

# Rare-earth Information Center

# Insight

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Volume 11

October 1, 1998

No. 10

## *Persistent Spectral Holeburning*

Current digital data storage methods store one bit of data at one physical location. The storage capacity of the device is increased by reducing the physical size required to store and readout that bit. Another way to increase that storage capacity is to have the physical location have the equivalent of a number of colors. Suppose we could have a red bit, a blue bit, etc. all stored at one physical location. Then, if we could measure the color spectrum at that location, we could store as many bits in that location as our spectral resolution allows. When a rare earth ion is placed in a well-ordered crystalline lattice, the optical absorption line width is very sharp. However, if the ion is placed in a disordered lattice, the line width becomes thousands of times greater than the intrinsic line width as each rare earth ion has a slightly different environment. In this case, it is well-known that a high intensity laser can "burn holes" in the optical absorption spectrum by driving significant fraction ions, whose absorption peak matches the laser energy into the excited state, thus, reducing the number of ions in the ground state, which can be excited. If the lifetime of the excited state is sufficiently long, these holes may be used to store data. Z. Hasan et al. {*Appl. Phys. Lett.*, **72**, 2373-5 (1998)} have recently reported on the use of CaS:Eu and CaS:Eu,Sm phosphors for photon-gated holeburning. Using a dye laser,  $\text{Eu}^{2+}$  ions are excited from the  $4f^7(^8S_{7/2})$  ground state to the lowest state of the  $4f^65d$  configuration. If the electrons from this state are further excited into the conduction by IR photons from a tungsten lamp, they can be trapped at other locations in the crystals resulting in  $\text{Eu}^{3+}$  at the original site. If the laser power is increased sufficiently, the second photon can come from the laser in what is referred to as self-gating. Hasan et al. demonstrated that they could burn in excess of 250 holes in the absorption band of a single spot. At the current time, spectral hole burning, both writing and reading, requires that the material be held at liquid helium temperatures. What is interesting about this latest result is that if the material was warmed to room temperature between the write and the read, the holes were maintained.

## *High Photovoltages in Terbium Molybdate*

B. K. Ponomarev et al. {*Phys. Solid. State*, **40**, 661-3 (1998)} report that an anomalously high electric polarization occurs when the ferroelectric terbium molybdate,  $\text{Tb}_2(\text{MoO}_4)_3$ , is exposed at room temperature to a laser beam of wavelength 4880 Å. The induced polarization is stable for several days and that after 4.5 h of exposure to a 0.5 W laser beam, the photoinduced polarization exceeds the spontaneous polarization by an order of magnitude. The electric field, which results from the polarization, is  $2.5 \times 10^6$  V/cm.

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**Company Notes:**

Magnequench International, Inc. (MQI) has recently acquired Xinbao, a Nd alloy manufacturing company in China. On September 11, they announced that a new powder manufacturing facility will be built near Tianjin, China. The manufacturing facility is scheduled to be operational by early 2000. In addition, they announced a new Technology Center scheduled for a mid-year 1999 opening. The center will provide MQI customers with assistance in application engineering, applied product development and preproduction capabilities. For more information, contact Sevi Gaiffi (765)648-5028, [sgaiffi@mqii.com](mailto:sgaiffi@mqii.com).

Rhodia Terres Rares S.A. – Rhodia Rare Earths has moved its corporate headquarters to its main production site at La Rochelle, France and transferred its teams previously based in the Paris region to La Rochelle. The new address is: Rhodia Terres Rares S.A, Z. I. 26, rue Chef de Baie, 17041 La Rochelle Cedex – France, Telephone: +33 (0) 5 46 68 34 56; FAX: +33 (0) 5 46 68 33 44.

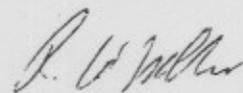
Last month, we reported a story from the *Toronto Globe and Mail* reports that YBM Magnex International Inc.'s (YBM) biggest shareholder was taking steps to replace the company's entire board of directors. The unidentified Canadian institutional investor was represented by Wesley Voorheis, managing director of VC & Co. Inc., a Toronto advisory firm. On September 22, 1998, YBM, together with representatives of certain institutional shareholders, "has reconstituted the Company's board of directors. Effective immediately, the new board of directors will consist of Messrs. Gordon MacDougall, Jacob Bogatin, Wesley Voorheis, Owen Mitchell and Stephen Coxford." On September 24, 1998, the company announced that Mr. Voorheis has been appointed Chairman of the Board. In addition, an Audit Committee consisting of McDougall (chair), Mitchell and Coxford has been appointed. Furthermore, a Special Committee of the Board (Voorheis, chair), Coxford and Mitchell has been given the mandate to "independently identify and access the principal issues which affect the business and affairs of the Company and to consider all alternatives available to preserve and enhance shareholder value." For further information contact G. Wesley Voorheis, Chairman, Telephone: 416 947 1400.

**OOPS:**

The Toyota Prius uses 1.5 kg of rare earth magnets as originally reported in August. 15 kg of metal hydride alloy are also used in the car.

**Next Month's Conferences:**

**'98 Beijing International Exhibition on Rare Earth Development and Applications 4-8 October 1998.** Contact: Sub-Council of Metallurgical Industry, CCPIT, 46 Dongsu Xidajie, Beijing 100711, P.R. China, Telephone: 86 10 6522 0753; FAX: 86 10 6523 3861. **China Magnets 1998: Supply, Demand, Innovations and Markets for Magnetic Materials in China 19-21 October 1998** in Beijing. Gorham/Intertech Consulting. Contact: Telephone: 207 781 9800; FAX: 207 781 2150; E-mail: [info@interrechusa.com](mailto:info@interrechusa.com). **Rare Earths '98 The international Rare Earths Conference 25-30 October 1998**, Fremantle, Western Australia. Contact: Telephone: 61 8 9387 9590; FAX: 61 8 9383 9639; E-mail [PE98@miwa.org.au](mailto:PE98@miwa.org.au). I look forward to meeting those of you who will be at the first or last of these.



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Director CREM/RIC