US demand to increase 4% annually through 2012

Demand for advanced ceramics in the United States is forecast to increase 4.0 percent per year to over $12 billion in 2012. Gains will benefit as advanced ceramics continue to penetrate several applications -- such as capacitors, cutting tools, joint implants and membranes -- where ceramics are valued for their favorable performance characteristics.

The use of advanced ceramics is highly dependent on the health of the electronic component and electrical equipment industries, which combined accounted for 43 percent of total demand in 2007. Opportunities in the electronic components industry will arise due to material substitution, as ceramics gain use over alternatives, as in the case with some capacitors. However, the electronic components industry is projected to remain sluggish, limiting further advanced ceramics demand. The electrical equipment market is sizeable but relatively mature with a comparatively low level of new product development. After experiencing significant gains during the 2002 to 2007 period, electrical equipment output will post a marked deceleration through 2012, restricting advanced ceramics demand for items such as insulators.

Medical markets to offer good opportunities

The chemical and plastic, environmental, industrial machinery and medical product markets will post above-average gains. Ceramics will find greater use in the chemical and plastic market, with the most growth arising from membranes. In this application, growth will accrue due to ceramic’s performance advantages such as toleration of high temperatures and harsh chemicals that boosts gains for ceramic membranes in markets with more difficult processing conditions. Demand will also be driven by greater penetration into specialty applications such as natural gas purification. Interest in reducing the country’s dependence on foreign oil will provide opportunities for advanced ceramics in the environmental market. Emerging applications include the use of ceramic bearings in wind turbines.

Ceramics continue to gain use in various industrial machinery applications, such as cutting tools, as end users realize the performance advantages of these materials. Limiting further gains will be a deceleration in the industrial machinery industry. In the medical product market, gains will derive 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 opalescent color and translucence.

Study coverage

Advanced Ceramics is a new Freedonia industry study priced at $4600. It presents historical demand data (1997, 2002 and 2007) plus forecasts for 2012 and 2017 in current dollars by product, type and market. The study also considers US market environment factors, evaluates company market share and profiles 32 key players.

For complete details on any study visit www.freedoniagroup.com
Advanced Ceramics

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Engine Parts
Cutting Tools
Wear Parts
Other Ceramic Coatings
Ceramic Matrix Composites
Wear Parts
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Filters
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Bioceramics
Membranes
Cutting Tools
Other Monolithic Ceramics

NEW US INDUSTRY STUDY WITH FORECASTS FOR 2012 & 2017
are being incorporated, primarily because the latter two products offer certain advantages (e.g., ease of fabrication and greater strength) over monolithics. This is particularly true of larger parts, which are difficult to form as monolithic ceramics; and parts which must withstand considerable stress, and thus benefit from the added strength offered by composite construction. Silicon carbide and silicon nitride are among the types of advanced ceramics used in wear parts.

In 2007, cutting tools accounted for one-third of total advanced ceramic demand in the industrial machinery market. Cutting tools and inserts are the consumable portion of machine tools, machinery used to cut, bend, bore and otherwise shape metals. In this application, monolithic ceramics and ceramic matrix composites compete with metal, and continue to increase their share of the cutting tool market at the expense of metals, primarily due to enhanced durability. Ceramic coatings will benefit regardless of the tool substrate, as these coatings can be applied to either ceramic or metal tools. Advanced ceramic cutting tools are composed of a variety of materials, including alumina, silicon nitride and silicon carbide fiber-reinforced alumina.

Monolithic ceramic membranes are generally made using alumina ceramics; however, titinate or zirconate ceramics may also be used. These membranes are most commonly used in either microfiltration or ultrafiltration applications. Ceramic membranes were originally developed as a byproduct of nuclear research, but are currently used in applications such as specialized water treatment, food and beverage processing, fine chemical production, pharmaceutical purification, blood separation and petroleum refining.

Among the applications ceramic membranes are being developed for is the conversion of natural gas to liquid fuels and gasoline additives. These membranes replace the more common steam reforming process for producing synthesis gas (syngas), a product which is used as a fuel cell fuel or an input material for methanol or other synthetic liquid mobility fuels. Since steam reforming is very energy intensive, the use of membranes helps to greatly reduce
Other Titles from The Freedonia Group

Wind Turbine Systems & Components
This study analyzes the US wind turbine component and system industry. It presents historical demand data (1997, 2002 and 2007) and forecasts for 2012 and 2017 by product (horizontal systems, vertical systems, and nacelles, rotors and blades, towers and other components), application (utilities and on- and offgrid small wind), and US regional market. The study also considers market environment factors, outlines government incentives and regulations, evaluates company market share and profiles industry competitors.

Machine Tools in China
Machine tool demand in China will grow 13% yearly through 2012, based on rapid growth in durable goods production and infrastructure expansion and modernization. Metal cutting tools will outpace other products, spurred by strong growth in manufacturing investment. Industrial machinery will remain the largest market. This study analyzes the 328.5 billion yuan machine tool market in China, with forecasts for 2012 and 2017 by product, market and region. It also evaluates market share and profiles industry players.

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.

Specialty Silicas
US specialty silica demand will grow 5.4% annually through 2011. The dominant rubber market offers the best prospects, although the fastest gains will occur in the lower volume electrical and electronic equipment market. Fumed silica will lead gains by type based on its use in slurries that polish semiconductor substrates. This study analyzes the $1.3 billion US specialty silica industry, with forecasts for 2011 and 2016 by product and market. It also details company market share and profiles major players.

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.