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Chemicals Look Up—Briefly

By Junro Mitsuoka

In 1982, Japan's chemical industry shipped ¥18.4 trillion (\$76.7 billion) worth of products, or 8.0% of total manufactures. The share rises to 12% if "downstream" sectors are included: plastics, rubber processing, and others. The chemical sector alone has 400,000 workers on its payroll.

These numbers speak of the important position chemicals hold in the Japanese economy—they are one of the country's leading industries.

Put in international perspective, the nation's chemical industry can easily be described as world-class. Japan is the second largest producer of ethylene, caustic soda, and other products after the United States.

Although the industry produces a rich variety of chemicals, its products all fall in one of two categories: raw materials for other industries (petrochemicals and fertilizers, for example), or highly processed goods (typically, pharmaceuticals and

cosmetics). Leading diversified concerns, such as Mitsubishi Chemical Industries and Sumitomo Chemical Co., generally produce raw materials. The specialty producers are smaller, more numerous, and defy easy generalization.

The industry's diverse products and companies make for a complicated picture. But one thing is certain: Japanese companies are small by international standards. Mitsubishi Chemical, with the largest sales volume in Japan, ranks only 33rd among world chemical firms.

Structural change in raw materials

Japan's raw material producers enjoyed high growth until the early 1970s as they rode a favorable cycle of higher demand, construction of larger facilities and production cost (and price) cutting. But the oil crises brought dramatic and rapid structural change, slower growth of domestic demand and a deteriorating export-import balance.

The international slump and efforts to conserve energy and materials (e.g., lightweight products) slowed the growth of demand for chemicals. Skyrocketing costs for naphtha feedstock battered the Japanese industry's competitiveness vis-a-vis petrochemicals made primarily from ethane gas in the U.S. and Middle East. Lower-priced North American imports took market share away from Japanese producers both in Japan and Southeast Asia. That in turn damaged the industry's export-import balance and contributed to price reductions in the Japanese market. Before long, the chemical industry was in the grip of a major structural recession. In 1981-1982, Japanese petrochemical companies reportedly lost between ¥300 and 400 billion (\$1.25-1.66 billion).

Supply and demand

As shown in Table 1, the chemical industry—petrochemical makers in particular—has seen substantial improvement in supply and demand since the second half of 1983. The improvement comes in sharp contrast to the recession of 1981 and 1982. Ethylene production recovered to 2.2 million tons in the second half from



Researchers work to develop new products for new markets.

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1.77 million tons in the first, testifying to the quick and substantial recovery.

The petrochemical recovery has been stoked by stronger domestic demand, improved export-import balance, lower naphtha prices, and producers holding market prices stable. The economic recovery in the U.S. encouraged U.S. petrochemical makers to cut back on exports, helping Japanese firms improve their trade balance. Higher selling prices in the U.S. carried over into exports to Japan, further aiding the Japanese in their attempt to maintain market prices.

As a result, chemical corporate performance improved for the first time in nearly three years.

Many in the industry maintain that the present business recovery is only a temporary improvement. Industry sources are generally the first to cite the uncertainty they face.

First, the present business recovery does not derive from the solution of any fundamental problems, such as cost competitiveness (or the lack of it). The recovery in Japan was in large measure due to the U.S. economic recovery, and the demand-supply balance could deteriorate once again, if the U.S. economy falters.

Moreover, petrochemical plants with a total ethylene capacity of 4 million tons a year—roughly equivalent to all of Japan's present capacity—are slated to start up in Saudi Arabia and Canada around 1986. Their impact on Japan will be enormous.

Longer-term tasks

Raw material manufacturers, and especially petrochemical makers, plan to cope with this severe environment by improving their "corporate physiques."

First, they are slashing and realigning capacity for general-purpose, mass-production petrochemicals. This is designed to rationalize operations by cutting domestic production and consolidating what remains in more efficient plants. The supply-and-demand balance must take into account imports from Saudi Arabia and Canada, whose ethane-based products cannot be challenged. Under the Temporary Measures Law for Structural Adjustment of Specific Industries, about 30% of major petrochemical and fertilizer capacity is being eliminated. These cuts are being accompanied by improved production and distribution.

Second, many companies are trying to

shift from bulk general-purpose commodities to fine and specialty chemicals. Variable costs account for a heavy proportion of commodity chemicals production cost. These bulk products are also vulnerable to supply-and-demand changes. By comparison, fine chemicals can be designed with unique qualities. Weighting the product mix toward fine chemicals is expected to help stabilize corporate performance.

Diversification is also considered one of the most promising ways to survive future problems. Chemical companies are aggressively diversifying into three fine-product areas: biotechnology, electronics materials, and other new materials (Table 3).

Japanese chemical companies are ex-

pected not only to increase their own fine-chemicals research and development efforts but also to tie up with U.S. producers. Only a technology-intensive industry can produce fine products, and success depends heavily on a firm's R&D capability.

It is also likely that Japanese companies will boost investment in the U.S. to produce specific fine products. U.S. production promises both a vast market and ready access to high-technology information.

Japan's chemical industry is expected to play a key role in fine products and advanced high technology, which in turn will serve to drive all of Japanese industry. The chemical industry is only now taking its first steps toward a new era. ●

Table 1 Petrochemical Industry Trends

(Thousand metric tons)	FY1980	FY1981	FY1982	FY1983	FY1983		FY1984
					1st half	2nd half	
Domestic sales	3,580	3,640	3,600	3,870	1,890	1,980	4,050
Exports	420	450	430	430	190	220	390
Imports	230	340	410	400	190	210	480
Production	3,870	3,590	3,570	3,970	1,770	2,200	4,050
Capacity	6,070	6,110	6,110	6,030	3,020	3,020	4,640
Operating rate (%)	63.8	59.2	58.4	65.7	58.6	72.9	87.3
Corporate profit or loss (¥billion) (5 diversified companies and 2 petrochemicals makers)	59.3	-24.1	-42.7	34.8	-3.1	37.9	97.5

Table 2 Disposal of Petrochemical Production Capacity

(thousand metric tons)

	Total Capacity	Disposal	Capacity reduction (%)
Ethylene	6,347	2,070	32.6
Low-density polyethylene	1,667	603	36.2
High-density polyethylene	1,007	268	26.6
Polyvinyl chloride	2,007	491	24.5
Ethylene oxide	743	201	27.1

Table 3 Projected New-Material Markets

(¥ trillion)

	1981	2000		
	New materials	New materials	Related materials	Total
High-performance polymers	0.2	1.5	0.5	2.0
Fine ceramics	0.2	1.9	1.9	3.8
New metals	0.1	1.5	2.3	3.8
Composite materials	—	0.4	—	0.4
Total	0.5	5.4	4.8	10.2

Source: New Materials: Present State and Future Outlook (Ministry of International Trade and Industry), March 1984