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World Catalysts

Industry Study with Forecasts to **2005 & 2010**

Study #2125 | January 2007 | \$5500 | 431 pages



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Single-site catalysts will achieve double digit gains as they find greater acceptance in polymer capacity additions, especially in the Mideast where natural gas-rich nations are expanding their polymer capacity.

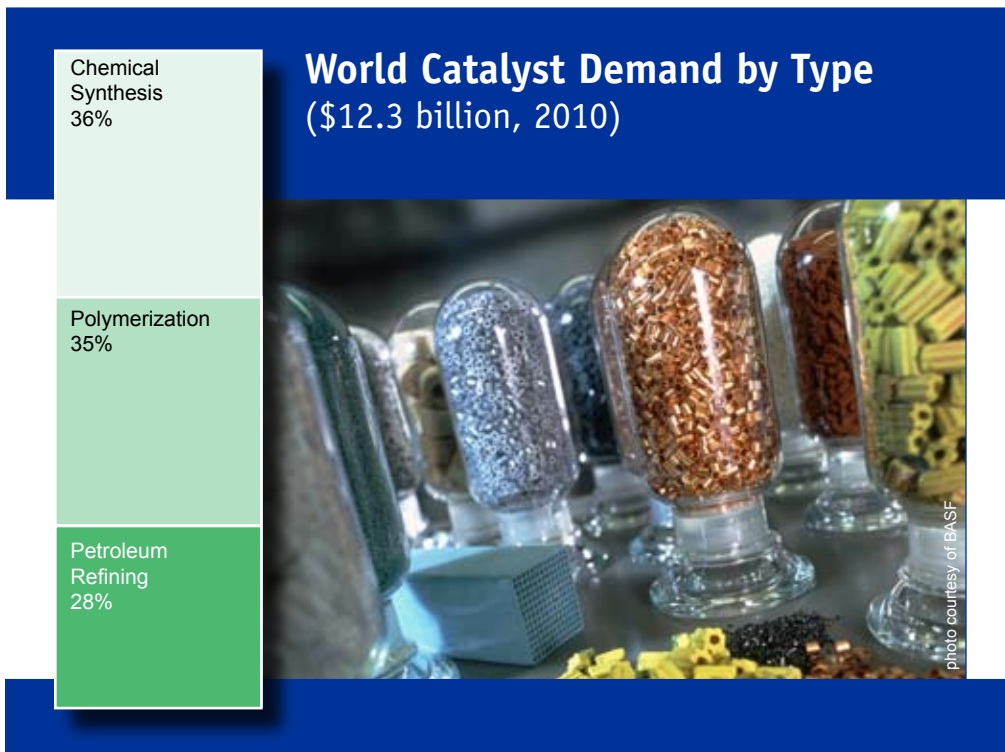
World demand to rise 3.6% annually through 2010

World catalyst demand will rise 3.6 percent per year to \$12.3 billion in 2010, aided by a healthy world economy, and growing demand by the chemical, polymer and refining industries for more energy efficient processes and products. After experiencing robust growth in recent years due to rapidly rising prices, catalyst demand will moderate in the near term due to falling raw material and energy costs. Further out, growth will accelerate as prices rise again and companies continue to move to newer, higher-value and energy efficient products.

Polymerization catalysts to grow the fastest

Reflecting continued strong growth in polymer demand and production, polymer catalysts will experience the fastest gains. Single-site catalysts will achieve double digit advances as they find greater acceptance in new capacity additions, particularly in the Mideast where natural gas-rich nations such as Iran and Saudi Arabia are rapidly expanding their polymer capacity. Other polymerization catalysts, such as the more traditional Ziegler-Natta catalysts, will also achieve strong gains, as their established track record continues to make them attractive options, particularly at existing plants.

Refining catalyst growth will be aided by strong volume gains and a continued improvement in prices for fluid catalytic cracking catalysts. However, the return



of sulfuric acid prices in North America closer to historical levels will prevent even faster advances. Slower gains in North America and Western Europe will be offset by rapid growth in Asia and other developing regions as rising per capita incomes boost gasoline demand, and as developing countries begin imposing stricter sulfur regulations to fight air pollution.

Chemical synthesis catalyst demand growth will be led by strong growth in enzymes and biocatalysts used in the production of ethanol, particularly in North America. Organic synthesis and oxidation catalysts will also experience healthy gains, though demand for hydrogenation catalysts will trail the average.

Weakness in Western Europe will be offset by expanding production in China and India, and rapid growth in the Africa/Mideast region where basic organic and petrochemical production account for a greater share of chemical output.

Organometallics to lead gains by material

Organometallic catalyst materials will achieve the fastest growth, driven by their use in polymer production. Enzymes and biocatalysts will also achieve strong gains due to the rapid increase in the production of the biofuel ethanol from corn and other starch sources. Basic and precious metal catalysts will experience moderate advances.

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Sample Text, Table & Chart

COMPANY PROFILES

Air Products and Chemicals Incorporated

7201 Hamilton Boulevard
 Allentown, PA 18195
 610-481-4911
<http://www.airproducts.com>

Sales: \$ billion (FY 2005)
 Geograph cent of total) US 50%; Europe
 29%; As da and Latin America 4%; and the
 Rest of t
 Employ

Key Products: metal-based and amine-type polyurethane catalysts

Air Products and Chemicals is a supplier of industrial gases and related equipment, and specialty and intermediate chemicals. In FY 2005, the Company operated in three segments: Gases, Chemicals and Equipment. Beginning in September 2006, Air Products reorganized into six business segments: Merchant Gases, Tonnage Gases, Electronics and Performance Materials, Equipment and Energy, Healthcare, and Chemicals.

The Company participates in the world catalyst industry through the Chemicals segment, which had FY 2006 sales of \$908 million. Included in the operations of this segment is Air Products' Polyurethane Additives business, which produces and supplies a broad range of catalysts and surfactants, as well as prepolymers and curatives, used in the manufacture of polyurethane foams, coatings, adhesives and sealants. Among these offerings are various metal-based catalysts marketed under the DABCO and POLYCAT brand names.

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TABLE VIII-17

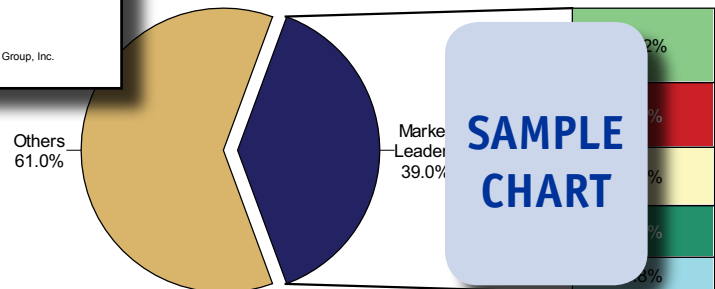
SAUDI ARABIA MACROECONOMIC INDICATORS

Item	1995	2000	2005	2010	2015
Gross Domestic Product (bil 2000\$)	212	341	393	357	423
GDP/capita	110	110	110	110	170
Population (mil)	1	1	1	1	4
Mfg Value Added (bil 2000\$)					10
Refined Products Production (mil bbls)					30
Polymer Production (000 metric tons)	1400	2710	3100	3500	15000

SAMPLE
TABLE

CHART IX-1

WORLD CATALYST MARKET SHARE, 2005 (\$10.3 billion)



*includes Engelhard's 2005 catalyst sales

SAMPLE
CHART

Sample Profile, Table & Forecast

OTHER REGIONS

Saudi Arabia: Catalyst Demand

Saudi Arabia is a major producer of crude petroleum. Over the past few years has moved aggressively to diversify its crude oil exports with related downstream petrochemicals. Saudi Arabia, utilizing advanced technologies in the region, has increased its refining capacity, but the total throughput remains small. Saudi Arabia's crude oil is sour -- that is, it contains high levels of sulfur that must be removed before the distillates can be upgraded to more valuable motor fuels for the export market.

SABIC is a state-owned conglomerate engaged in the production of petrochemicals and polymers. SABIC has led the way in expanding polymer production capacity, either through its own facilities or joint ventures. Many of the new facilities will use advanced catalyst technology from foreign companies, though SABIC is actively developing its own chemical, polymer and refining technologies.

Closely related to the expansion of polymer production has been the growth in petrochemicals and petrochemical derivatives, as they rely upon the same raw materials. Again much of the technology is being sourced from foreign countries, particularly because the chemicals being produced are made using well-established processes that have already been extensively optimized. For example, Haldor Topsoe has a contract with Mitsubishi Heavy Industries to supply Topsoe's two-step reforming technology for a new world-scale methanol plant in Al-jubail, Saudi Arabia. The methanol plant is being built by AR-RAZI, a 50/50 joint venture between SABIC and a Japanese consortium led by Mitsubishi Gas Chemical.

**SAMPLE
TEXT**

TABLE VIII-18

SAUDI ARABIA CATALYST DEMAND
(million dollars)

Item	1995	2000	2005	2010	2015
Gross Domestic Product (bil 2000\$)	200	230	270	320	380
metric tons catalyst/bil \$ GDP	42	45	48	52	55
Catalyst Demand (000 metric tons)	84	90	96	104	110
\$/metric ton	50	55	60	65	70
Catalyst Demand					
Refining Catalysts	45	48	51	54	57
Polymerization Catalysts	35	37	39	41	43
Chemical Synthesis Catalysts	4	5	6	7	8
% Saudi Arabia	20	21	22	23	24
Africa/Mideast Catalyst Demand	200	210	220	230	240

**SAMPLE
TABLE**

"Catalyst demand in Saudi Arabia will advance at a rapid 8.9 percent annual pace to \$230 million, or 25,000 metric tons, in 2010. The strongest gains -- nearly twelve percent per year -- will be in ..."

--Section VII, pg. 287

OTHER STUDIES

Oilfield Chemicals

US oilfield chemical demand will rise 4.3% per year through 2011. Gains will be driven by a rise in rig counts, more use of well stimulation and enhanced oil recovery (EOR) methods and more deepwater drilling and production. Best prospects include EOR chemicals, drilling fluids and well stimulation chemicals. This study analyzes the \$6 billion US oilfield chemical industry, with forecasts for 2011 and 2016 for formulated products and their raw materials. It also details market share and profiles major players.
 #2253 10/2007..... \$4500

World Enzymes

World demand for enzymes will grow 7.6% annually through 2011. Gains will be driven by continued robust growth in pharmaceutical enzyme demand, double-digit increases in demand for biocatalysts for drug and fine chemical production, and the rapid expansion in bioethanol production from grains. This study analyzes the \$4.1 billion world enzyme industry, with forecasts for 2011 and 2016 by product, market, world region and for 15 countries. It also evaluates market share and profiles major players.
 #2229 09/2007..... \$5400

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

Industrial Gases

This study analyzes the US industrial gas industry. It presents historical demand data for 1995, 2000 and 2005 and forecasts to 2010 and 2015 by type (e.g., nitrogen, oxygen, hydrogen, carbon dioxide, argon, helium, acetylene); and application (e.g., metal processing, chemical processing, electronics, food and beverage processing, petroleum refining, enhanced oil recovery, water treatment, healthcare). The study also considers market environment factors, evaluates company market share and profiles major players.
 #2149 02/2007..... \$4400

Amines

US amine demand will grow 3% per year through 2010. Growth will be driven by new applications (e.g., wood preservatives), fast-growing niches (e.g., glyphosate herbicides) and higher surfactant loadings in detergents and personal care products. Ethanolamines -- the largest type by volume -- will continue to show the fastest growth. This study analyzes the \$2.3 billion US amine industry to 2010 and 2015 by product and market. It also evaluates company market share and profiles leading industry players.
 #2072 08/2006..... \$4300

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