Freedonia Industry Study #1555

# *Fluorochemicals*

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***Fluorochemicals,*** a new study from The Freedonia Group, provides you with an in-depth analysis of major trends in the industry and the outlook for product segments and major markets -- critical information to help you with strategic planning.

This brochure gives you an indication of the scope, depth and value of Freedonia's new study, *Fluorochemicals*. Ordering information is included on the back page of the brochure.

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# *Study Highlights*

- Demand for fluorochemicals in the US is projected to increase 1.4 percent per year to 1.5 billion pounds in 2006, boosted by continued growth in refrigerant and coatings uses, the largest fluorochemical outlets.

- Specialty organics and gases are expected to register above average growth due to their increasing use in electronics.

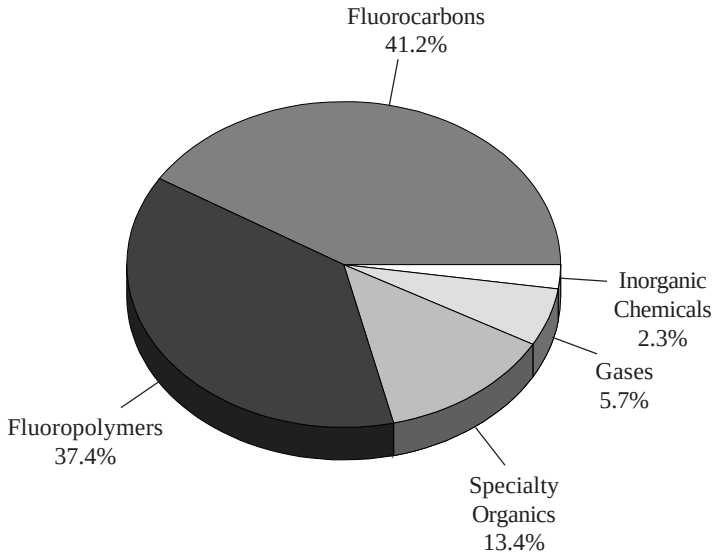
- Fluorocarbons will still represent the largest product class of fluorochemicals, accounting, for more than 60 percent of volume and 40 percent of market value in 2006.

- Refrigerants will remain the most important market for fluorochemicals, accounting for 28 percent of fluorochemical demand in value terms.

- Leading suppliers of fluorochemicals to the US market include DuPont, 3M, Honeywell, Solvey and Atofina. These companies combined to account for nearly 60 percent of total sales in 2001.

# *Study Highlights*

## Fluorochemicals Demand, 2001




**Fluorochemicals Demand**

(million dollars)

| Item | 1992 | 2001 | 2006 | 2011 | % Annual Growth 01/92 | % Annual Growth 06/01 |
|---|---|---|---|---|---|---|
| Gross Domestic Product (bil 1996$) | 6880 | 9334 | | | | 2.9 |
| lb fluorochem/000$ GDP | 0.19 | | | | | |
| Fluorochemicals Demand (mil lb) | 1320 | | | | | |
| $/lb | 1.61 | | | | | |
| Fluorochemicals Demand | 2125 | 3 | | | | |
| Fluorocarbons | 1075 | | | | | |
| Fluoropolymers | 685 | | | | | |
| Specialty Organics | 230 | | | | | |
| Gases | 41 | | | | | |
| Inorganic Chemicals | 94 | | | | | .4 |

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# *Market Environment*

The Market Environment Section discusses factors influencing fluorochemicals demand, including competitive technologies and the regulatory environment, as well as Freedonia's uniquely developed macro-economic indicators.

**This information provides you with an understanding and an analysis of the climate in which the fluorochemicals industry operates.**



**Regulatory Environment - US Regulations**

US environmental regulations co... ...carbons have been passed to satisfy the terms of the M... ...equent revisions. The US Senate must ratify all ... ...e force of law in the US. The EPA is charged w... ...nal agreement within the US under the Clean Air Ac... ...1990, which stipulate the conditions of the US phaseouts on the production and import of CFCs and HCFCs.



The US follows international controls on the production of ozone-depleting chemicals per the Montreal Protocol in 1987 and its phaseout acceleration amendments in 1990 (London) and 1992 (Copenhagen). Additional adjustments to the protocol were made at Vienna in 1995, but they have not entered into force or been ratified by the US Senate.

The EPA is required to add any substance that meets a statutory trigger (an ODP of 0.2 or greater) to a list of designated Class I substances and set a phaseout schedule of no more than seven years. Also, the EPA is required to add any substance that is known or may be reasonably anticipated to harm the stratosphere to a list of less depleting Class II substances and set a phaseout schedule of no more than ten years.

As of July 1, 1992, the EPA required that Class I substances used as refrigerants have the lowest achievable level of consumption and emissions, maximum recycling, and safe disposal. Furthermore, it became illegal to service commercial and residential refrigeration equipment containing Class I or II substances by venting or unapproved fluorocarbon disposal. It became illegal to vent Class I or II motor vehicle air conditioning refrigerants on January 1, 1992 for large repair

# *Products*

The Products Section provides demand for historical years and forecasts growth to 2006 and 2011.

This information helps you:

- **Analyze your company's growth potential in the industry.**
- **Outline your strategic plans for five and ten years out.**
- **Establish sales goals.**



**HFC-134a**

Demand fo[r] [t]hane) is projected to increase 8.9 percent per year to [2]on. Advances will be led by increased use in com[mercial] where HFC-134a is replacing HCFC-22 and othe[r] [t]o be substantial in the automotive air conditioning a[pplica]ough it is a more mature segment for HFC-134a. Growth for HFC-134a as a foam blowing agent as well as in newer applications such as tire inflators and aerosol propellants will also be considerable.

HFC-134a benefits from its stability, low VOC emissions and nonflammability compared to other fluorocarbons. Additionally, it is not considered an ozone depleting substance. However, there are environmental concerns about HFC-134a, most notably in terms of its global warming potential.

Refrigerant uses will remain the most important application for HFC-134a, accounting for nearly 85 percent of demand in 2006. Motor vehicle applications account for a majority of refrigerant usage. Motor vehicle manufacturers favor HFC-134a because it offers performance comparable to R-12 and does not require extensive design changes to air conditioner systems. Later model cars using R-12 refrigerant systems can be fairly easily and usually inexpensively retrofitted to use HFC-134a. HFC-134a can also be used in older model cars, but at a greater retrofitting cost, due to the need to replace the lubricant and several components.



**Tungsten Hexafluoride Demand**
(million dollars)

| Item | 1992 | 1996 | 2001 | 2006 | 2011 |
|---|---|---|---|---|---|
| Manufacturers' Shipments (bil 1996$) | 3094 | 35[illegible] | | | [illegible]60 |
| lb WF6/mil $ shpts | 0.01 | | | | |
| Tungsten Hexafluoride (mil lb) | 0.03 | | | | |
| $/lb | 133.30 | 142[illegible] | | | [illegible]40 |
| Tungsten Hexafluoride Demand | 4 | | | | |
| % WF6 | 9.8 | | | | |
| Inorganic Fluorine Gases Demand | 41 | [illegible] | | | [illegible]55 |

# *Functions & Markets*

The Functions and Markets Section analyzes trends and considers the threats and opportunities in each of the major markets for fluorochemicals.

The information presented will help you:

- **Focus your sales and marketing efforts on high growth areas.**
- **Propose new areas for development.**



**Wire & Cable - Fluorochemicals Demand**

Demand for fluorochemic… …s is projected to increase 6.3 percent per year to 5… …illion, based primarily on strong demand for ele… …Ns. LANs connect computers and allow the transfer… …een them. Fluoropolymer demand is expected to be strongest in higher-value wire and cable applications. First, growth for those types of wire and cable is projected to outpace the overall average for wire and cable. Second, wire and cable intended for more routine use is usually jacketed with lower-value coatings. In high-speed data transmission lines, fluoropolymers receive less competition from other materials, due to their extremely low dielectric constant and thus minimized signal interference. Expansion of plenum networks has been a major factor driving the use of FEP and … the …ion, …n for …cable …s, …s …se of …per …reatly …ates …veen



**Electronics Market for Fluorochemicals**
(million dollars)

| Item | 1992 | 1996 | 2001 | 2006 | 2011 |
|---|---|---|---|---|---|
| Electronic Components Shpts (mil $) | 71.4 | 126.0 | | | |
| lb fluorochems/mil $ shpts | 84 | 79 | | | |
| Electronics Fluorochemical Demand | 6 | 10 | | | |
| Fluoropolymers: | 4 | 7 | | | |
| PTFE | 2 | 3 | | | |
| PVDF | 1 | | | | |
| Other | 1 | | | | |
| Specialty Organics | 2 | | | | |
| Inorganic Fluorine Gases | -- | 1 | | | |
| $/lb | 15.00 | 15.00 | | | |
| Electronics Fluorochemicals (mil $) | 90 | 150 | | | |
| % electronics | 4.2 | 5.8 | | | |
| Fluorochemicals Demand (mil $) | 2125 | 2595 | | | |

# *Industry Structure*

Gain a better understanding of your competition and analyze your company's position in the industry with information about:

- **market share**
- **industry restructuring**
- **research & development**
- **manufacturing**
- **marketing & distribution**
- **competitive strategies**
- **cooperative agreements**



**Research & Development**

Inorganic chemicals are relatively mature commodities and are not often the focus of industrial research programs. As a result, research and development in the fluorochemicals industry is focused primarily on higher value fluorocarbons, fluoropolymers, and specialty gases and organic chemicals. A good deal of fluorocarbon research and development is dedicated to developing suitable replacements for products tha[illegible]ased out. Overall, though, fluorochemicals are a res[illegible]due to environmental regulations and strong d[illegible]arkets.



One potential specialized applicat[illegible]emicals is to serve as artificial blood. Researchers at the State University of New York at Buffalo have collaborated with Sonus Pharmaceuticals to develop perfluoropentane emulsions for oxygen delivery systems. Oxygen carrying products may hold the promise of eliminating the need for blood cross-matching and typing, and, in addition, there would be no risk of contamination from blood-borne diseases. Tests have indicated that this gaseous fluorocarbon is much more effective than liquid fluorocarbons for delivering oxygen. The calculations from these models demonstrate that the perfluoropentane emulsions can carry more than 600 times as much oxygen as another fluorocarbon currently under clinical development.

DuPont Dow Elastomers continues to add new products to its VITON fluoroelastomer line in response to automakers' extended warranty standards. Engines that run hotter and more aggressive lubricants have spurred development of VITON TBR and VITON IBR. VITON TBR offers extreme temperature and chemical resistance and is recommended for use in wheel bearing, differential, engine crankshaft, camshaft and valve stem seal applications. For applications demanding less chemical inertness, DuPont Dow has developed VITRON IBR for powertrain seal-making customers that do not want to use overengineered

# *Company Profiles*

The Profiles Section analyzes 28 companies active in the U.S. fluorochemicals market. These profiles represent a sampling or cross-section of the types of companies involved in the industry.

Divisions, subsidiaries, joint ventures, etc., are discussed under appropriate parent companies.

Sources for profiles included:

- **Information provided by key staff members in the respective companies**
- **Annual reports**
- **10-K reports**
- **Security analysts reports**
- **Corporate product literature**



**Total Fina Elf SA**
2, place de la Coupole
La Défense 6
92400 Courbevoie
France
331-4744-4546
http://www.totalfinaelf.com

Atofina Chemicals Incorporated
2000 Market Street
Philadelphia, PA 19103
215-419-7000
http://www.atofinachemicals.com

Sales: $
North )
Employ



Key Products: fluorocarbons, fluoropolymers, and selected inorganic and specialty fluorines

Atofina was the fifth leading supplier of fluorochemicals to the US market in 2001, with an estimated share of seven percent. It is a producer of fluoropolymers, but its market position is largely a result of its strength in fluorocarbons.

*Atofina Chemicals' Fluorochemical Products* -- Fluorochemicals produced by the company include fluorocarbons, fluoropolymers and inorganic fluorines. Fluorocarbon products, offered by Atofina Chemicals under the FORANE brand name, include various HFCs, HCFCs and blends used as refrigerants, foam blowing agents

# *Companies Profiled*

Air Products and Chemicals Incorporated
  Solkatronic Chemicals
Alcoa Incorporated
Asahi Glass Company Limited
  AGA Chemicals Incorporated
Bayer AG
CFC Refimax LLC
  InterCool Distribution LLC
Chromatics Incorporated
Ciba Specialty Chemicals Incorporated
Clariant International Limited
Daikin Industries Limited
  MDA Manufacturing Incorporated
DuPont (EI) de Nemours
Edison SpA
  Montedison SpA
GenTek Incorporated
  General Chemical Corporation
Great Lakes Chemical Corporation
Halocarbon Products Company
Honeywell International Incorporated
IMC Global Incorporated
Imperial Chemical Industries plc
INEOS Group Holding plc
  ICI Klea
Intermagnetics General Corporation
LaRoche Industries Incorporated
Makhteshim-Agan Industries Limited
  Milenia Agro Ciencias SA
Occidental Petroleum Corporation
  OxyChem
Saint-Gobain
  Chemfab Corporation
Solvay SA
  Alventia LLC
  Ausimont USA Incorporated
Spectrum Laboratory Products Incorporated
3M Company
  Alventia LLC
  Dyneon LLC
  MDA Manufacturing Incorporated
  Minnesota Mining and Manufacturing Company
Total Fina Elf SA
  Atofina Chemicals Incorporated
Toxco Incorporated
  Ozark Fluorine Specialties Incorporated



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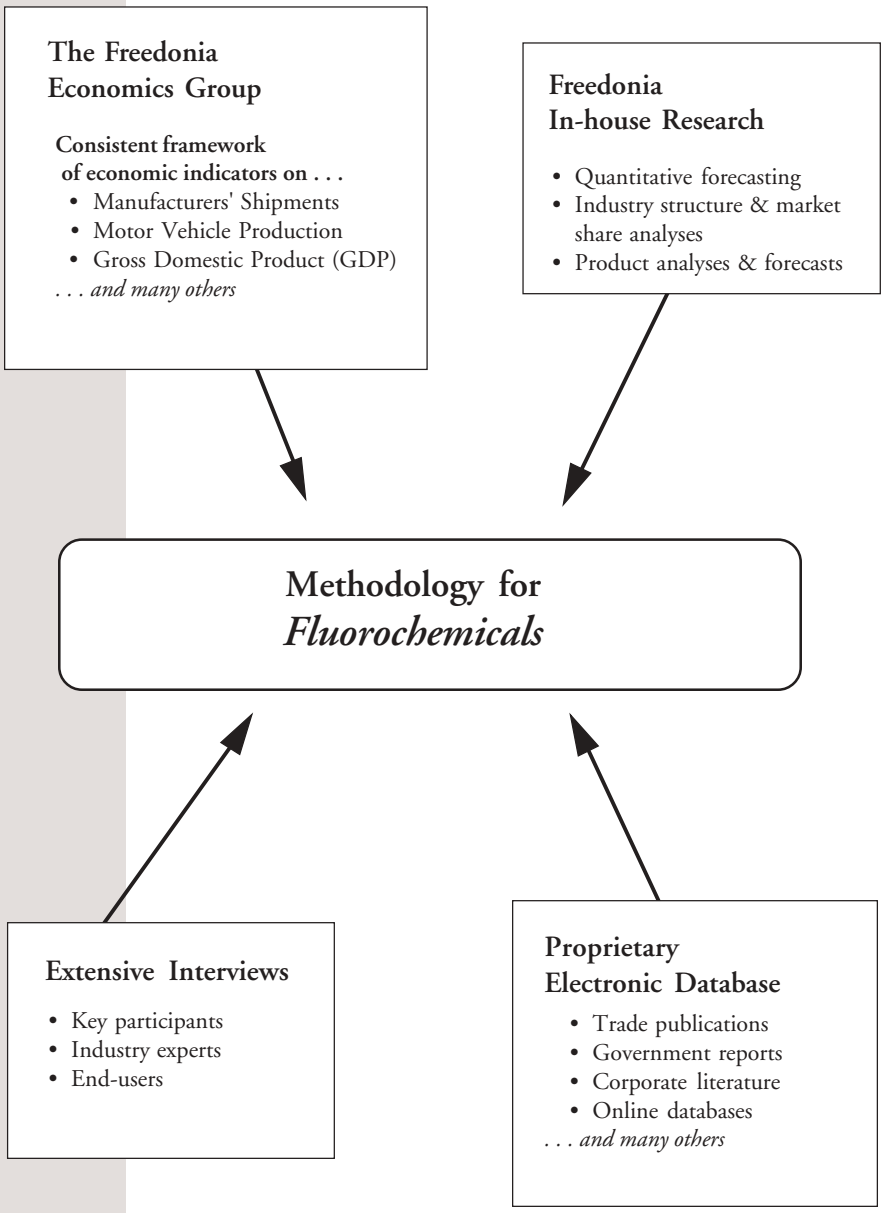
# *Forecasting Methodology*

Freedonia does not just collect and reprint data; Freedonia develops data. Our analysts thoroughly investigate an industry by extensively interviewing key industry participants and analyzing information from sources such as associations, government and trade literature. Once this research is complete, Freedonia establishes one set of forecasts. All writing, editing and forecasting is done in-house to assure quality and consistency. In cases where data does not exist, Freedonia develops the data based on input/output ratios, bills of materials and flow charts. The following chart summarizes Freedonia's methodology:



# *About The Freedonia Group*

**The Freedonia Group, Inc.** is a leading international industry study/ database company.

Since 1985, Freedonia has published 1,800 titles covering areas such as chemicals, coatings and adhesives, building materials, plastics, industrial components and equipment, health care, packaging, household goods, security, and many other industries.

Freedonia has produced a wide variety of titles, including:

- *Insulated Wire & Cable*
- *Specialty Gases*
- *Water Management Chemicals*
- *Foamed Plastics*

Because Freedonia is a reliable information source, our forecasts are cited in numerous publications such as *The Wall Street Journal, Chemical Market Reporter* and *Chemical Week.*

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**In-house operations**

Because all of our staff work at the same location, interaction between analysts and departments provides a strong system of checks and balances.

**Consistency**

Our Economics Group develops indicators that are used by all analysts. Therefore, every Freedonia study is based on a consistent set of economic assumptions (GDP, motor vehicle production, manufacturers' shipments, etc.)

**Reliable forecasts**

Because all of our forecasts consider the environment in which a product or industry is operating, as well as threats and opportunities to the market, Freedonia forecasts are reliable indicators of future performance.

**One-on-one interviews**

All studies are produced by conducting interviews with key industry participants and end-users.

**Proprietary electronic database**

Freedonia's analysts can tap into an extensive in-house electronic database containing corporate literature (including private company information), trade publications, government reports and many other sources of information.

# *About Our Customers*

Freedonia's clients include major US and international companies in the manufacturing, services, consulting and financial sectors.

Typical purchasers of Freedonia studies :

- **Key Executives**
- **Corporate Planners**
- **Market Researchers**
- **Financial Analysts**
- **Information Centers**
- **New Product Developers**
- **Merger & Acquisition Specialists**

Since 1985 we have provided research to customers ranging in size from global conglomerates to one person consulting firms. More than 90% of the industrial companies in the Fortune 500 use Freedonia research to help with their strategic planning.

Some of Freedonia's customers in the fluorochemicals market include: Bayer AG, DuPont, Honeywell International, Saint-Gobain, 3M and Total Fina Elf.

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### *Paints & Coatings*
Growth in US paints and coatings will accelerate through 2006. Durable equipment coatings will lead gains based on strength in motor vehicles and durables production and growth in coatings exports. Powder coatings will continue to make inroads into motor vehicles, appliances and furniture, while architectural paint is supported by home repair and maintenance. This study analyzes the US paints and coatings industry by type and market. It also evaluates market share and profiles key industry competitors.
#1581. . . . . 8/02. . . . . $3,900

### *Insulated Wire & Cable*
Demand for insulated wire and cable in the US will grow over 5% annually through 2006. The best prospects will be for high-end products such as fiber optic, coaxial and multiconductor wire and cable. Motor vehicle wire will also post improved gains, due to the brightening outlook for US light vehicle production. This study analyzes the $20.5 billion US insulated wire and cable industry to 2006 and 2011 by material, product, and market. It also presents market share data and profiles key competitors.
#1559. . . . . 6/02. . . . . $3,800

### *World HVAC Equipment*
World demand for heating, ventilation and air conditioning (HVAC) equipment will grow 4.8% annually through 2006. Room air conditioners will do well in developing regions and in Western Europe, while gains in motor vehicle air conditioners will benefit from rising motor vehicle production and installation rates worldwide. This study analyzes the US$87 billion world HVAC industry to 2006 and 2011 by product, region and for 17 countries. It also evaluates market share and profiles 35 key industry players.
#1549. . . . . 5/02. . . . . $4,600

### *Engineered Plastics*
US demand for engineered plastics will reach 5.7 billion pounds in 2006. Gains will result from performance and cost advantages over competitive materials, which will continue to spur new applications. Polycarbonate will outpace ABS and nylon. Smaller-volume resins (e.g., polyphenylene oxide, thermoplastic polyester) will grow even faster. This study analyzes the $8.1 billion US engineered plastics industry to 2006 and 2011 by resin and market. It also details market share and profiles major producers.
#1543. . . . . 4/02. . . . . $3,600

### *Specialty Gases*
Demand for specialty gases in the US will grow 7% annually through 2005. Gains will be driven largely by the semiconductor market based on soaring demand for fluorine-based chamber cleaning gases used in chemical vapor deposition. Other supporting markets include analytical and chemical processing, medical and industrial lasers, and lighting. This study analyzes the $1.4 billion US specialty gases industry to 2005 and 2010 by type, market and application. It also evaluates market share and profiles key firms.
#1515. . . . . 2/02. . . . . $3,600

### *Foamed Plastics*
Demand for foamed plastics in the US will reach 7.8 billion pounds in 2005. Opportunities in insulation and cushioning will support demand for foamed urethane, while foamed polystyrene demand will be driven by advantages in packaging and insulation. Construction will remain the leading market based on heightened energy efficiency standards. This study analyzes the $13.7 billion US foamed plastics industry to 2005 and 2010 by type and market. It also evaluates market share and profiles key companies.
#1436. . . . . 6/01. . . . . $3,700

### *World Fluorochemicals*
World fluorochemicals demand will grow 3.4% annually through 2005, a marked improvement over the 1990s pace when the ban on CFCs had the most effect. Robust gains in HFCs will partially offset declines in CFCs, and stellar growth in fluoropolymers and specialty fluorochemicals will provide an added boost. This study analyzes the US$8 billion world fluorochemicals industry to 2005 and 2010 by product, market, region and for 13 countries. It also presents market share data and profiles key firms.
#1434. . . . . 7/01. . . . . $4,500

### *Solvents: Green & Conventional*
Following a lengthy period of decline, demand for solvents in the US will exhibit positive annual growth through 2005. While demand for conventional solvents will be flat, green solvents will post robust advances, capturing 20% of the market by 2005. Cleaning products and transportation will be the fastest growing markets. This study analyzes the $3.3 billion US solvents industry to 2005 and 2010 by product, function and market. It also presents market share data and profiles leading companies.
#1418. . . . . 5/01. . . . . $3,700

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