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Supplies Squeezed, Rare Earth Prices Surge

By KEITH BRADSHER

HONG KONG — Rare earth prices are reaching rarefied heights.

World prices have doubled in the last four months for rare earths — metallic elements needed for many of the most sophisticated civilian and military technologies, whether smartphones or smart bombs.

And this year's increases come atop price gains of as much as fourfold during 2010.

The reason is basic economics: demand continues to outstrip efforts to expand supplies and break China's chokehold on the market.

Neodymium, a rare earth necessary for a range of products including headphones and hybrid electric cars, now fetches more than \$283 a kilogram (\$129 a pound) on the spot market. A year ago it sold for about \$42 a kilogram (\$19 a pound).

Samarium, crucial to the manufacture of missiles, has climbed to more than \$146 a kilogram, up from \$18.50 a year earlier.

While the price inflation is a concern to manufacturers, consumers in many cases will barely notice the soaring cost of rare earths. Even though the materials are crucial to the performance of everyday equipment like automotive catalytic converters and laptop computer display screens, rare earths typically are used only in trace quantities.

One exception is the Toyota Prius hybrid car, whose manufacture uses a kilogram of neodymium.

Toyota has been raising prices for the Prius, but has cited demand for the car and economic conditions. While acknowledging that rising prices for raw materials in general have affected the company's overall financial results, Toyota has declined to provide a breakdown of the role of rare earths. (Production problems stemming from the Japanese earthquake and tsunami have also crimped supplies of Prius cars, which are made only in Japan.)

The high prices for rare earths reflect turmoil in the global industry that mines and refines them. China, which controls more than 95 percent of the market, has further restricted exports so as to conserve supplies for its own high-tech and green energy industries. That is despite the World Trade Organization's ban on most export restrictions.

Meanwhile, an ambitious effort to open the world's largest rare earth refinery in Malaysia, which had seemed certain to begin operating by this autumn, is tied up over regulatory reviews of the disposal plans

for thousands of tons of low-level radioactive waste the plant would produce annually. Public opposition to the refinery is evident in the weekly protest demonstrations now being held.

At the same time, Japanese companies are finding it harder than originally hoped to recycle rare earths from electronics and to begin rare earth mining and refining in Vietnam.

Although rare earths are crucial to the supply chains of some of the world's biggest manufacturers, the industry that mines and refines them has long been characterized by small, entrepreneurial companies. Lately, though, soaring prices have contributed to industry consolidation.

Last month, for example, Solvay, a big Belgian chemical-industrial corporation announced that it would pay \$4.8 billion to acquire Rhodia of France, a technological leader in making complex chemicals based on rare earths.

That same day, April 4, Molycorp, the only American company currently producing rare earths, said it had paid \$89 million for a more than 90 percent stake in Silmet of Estonia, a much smaller company that is Rhodia's only European rival in rare earth processing.

In Malaysia, where [the giant rare earth refinery is under construction](#) near the eastern port of Kuantan, regulators are delaying approval for an operating permit amid public concern about naturally occurring low-level radioactive contamination of the rare earth ore, which will be mined in Australia.

Raja Dato Abdul Aziz bin Raja Adnan, the director general of the Malaysian Atomic Energy Licensing Board, said the board had asked the Lynas Corporation of Australia, which is building the refinery, to provide additional documentation before accepting its application for an initial operating permit. It will take up to six months to review the application, Raja Adnan said, and Lynas will not be allowed to bring any raw material to the plant until a permit is issued.

But Nicholas Curtis, Lynas's executive chairman, said that he believed the company could obtain the necessary approvals before September and that his company was sticking to its plan to begin feeding Australian ore into the Malaysian refinery's kilns by the end of that month.

The Malaysian government also announced last week that it would appoint a panel of international experts to review the safety of Lynas's plans. The company said it welcomed the move.

But Fuziah Salleh, an opposition legislator who represents downtown Kuantan and has been leading weekly protests, is mistrustful.

"The people's concerns are that the independent panel will be formed by the government to prove that they are right," she wrote in an e-mail message.

Toyota Tsusho, a materials purchasing unit of the Toyota Group, has separately encountered complex local regulations as it seeks to open rare earth mining and processing operations in Vietnam. The project was announced last October during [a Chinese embargo](#) on rare earth shipments to Japan. Takeshi

Mutsuura, a spokesman, said that Toyota Tsusho now hoped to reach a contract in Vietnam this summer and start production in early 2013.

As recently as last autumn, there were also ambitious hopes in Japan to recycle rare earths from electronics waste. Dowa Holdings tried then to come up with ways to separate rare earths at a recycling factory in northwest Japan but found the task significantly more difficult than recycling other, more widely available precious metals. The recycling factory is now recovering 19 other metals instead, including cobalt and lithium.

All of this has left the world even more dependent on China. The Chinese government last autumn showed a willingness to use that near monopoly as a trade weapon, halting shipments to Japan from late September to mid-November, during a territorial dispute over islands in the East China Sea.

Although Beijing has officially denied that it imposed a Japanese embargo last fall, China's own trade data released since then show that its shipments to Japan suddenly fell to zero in October for rare earth metals, and to nearly zero for rare earth oxides — which are more processed chemical compounds. At the beginning of this year China reduced its rare earth export quotas to all countries, while raising export taxes on some rare earths to 25 percent, from 15 percent previously.

Since April 1, China has also raised taxes on rare earth mining companies to the equivalent of \$8 for each kilogram of refined product; rare earths were previously taxed like many other nonferrous minerals in China, at less than 50 cents a kilogram.

One of the biggest questions hanging over the rare earths industry is whether the United States, the [European Union](#) and Japan will file a World Trade Organization case against China, challenging its export quotas and duties. James Bacchus, a former chairman of the W.T.O. appeals tribunal in Geneva, said that Chinese trade data shows a virtually complete halt in shipments to Japan last autumn could be cited to buttress any W.T.O. filing by rare earth-importing countries.

China denies violating the W.T.O. ban on export restrictions, saying that it qualified for an exception to the ban for environmental protection and conservation of natural resources. But China has done little to restrict its own industries' consumption of rare earths, usually a prerequisite for invoking an environmental defense.