

Why All the Fuss over Rare Earths?

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Rare earth elements (REEs) have been the mystery metals of the mining world for years. Now, suddenly, everyone's heard about them.

Before we delve into the reasons behind all the publicity, here's the basic skinny on REEs: One, they are rare, at least sort of. Two, they are indispensable to modern technology. Three, the number of active, dedicated producers is tiny, with more than 90% of the world's supply coming from China.

If you took high school chemistry, you probably remember the periodic table of the elements. But if you're like most of us, even if you pulled a 95 on the chem final, you may not recall many of the details today. And there's a better than even chance you *never* bothered to memorize the names of the REEs. It's time to get reacquainted.

They're generally clustered in a separate grouping at the bottom of the table, are known collectively as the lanthanoids, and these are their names, in order of atomic number (57-70): lanthanum, cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, and ytterbium. Yttrium (39) and lutetium (71) are also sometimes included.

Need to know, point 1: Rarity.

Fact is, we begin with something of a misnomer. These elements are not, strictly speaking, rare. Earth's crust is full of them. True, they're not as common as iron, carbon, or silicon, but are about on a par with nickel, copper, and zinc. Even the scarcest is way more abundant than gold, platinum, or palladium.

What *is* rare about them is that they're widely dispersed. Very seldom are they found in economically exploitable deposits. Complicating matters further is that there are so many of them, and they clump together. They have to be separated first from the ore and then from each other.

Thus REE production comes primarily from other mines' byproducts. The miner strips off the metal he's really after, then sends the REE clusters to a specialty refiner.

Need to know, point 2: Applications.

It's safe to say that life as we know it would be very different without the REEs. The more our technological accomplishments pile atop one another, the more crucial these metals become. Because of their unique properties, there are generally no substitutes for them.

Of all the REEs, the one people may have heard of is neodymium. Alloys containing it

have revolutionized permanent magnet technology, allowing miniaturization of all sorts of electronic components in appliances, A/V equipment, computers, communication systems, and military gear. Your hard drive probably has neodymium in it. So does your DVD player.

Liquid crystal displays depend on europium. Fiber-optic cables can't function without erbium. Virtually all specialty glass products, from mirrors to precision lenses, are polished with cerium oxide. Several REEs are essential constituents of both petroleum fluid cracking catalysts and auto emissions-control catalytic converters. Half a dozen REEs go into the manufacture of the energy-efficient fluorescent bulbs that will soon be mandatory. Lanthanum-nickel-hydride rechargeable batteries are replacing older ones based on lead or cadmium. And no REEs, no electric cars. Nor next-generation wind turbines.

That's only a partial list. But what makes REEs an increasingly sensitive topic is their role in national defense. Here are a few small items that have become dependent on them: jet fighter engines, missile guidance systems, underwater mine detectors, range finders, space-based satellite power plants, and military communications systems.

Think the Pentagon is very, very interested in maintaining a steady REE supply?

Need to know, point 3: Supply.

95% of the world's REE production originates in China. If you're looking for reasons why we're so nice to the premier Communist power left standing, this is a biggie.

We weren't always so dependent. Not long ago, mines such as Mountain Pass in California made us nearly self-sufficient in REEs. But in the early '90s, China flooded the market with cheaper product, until it had driven all of its competitors out of business.

Today, Mountain Pass is being revived, but the start-up of an old mine is a lengthy and costly process. There are also some from-scratch REE development projects under way in the U.S., as well as Canada and Australia. But for the moment, China holds the hand with all of the high cards in it.

Forget your hard drive. Forget 11th-grade chemistry experiments. This is a national security issue. The American government cannot afford to lose that supply source, period. Maybe someday, but not now.

And that's what's behind the recent furor over these obscure elements. Because China threatened just that, a cutoff. The one thing that really gets Washington's knickers in a twist.

In August, the story broke in the mainstream press. Sources in China leaked news of a draft copy of a report from the Ministry of Industry and Information Technology. It

allegedly calls for a total export ban on five of the rare earths, with the rest restricted to a combined export quota of 35,000 metric tons a year, far below annual global consumption of 125,000 tons, and rising fast.

This doesn't look like a move they'd follow through on, if only because of the lost trade revenues. And it's only a recommendation; final approval rests with China's State Council. But consider it an opening shot across our bow, if you wish. Or perhaps they're telling us they need their REEs for the domestic economy, and we'd best go find our own supplies. Either way, the scramble is on to find alternatives.

That could backfire. REE prices and demand were already dropping last fall as the recession deepened, and China maintains a decided competitive advantage beyond control of supply: lax environmental standards (many REEs are highly toxic). Thus the new companies could spend the fortunes required to come on line, only to find themselves victims of yet another market glut engineered by the Chinese. Still, these metals are so important, it wouldn't surprise us if the U.S. government subsidized domestic production, rather than risk a squeeze.

The Market

The market took due notice of the China story, driving the stocks of Western REE producers, and would-be producers, nearly straight up. Since late August, Avalon Rare Metals has gained 120%, Arafura Resources is up 75%, Rare Element Resources has added 72%, and Lynas Corp. is 50% higher (China, ever the master strategist, exploited the credit crisis to grab 25% of Arafura and more than 50% of Lynas). Lurking in the background is Molycorp, the private company redeveloping Mountain Pass. It's planning an IPO that may well come out of the gate red hot.

With market action this frantic, the sector is on the frothy side at the moment. The heady market caps being awarded to these companies are obviously not based on fundamentals, and a savvy investor takes care not to get caught on the wrong side of a bubble.

Even though the Chinese export ban may never materialize, the ever-growing need for REEs is dead serious. And while the current bubble may pop any day, the long-term prospects for successful miners are outstanding.