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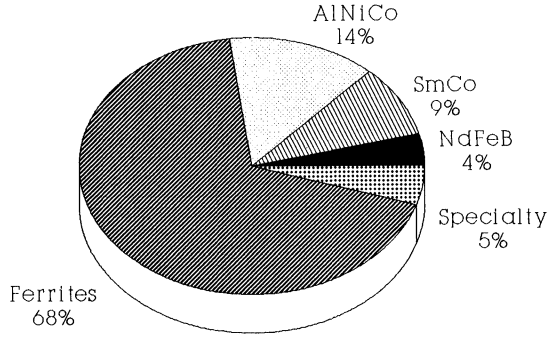
# *News Briefs*

## RARE EARTH MAGNETS IN EUROPE

According to *Materials Edge* (No. 40, September 1992), the currently static market of rare earth magnetic materials is a consequence of two factors. First, sensitivity of NdFeB magnets to elevated temperatures reduces their usage in large–scale applications, e.g. in auto industry. Secondly, NdFeB magnets need painting or coating to prevent corrosion, the issue often overlooked. Several programmes are underway to overcome both these problems.

For example, a collaboration of the French CNRS, Germany's Max Planck Institute and the University of Amsterdam led to a better understanding of the effects of different manufacturing and processing methods on the coercivity of NdFeB magnets. It was concluded that melt–spun magnets were more resistant to




Sales of Permanent Magnets, Europe 1992
(by value)

(The above diagrams are based on figures supplied by Materials Edge Research and were published by Materials Edge, No. 40, September 1992)

## SUPERCOLLIDER: STRING TEST SUCCESS

The accelerator systems string test at the Superconducting Supercollider in Texas met its objective by operating a half–cell of five collider dipole magnets, one quadrupole magnet and two spool pieces at the design current of 6500 A. Cooldown began in June 1992 and current was slowly raised, testing the quench protection system along the way. The magnets were assembled by General Dynamics at Fermilab.

## RARE EARTH RESOURCES IN AUSTRALIA

In Australia, current production of rare earth minerals occurs as a by–product from titanium–enriched placers and beach sands. Undeveloped resources are associated with a range of minerals including silicates and phosphates and their exploitation may require development of new processing and extraction methods. The steadily increasing applications of RE in industry and the encouraging research results on high–temperature superconductors and permanent magnets using RE have led to increasing interest in the exploitation of new resources.

## MAGNETIC SEPARATION IN AN INDIAN MN–ORE PROJECT

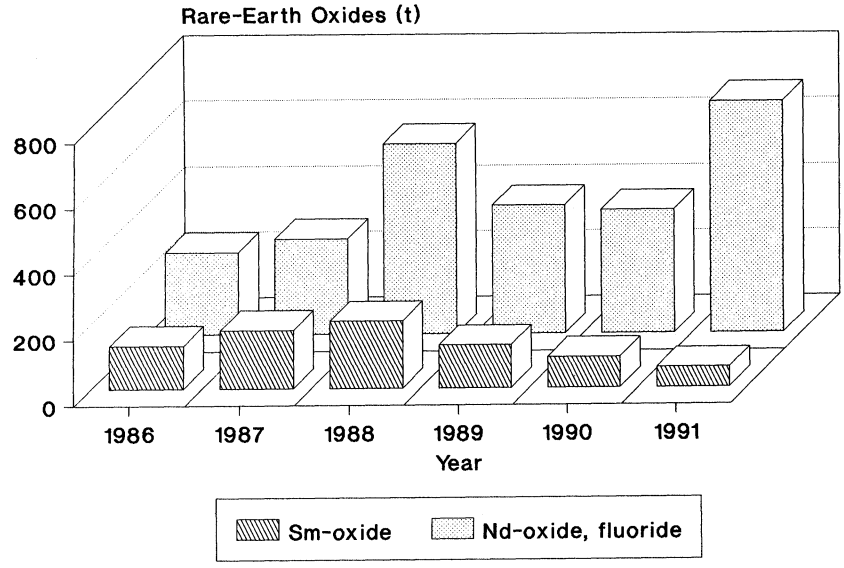
Sandur Manganese of India is planning to set up a Rs30 million pilot plant to beneficiate low–grade manganese ore in collaboration with the regional research laboratory in Bhubaneshwar. High–grade concentrate will be produced by magnetic separation and reduction roasting processes. A commercial plant will be set up later costing Rs100 million which would expand the company's exports of

manganese ore.

## DEMAND FOR RARE–EARTHS IN JAPAN IN DECLINE

Production of rare–earth sintered magnets in Japan totalled 767 tonnes in January to June 1992, a fall of 11 per cent from the same period of 1991. In September 1992 there were, however, signs of recovery, especially in the market for Nd–Fe–B magnets. Increased demand follows the continuing trend towards miniaturization of electronic equipment.

Japanese imports of rare–earths fell by 31 per cent in the first half of 1992. Far the largest supplier of neodymium oxide and fluoride has been China, while France has been the dominant supplier of samarium oxide. Development of Japanese imports of Nd and Sm compounds is summarized in the following diagram. *(Roskill's Letter from Japan, October 1992).*




Japanese imports of samarium oxide, neodymium oxide and fluoride, 1986–1991 (tonnes)

## A HIGH–PURITY ALLOY PRODUCED IN A MAGNETIC POT

The National Research Institute for Metals and Chubu Electric Power Co. have produced 2.3 kg of pure titanium by melting the metal in a copper melting pot in which the magnetic force keeps the melted metal from touching the surface of the pot. Previously, much smaller amounts of metal could have been melted by a similar method. By doubling the size of the magnetic coil and changing the shape of the pot the melting capacity has been increased considerably. The technology can be used to fuse metals with high melting points and production of new materials can thus be expected. *(The Japan Times, 22/9/92).*

## MAGNETIC SEPARATION IN A NEW HEAVY MINERAL PROJECT

Anglo American Corp. gave the go–ahead for its US$350 million Namakwa Sands project to recover heavy minerals from deposits inland from the west coast of South Africa. Production is scheduled to start in 1994 at an initial rate of 4 Mt/y, ultimately rising to 16 Mt/y. The sand will be conveyed from the mining area near Brandsebaai, where reserves are in excess of 500 Mt, to a primary concentration plant where the heavy minerals will be concentrated. Magnetic separation, including WHIMS, will be used. The washed heavy minerals will then be trucked to a smelter feed preparation plant located north of Koekenaap. The main product will be ilmenite, while the by–products will be zircon and rutile.

## COAL DESULPHURIZATION BY NON–MAGNETIC MEANS

A simple and efficient way of removing sulphur from coal before it is burned in thermal power plants and steel furnaces has been developed by the Central Research Institute of Electric Power Industry in Japan. The new desulphurization process involves passing finely powdered coal through a water tank full of bacteria; most of the inorganic sulphur can be removed in just two to three minutes.
*(The Nikkei Weekly, 5 September 1992)*

## A NEW MAGNET WITH COMPLEX MAGNETIC PATTERN

A new magnetizing method which can create any desired magnetic pattern on Mn–Al metal has been commercially developed by Sanyo Special Steel. Co. The new technology make it possible to directly produce Mn–Al magnets possessing a stripe, step, spiral, mesh or any other magnetic pattern according to user's requirement. Mn–al magnets produced at Sanyo Steel are made by warm extrusion of powder and are characterized by their high strength and easy formability. The magnets have the $BH_{max}$ = 7 MGOe, with coercive force equal two to three times that of Alnico magnets. Mn and Al powder is first extruded to form a rod or wire, which is then put through a specially designed coil for magnetizing. By changing the way the coil is wound, various magnetic patterns are generated in the metal. The production of 50 tonnes is expected in 1993 and it is assumed that the price will range between US$25 and US$85 per kilogram.

## WHY BUSINESS NEEDS SCIENTISTS

According to M. Schulhof (*Scientific American, Nov. 1992, p. 96*) who began his career as a physicist at Brookhaven National Laboratory and is presently the vice–chairman of Sony USA, a background in pure science is an ideal preparation for business. Science teaches lessons that can well be applied to business. One of these is a simple work ethics: if you have a meaningful challenge, personal time means little. Science encourages intellectual curiosity and tenacity. It is important to master the fundamentals of a field before contemplating new work. Business schools tend to restrict personal creativity, but a successful businessman is often a creative risk–taker, who need a vision of the future and the confidence to invest in that vision. Critical and analytical thinking is vital if problems are to be analyzed and solved. If business really wishes to acquire these skills it should recruit more scientists.