Book Review

RARE EARTHS IN THE 1990S: HOW CHINA WILL RESHAPE THE INDUSTRY


For the last two decades the rare earth market has been dominated by traditional sectors of industry: glass manufacture, metallurgy and catalysis. In spite of positive growth in consumption in these three applications, a considerably stronger growth in new high-tech applications has redirected the research and application developments of rare earths.

Such a scenario offers increasingly important opportunities for magnetic technology. Rare earth permanent magnets have been responsible for one of the fastest growing segments of the rare earth market.

At the same time, magnetic technology is likely to play an irreplaceable role in the concentration and purification of rare earth compounds and elements.

The multi-client study "Rare earths in the 1990s" covers, in ten chapters and on more than 400 pages, all aspects of the international rare earth industry.

Geology and mineralogy of rare earths, their mining and beneficiation technology, processing and refining technology are discussed in detail under the heading "Technical aspects of the rare earth industry".
A chapter on the supply of rare earth elements surveys the rare earth reserves and production capacity, mine production and resources in all major and minor producing countries. Similarly, the supply of refined rare earth compounds is reviewed, also by country.

A chapter on the consumption of rare earth compounds gives a detailed survey of applications and consumption of rare earth elements.

Trade and prices of rare earth raw materials, intermediate products and separated rare earths are examined in the subsequent chapter.

Special emphasis is put on the role of the Chinese rare earth industry, the leading supplier of raw rare earth materials, as well as separated rare earth products.

Corporate strategies in the rare earth supply and processing and the balance of supply and demand in 1990-2000 are discussed in two closing chapters of the report.

The publication contains an impressive and probably nearly exhaustive wealth of information on the rare earth industry. The essential information is arranged in easy-to-examine tables (there are 186 of them) and in 27 figures and diagrams. A most commendable Executive Summary will be found useful by everybody who needs a quick overview of the subject.

Quiet revolution that has been going on in the rare earth magnet sector makes information on the subject obsolete the moment a report of this kind is published. Even after taking this fact into account, a rather lean chapter on rare earth magnets is somewhat disappointing.

Although comprehensive lists of manufacturers of rare earth magnetic alloys and of rare earth magnets are very instructive, little information on types of products, market development and prices is given. This could be rather deceiving in view of
the fact that the forecast growth in the rare earth consumption is 14.3 per cent per year in the period 1990-1995, and 17.1 per cent per year in the period 1995-2000, as compared to 4.2 per cent and 5.3 per cent per year growth of total rare earth consumption.

The chapter on the rare earth magnets was clearly written by a non-specialist and certain degree of disinformation crept in. For instance, the Curie temperature of the NdFeB magnet is claimed to be 120\(^\circ\) C, while samarium-cobalt magnets are, inexplicably, denoted as CoSm, although, in few instances, the standard notation SmCo was used.

It is claimed that rare earth magnets are used where size or weight reduction is an important consideration. Although this is true for a certain segment of the market, numerous large-scale applications, (e.g. magnetic resonance imaging, magnetic separation and magnetic levitation) are based solely on availability of considerably greater magnetic field intensity of rare-earth magnets compared to conventional permanent magnets.

Moreover, the applications of rare earth magnets in mineral processing which, in several cases, considerably changed the operational practice in otherwise conservative mining industry, are not mentioned at all.

Overall, this well-presented report contains an abundance of invaluable information on rare earth industry and those who are prepared to pay the price to join the exclusive club of the readers of this report will have a well-researched publication to which to turn for many years to come.

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