

Opto-Magnetic Memory (Terbium, Dysprosium, Neodymium, etc.)

Terbium, steel and cobalt are commonly used in opto-magnetic memory applications. More recently, applications in this area have been announced for neodymium, samarium and dysprosium (i.e., Seiko Epson's (Nd₂₃Dy₇₇)₂₅(Fe₅₅Co₄₀Ti₅)₇₅).

At present, research is under way in this area concentrating on aspects such as access time reduction, reliability and durability.

6 The Future of the Industry

Factors Shaping the Industry

The progress of Japan's rare earth industry has largely depended on the following factors:

- the securing of mineral resources;
- the improvement of extraction and purification methods; and
- the development of new applications.

With respect to the latter, catalysts, memory storage materials, and laser crystals are examples of the application fields currently under research.

In November 1986, the rare earth industry seemed to stand on the threshold of yet another revolutionary phase as superconductor development reached fever pitch. Until April 1987, record-breaking developments were announced from all parts of the world on an almost daily basis.

A small portion of rare earth elements including yttrium and lanthanum were used in the elemental structure of high-temperature superconductor ceramics. As the ceramic featured superconductive properties without requiring helium temperature cooling, it was thought to be a major step towards developments such as reductions in cost, helium use and the size of the refrigeration unit.

However, more recent experiments with materials other than those using rare earth elements indicate that the role of rare earth in superconductivity is minor. Hence, much of the fervour over rare earth relative to superconductor technology is dying out.

Figure 1 compares Japan, the U.S. and world rare earth demand -- real and estimated -- against 1980 estimates. As the figure shows, Japan has exceeded its 1980 demand estimate while the U.S. fell short. The condition is largely attributed to a difference in the major industry application sectors of the two countries. In the case of the U.S., the bulk of rare earth demand is accounted for by petroleum refinery catalysts -- an area which is at best stagnating -- while Japan's demand is concentrated in the high tech industries.

At present, the U.S. accounts for the largest share of rare earth demand worldwide, but if current trends prevail, Japan will likely exceed U.S. demand volume by the year 2000.

Opportunities for Canadian Exporters

During the course of this study, consultants met with the executive director of the Society of Non-Traditional Technology, a non-profit research organization. When questioned on opportunities for Canadian rare earth in Japan, the director offered to test any Canadian samples -- at a minimal fee to cover lab-related expenses -- and evaluate their suitability for the Japanese market. Should samples prove suitable, the director added that the organization would be willing to introduce parties that might be interested in Canadian supplies.