

Rare-earth Information Center **INSIGHT**

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China: Part III

Developments concerning the Chinese rare earth industry continue unabated into early 1994 (also see **RIC Insight 6**, No. 12, December 1993 and **7**, No. 1, January 1994). According to Thomas C. Pool, editor of Concord's **Elements**, Chinese rare earth producers and exporters have set up a cartel and agreed to adopt uniform prices for export in 1994. If this agreement holds, the bitter price war over the last few years has come to an end and will bring some stability to the world-wide rare earth markets.

A new company, Westlake Rare Earth Industries (WREI), has been formed to manufacture and sell a variety of rare earth products of Chinese origin. WREI will operate as a division of Westlake Developments Co., Inc., which has ten joint ventures in the People's Republic of China, two of which are with Baotou Steel and Rare Earth Co. and Baotou Rare Earth Smelting Co. These two ventures are to be folded into a new company for smelting rare earths. The new plants will use the latest manufacturing technology and are expected to be in operation by the end of 1994. They will be supplied with the raw products, bastnasite and monazite, from the Baiyunebo mine near Baotou. In addition WREI has been appointed as the world-wide agent for Yue Long Non-Ferrous Metal Co., Ltd. (Shanghai) and Baotou Steel and Rare Earth Co.

Ovonic - Philips

Ovonic Synthetic Materials Co., Inc. (OSMC) announced that it has received a world-wide license from Philips Electronics N.V. for patented technology to produce a new class of low cost, high performance, rapidly solidified, neodymium-iron permanent magnetic materials. The new material has an approximate composition of $Nd_4Fe_{75}B_{20}$. The material goes under the name HIREM 12L, and has an energy product (BH_{max}) of 12.5 MGOe. The material is available as a -60 mesh powder and will be sold to bonded magnet manufacturers.

On the Go with ISO-9002

Johnson Matthey - Rare Earth Products (JM-REP), Widnes, Cheshire, UK, recently became certified by the British Standards Institute as having met the ISO-9002 quality standards in their product line of rare earth materials. Congratulations on achieving such a level of excellence. The letters ISO stand for International Organization for Standardization, and the 9000 series is a set of standards which a company must meet in order to be certified. Such

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accreditation means that a company's products will meet or exceed certain criteria and that buyers can be confident of the quality of the purchased product. As far as we are aware, JM-REP is one of the first rare earth producers to attain this distinction.

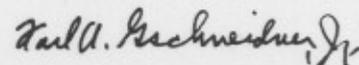
JM-REP also announced that their production facility in Widnes will be doubled by the end of 1994. The Widnes plant manufactures a large line of rare earth products, with a special expertise in the production of high performance rare earth alloys. In order to assure a long-term supply of raw materials, they have recently opened local offices in Moscow and Shanghai.

Rare Earths in Steel to Make a Comeback!

RIC has learned of some new developments which indicates that rare earth additions to steel may become, once more, an important rare earth metal market in the next few years. Although the new developments look promising, even if it reaches 100% acceptance in the steel industry, it will never be as large a market as it was in the early 1970's. A number of changes in the processes of manufacturing slab-cast steels and favorable price changes for the lanthanide metals, due to the explosive growth of the neodymium permanent magnet market, have made it possible for the rare earths to be a viable competitor for calcium treated steels. More details will be given in a paper to be presented next month at the 77th Steelmaking Conference in Chicago. As soon as we receive this additional information we will pass it on to our readers.

New Magnetic Refrigerator Material

Scientists at the U.S. Department of Energy's Ames Laboratory (Iowa State University) announced that they have designed a new material for the low temperature stage of an active magnetic refrigerator for the liquefaction of hydrogen gas, which is 30% better than the standard prototype material. The team of scientists, headed by K. A. Gschneidner, Jr., found that $(Dy_{0.5}Er_{0.5})Al_2$ has a magnetocaloric effect which is 30% larger than that of the standard material GdPd [Applied Phys. Lett. 64, 253 (1994)]. Their results indicate that an active magnetic regenerator (AMR) magnetic refrigerator (MR) using $(Dy_{0.5}Er_{0.5})Al_2$ would have a significantly larger cooling power for the same size MR employing GdPd. Or, for an AMR/MR which has the same cooling power, the size of the refrigerator, which includes a superconducting magnet, could be reduced and as a consequence would greatly lower the capital costs, since the superconducting solenoid is the major cost component of an AMR/MR. Furthermore, they note that replacing GdPd by $(Dy_{0.5}Er_{0.5})Al_2$ would lower the cost of the magnetic refrigerant itself, which is the second most expensive component of the MR, by about 75%. This development may one day make it possible to replace fossil fuels with the more renewable and cleaner liquid hydrogen fuels.



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