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[Table of Contents 2](#)

[List of Tables & Charts 3](#)

[Study Overview 4](#)

[Sample Text, Table & Chart 5](#)

[Sample Profile, Table & Forecast 6](#)

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World Catalysts

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

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

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Table of Contents

EXECUTIVE SUMMARY

MARKET ENVIRONMENT

General	4
World Economic Outlook.....	4
Recent Economic Performance.....	5
Macroeconomic Outlook.....	7
World Population Outlook.....	11
World Manufacturing Outlook.....	13
World Petroleum Refining Outlook.....	14
World Polymer Outlook.....	17
Environmental & Regulatory Outlook.....	19
Relationship of per Capita Catalyst	
Use to per Capita GDP.....	22
Catalyst Technology.....	26
Chemical Synthesis	26
Polymerization	29
Petroleum Refining	32
Pricing	36

CATALYST MATERIALS

General	39
Metals.....	42
Base Metals	44
Precious Metals	47
Organometallic Materials.....	49
Chemicals	51
Peroxides.....	53
Acids.....	54
Amines & Other Chemicals.....	57
Zeolites	59
Enzymes & Other Materials	62

CATALYST PRODUCTS & MARKETS

General	65
Chemical Synthesis Catalysts.....	69
Organic Synthesis Catalysts	72
Oxidation Catalysts	76
Synthesis Gas Catalysts.....	80
Hydrogenation Catalysts	84
Other Chemical Synthesis Catalysts.....	87
Polymerization Catalysts	89
Ziegler-Natta Catalysts	93
Reaction Initiators	95
Single-Site Catalysts	98
Other Polymerization Catalysts	100
Urethane Catalysts	102
Chromium Catalysts	103
Petroleum Refining Catalysts.....	104
Hydroprocessing Catalysts	107
Hydrotreating	108
Hydrocracking.....	110

Fluid Catalytic Cracking (FCC) Catalysts	111
Alkylation Catalysts	114
Reforming & Other Petroleum	
Refining Catalysts.....	117
Regional Overview.....	120

NORTH AMERICA

North America: Economic Overview	125
North America: Catalyst Demand.....	127
United States	129
Canada	135
Mexico	140

WESTERN EUROPE

Western Europe: Economic Overview.....	147
Western Europe: Catalyst Demand	150
Germany	152
France.....	157
United Kingdom.....	162
Italy	167
Belgium	171
Netherlands	176
Spain	181
Other Western Europe	185

ASIA/PACIFIC

Asia/Pacific: Economic Overview.....	190
Asia/Pacific: Catalyst Demand	194
Japan.....	197
China	203
South Korea	211
India	217
Taiwan	223
Other Asia/Pacific	228
Australia	234
Indonesia.....	235
Malaysia.....	236
Thailand.....	237

OTHER REGIONS

Other Regions: Economic Overview.....	239
Other Regions: Catalyst Demand	242
Latin America.....	245
Brazil.....	250
Other Latin America	256
Argentina.....	260
Colombia	260
Venezuela	261
Eastern Europe	261
Russia.....	267
Other Eastern Europe.....	272
Poland.....	277
Hungary.....	278

Africa/Mideast.....	278
Saudi Arabia	284
Other Africa/Mideast.....	289
Iran	294
Kuwait.....	294
Qatar.....	295
South Africa	295

INDUSTRY STRUCTURE

General	297
Market Share	301
Industry Restructuring	304
Cooperative Agreements.....	309
Research & Development.....	316
Marketing & Distribution.....	318
Competitive Strategies.....	319

COMPANY PROFILES

Air Products and Chemicals.....	322
Akzo Nobel NV.....	324
Albemarle Corporation	327
Arkema SA	331
Basell AF SCA	334
BASF AG	337
Bayer AG	343
Borealis AG	346
BP plc.....	348
Chemtura Corporation	349
Chevron Corporation	351
Chevron Phillips Chemical.....	354
Degussa AG.....	356
Dow Chemical.....	361
DuPont (EI) de Nemours.....	365
Eastman Chemical	368
Exxon Mobil	370
FMC Corporation.....	372
General Electric	374
Grace (WR) & Company	375
Haldor Topsoe A/S.....	379
Honeywell International.....	382
INEOS Group	386
Johnson Matthey	388
LANXESS AG	392
Lyondell Chemical	394
Mitsubishi Gas Chemical.....	396
Mitsui Chemicals	397
OM Group.....	400
PQ Corporation	402
Royal Dutch Shell.....	404
Sued-Chemie AG.....	409
Total SA.....	414
Univation Technologies	415
Zoom Developers Private Limited.....	416
Other Companies Mentioned in Study	418

List of Tables & Charts

EXECUTIVE SUMMARY

1 Summary Table..... 3

MARKET ENVIRONMENT

1 World Gross Domestic Product by Region ..10
2 World Population by Region12
3 World Manufacturing Value Added
by Region14
4 World Refined Petroleum Product
Output by Region.....17
5 World Polymer Production19
Cht Catalyst Use per Capita/GDP
per Capita Relationship, 200525
6 Chemical Synthesis Processes29
7 Polymers & Polymerization Processes32
8 Petroleum Refining Processes35

CATALYST MATERIALS

1 World Catalyst Demand by Material.....41
Cht World Catalyst Demand by Material, 2005.42
2 World Metal Catalyst Demand44
3 World Base Metal Catalyst Demand46
4 World Precious Metal Catalyst Demand49
5 World Organometallic Catalyst Demand51
6 World Chemical Catalyst Demand.....52
7 World Peroxide Catalyst Demand54
8 World Acid Catalyst Demand57
9 World Amine & Other Chemical
Catalyst Demand59
10 World Zeolite Catalyst Demand61
11 World Enzyme & Other
Catalyst Demand64

CATALYST PRODUCTS & MARKETS

1 World Catalyst Demand by Market68
Cht World Catalyst Demand by Market,
2005.....68
2 World Chemical Synthesis
Catalyst Demand71
Cht World Chemical Synthesis Catalyst
Demand by Type, 2005.....72
3 World Organic Synthesis
Catalyst Demand76
4 World Oxidation Catalyst Demand.....79
5 World Synthesis Gas Catalyst Demand81
6 World Hydrogenation Catalyst Demand87
7 World Other Chemical Synthesis
Catalyst Demand89
8 World Polymerization Catalyst Demand.....92
Cht World Polymerization Catalyst
Demand by Type, 2005.....93
9 World Ziegler-Natta Catalyst Demand95

10 World Reaction Initiator Catalyst Demand 97
11 World Single-Site Catalyst Demand 100
12 World Other Polymerization
Catalyst Demand 101
13 World Petroleum Refining
Catalyst Demand 106
Cht World Petroleum Refining Catalyst
Demand by Type, 2005..... 107
14 World Hydroprocessing Catalyst Demand 108
15 World Fluid Catalytic Cracking
Catalyst Demand 114
16 World Alkylation Catalyst Demand 117
17 World Reforming & Other Petroleum
Refining Catalyst Demand 120
18 World Catalyst Demand by Region 124
Cht World Catalyst Demand by Region, 2005 124

NORTH AMERICA

1 North America Macroeconomic
Indicators..... 126
2 North America Catalyst Demand 128
Cht North America Catalyst Demand, 2005 ... 129
3 United States Macroeconomic
Indicators..... 132
4 United States Catalyst Demand 135
5 Canada Macroeconomic Indicators..... 138
6 Canada Catalyst Demand..... 140
7 Mexico Macroeconomic Indicators 143
8 Mexico Catalyst Demand 146

WESTERN EUROPE

1 Western Europe Macroeconomic
Indicators..... 149
2 Western Europe Catalyst Demand 151
Cht Western Europe Catalyst Demand, 2005.. 152
3 Germany Macroeconomic Indicators..... 154
4 Germany Catalyst Demand..... 157
5 France Macroeconomic Indicators..... 160
6 France Catalyst Demand..... 162
7 United Kingdom Macroeconomic
Indicators..... 165
8 United Kingdom Catalyst Demand 167
9 Italy Macroeconomic Indicators 169
10 Italy Catalyst Demand 171
11 Belgium Macroeconomic Indicators 174
12 Belgium Catalyst Demand 176
13 Netherlands Macroeconomic
Indicators..... 178
14 Netherlands Catalyst Demand 181
15 Spain Macroeconomic Indicators..... 183
16 Spain Catalyst Demand..... 185
17 Other Western Europe
Macroeconomic Indicators 187
18 Other Western Europe
Catalyst Demand..... 189

ASIA/PACIFIC

1 Asia/Pacific Macroeconomic Indicators .. 193
2 Asia/Pacific Catalyst Demand 196
Cht Asia/Pacific Catalyst Demand, 2005..... 197
3 Japan Macroeconomic Indicators 200
4 Japan Catalyst Demand 203
5 China Macroeconomic Indicators..... 207
6 China Catalyst Demand..... 211
7 South Korea Macroeconomic Indicators.. 214
8 South Korea Catalyst Demand 217
9 India Macroeconomic Indicators 220
10 India Catalyst Demand 223
11 Taiwan Macroeconomic Indicators 226
12 Taiwan Catalyst Demand 228
13 Other Asia/Pacific Macroeconomic
Indicators..... 231
14 Other Asia/Pacific Catalyst Demand 234

OTHER REGIONS

1 Other Regions Macroeconomic
Indicators..... 242
2 Other Regions Catalyst Demand 244
Cht Other Regions Catalyst Demand, 2005.... 245
3 Latin America Macroeconomic
Indicators..... 248
4 Latin America Catalyst Demand..... 250
5 Brazil Macroeconomic Indicators..... 253
6 Brazil Catalyst Demand..... 255
7 Other Latin America Macroeconomic
Indicators..... 258
8 Other Latin America Catalyst Demand 259
9 Eastern Europe Macroeconomic
Indicators..... 264
10 Eastern Europe Catalyst Demand 267
11 Russia Macroeconomic Indicators..... 270
12 Russia Catalyst Demand..... 272
13 Other Eastern Europe Macroeconomic
Indicators..... 275
14 Other Eastern Europe Catalyst Demand.. 276
15 Africa/Mideast Macroeconomic
Indicators..... 282
16 Africa/Mideast Catalyst Demand 284
17 Saudi Arabia Macroeconomic Indicators . 287
18 Saudi Arabia Catalyst Demand 289
19 Other Africa/Mideast Macroeconomic
Indicators..... 291
20 Other Africa/Mideast Catalyst Demand ... 293

INDUSTRY STRUCTURE

1 World Catalyst Sales by Company, 2005.. 299
Cht World Catalyst Market Share, 2005 303
2 Selected Acquisitions & Divestitures..... 306
3 Selected Cooperative Agreements..... 311

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.

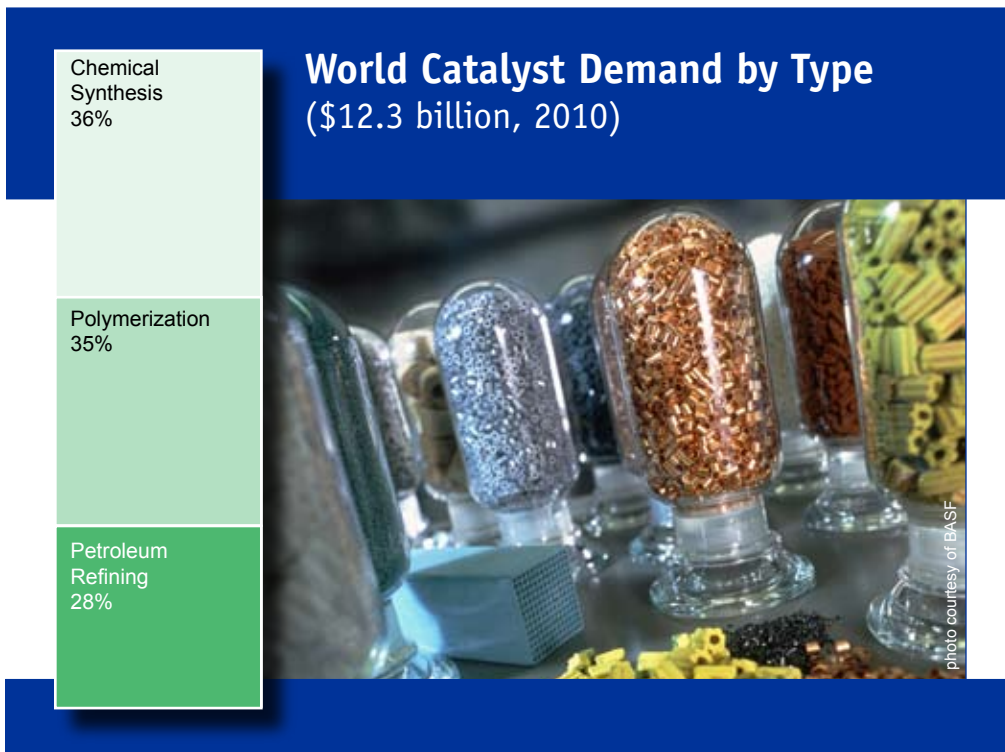
World demand to rise 3.6% annually through 2010

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.

322

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TABLE VIII-17

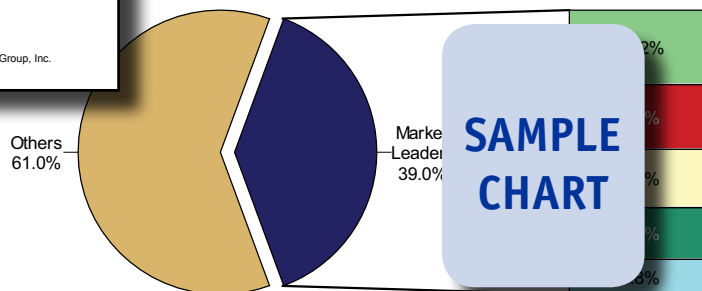
SAUDI ARABIA MACROECONOMIC INDICATORS

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 economy away from its crude oil exports with related downstream petrochemicals. Saudi Arabia has been producing petroleum products in Saudi Arabia, utilizing advanced refining technologies. Saudi Arabia has the largest refining capacity in the region, with a total capacity of 1.5 million metric tons per day. Saudi Arabia's 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	75	80	85	90	95
Polymerization Catalysts	5	6	7	8	9
Chemical Synthesis Catalysts	4	4	4	4	4
% Saudi Arabia	20	22	24	26	28
Africa/Mideast Catalyst Demand	200	220	240	270	300

**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

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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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