

Rare-earth Information Center

Insight

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Volume 11

November 1, 1998

No. 11

This month's *RIC Insight* reports on my recent trip to China. If there are topics about which you would like to have additional information, please contact me.

'98 Beijing International Exhibition on Rare Earth Development and Applications

The "'98 Beijing International Exhibition on Rare Earth Development and Applications" was held in Beijing from October 5 to October 8, 1998, in conjunction with "The International Forum on Rare Earth Technology and Trade", which ran October 5-7 1998. The exhibition featured a large number of companies that produced rare earth materials, products using them, or equipment for processing them. The exhibition was organized by a province within China. In some cases, a company had its own booth; and in others the provincial booth represented many of the enterprises within the province. Many of the displays were entirely in Chinese. This makes it a little hard to analyze the exhibition in terms of products. The majority of the exhibitors had at least short English write-ups in the catalogue for the exhibition. An incomplete analysis of this information reveals the following: For the companies using rare earth materials in their products, a large number were producing energy efficient fluorescent electric lights using trichromic phosphors. The number of companies producing the phosphors appeared to be limited with only four companies reporting the production of phosphors. A number of companies reported making rare earth permanent magnet motors and a reasonable number of bicycles with electric assist motors were on display. At least 17 companies advertised that they were producing sintered Nd-Fe-B magnets, while three companies advertised making bonded magnets. One company stated it produced "quick quenching" magnet powders. At least six companies are involved in the production of Ni-MH batteries.

An area, where there is not much activity in the west, is that of rare earth fertilizers. Ten companies advertised the production of rare earth fertilizers with the majority of them being exclusively fertilizer plants. Livestock food additives were also displayed. There are at least two research institutes dealing with rare earths in agriculture. There is considerable bewilderment in China as to why the west has little interest in rare earths in agriculture. Apparently, there has been some recent interest in Australia but very little other Western interest. An interesting application of rare earths to agriculture, which is easy to understand, is the production of "Red Light" film for covering green houses or use as blown mulch film. The "Red Light" film is a conventional polyethylene film with small additions of a rare earth organic chalet compound. The function of the rare earth is to absorb ultraviolet rays and convert them into orange-red light, which presumably is more useful in photosynthesis. You may recall from a previous *Insight* that a similar scheme has been investigated for solar cells to convert the ultraviolet light, which is not efficiently converted by the cell, into the range of high conversion efficiency. An area which I did not see represented is that of magnets for medical applications.

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Site Visits in China

While in China, I visited a number of places including the rare earth beneficiation plant of Baotou Steel and Rare Earth, where they produce rare earth concentrate with 50 and 60 % REO, and the Baiyunebo Mine, which produces much of the worlds rare earth material. Visiting Baiyunebo requires a special travel permit, which appears to be easily obtained. I visited three institutes in China: The Baotou Research Institute of Rare Earth, the General Research Institute for Non-ferrous Metals, and the Central Iron and Steel Research Institute. In addition, I visited Peking University and the University of Science and Technology Beijing. All three institutes shared a number of common features. While they are all research institutes, they are interested almost exclusively in practical materials. This results from the fact that in recent years they have all had significant reductions or complete elimination of state support for research, and must therefore generate revenues to survive. All three institutes have internal companies for the production of materials and a heavy emphasis on technology transfer to the industries that are now at least partially supporting them. The universities are also involved in technology transfer and the formation of companies to provide additional funds to support research.

Beijing Keguang Magnetic Material Co. Ltd.

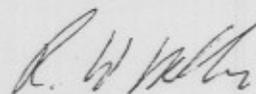
I visited one of the companies associated with the University of Science and Technology Beijing and is located on campus. The company, Beijing Keguang Magnetic Material Co. Ltd., has just started producing bonded magnets. They are producing their own HDDR powder in a bank of eight furnaces. From the powder, they are producing both isotropic and anisotropic materials including a large ring magnet for an electric lawn mower motor. This magnet is for export and to the best of my knowledge they are not producing electric lawn mowers in China. The entire operation is still quite small scale with a large amount of handwork. Powder production, compounding, aligning, and pressing, as well as inspection are all performed at the company. At the current time, I understand they have more orders than they can fill with their current capacity.

International Forum on Rare Earth Technology and Trade

The International Forum on Rare Earth Technology and Trade covered topics including rare earth production, rare earth phosphors, applications of Nd-Fe-B permanent magnets, and rare earths in agriculture. Unlike most scientific conferences, the majority of the talks were actually read with the presenter sitting before a microphone. The majority of the talks were in Chinese with simultaneous translation where the translator reads a previously prepared English text. The proceedings contain both the Chinese and English versions. I will only comment on a few of the papers.

WEN Kaiyuan of the State Development Planning Committee discussed current status of the Chinese rare earth industry. Significantly, in order for a joint venture between the Chinese and a foreign company to be approved, the company must not only invest capital but also provide technology. As I mentioned in discussion of the exhibition, there is considerable interest in rare earths in agriculture in China. Two papers dealt with this subject. One paper by Lilang reported the results of 20 small-area experiments. The viewpoint of the paper is that the RE works as a complexing agent or fertilizer activator. This is consistent with my conversations at the China Rare Earth Center for Agriculture Development, where it was stated that the RE need only be present in PPM quantities.

I would like to thank the Chinese Society of Rare Earths and the Chinese Rare Earth Information Center for their generous hospitality during my stay in China.



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