cosmetic dentistry. More concern about overall good health will provide added opportunities for mouthwash/dental rinses, sealants, fluoride treatments and other products. This study analyzes the US dental product and material industry, with forecasts for 2012 and 2017 by product and raw material. It also evaluates company market share and profiles leading industry competitors.

#2313 ..... 03/2008..... \$4500

**World Nanomaterials**

The global market for nanomaterials will reach \$4.2 billion by 2011 and remain concentrated in the US, Western Europe and Japan. Products making the greatest initial commercial impact are nanoscale versions of conventional materials such as silica, titanium dioxide, alumina, iron oxide, and zinc oxide. This study analyzes the \$1 billion global nanomaterials industry, with forecasts for 2011, 2016 and 2025 by product, market, world region and for 15 countries. It also discusses R&D and profiles major participants.

#2215 ..... 08/2007..... \$5500

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