Rare-earth Information Center INSIGHT

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New Production Facility for Terfenol

Etrema Products, Inc., a subsidiary of Edge Technologies, Inc., has begun the construction of a new materials research/development and manufacturing facility for Terfenol-D and related materials. Terfenol-D, which has the composition $(Tb_{0.3}Dy_{0.7})Fe_2$, is a magnetostrictive material which is used in sonar, high torque motors, robotics, geophysical exploration, laser position control, medical sonics, etc. In addition, there are a number of potential applications for terfenol materials, these include: vibration control systems, control of surfaces such as aircraft wings, high speed rockets and torpedoes. The new facility will be built in three stages at Iowa State University Research Park, Ames, Iowa, USA. The first stage is scheduled to be completed by April 1993. Etrema Products plans to complete the second and third stages by 1997, giving it a 4600 m^2 (50,000 ft^2) facility.

New Production Facility for Rare Earth Permanent Magnets

Swift Levick Magnets, Ltd. has finalized plans to construct a 2000 m^2 plant to manufacture $SmCo_5$ and Sm_2Co_{17} permanent magnets at the Barlborough Link Development on the outskirts of Sheffield, England. The new facility is expected to begin operations in June 1993. The rare earth permanent magnet production at Barbot Hall in Rotherham, England will be shut down. Swift Levick, which is a member of the Outokumpu Group of Finland, also has the option of manufacturing $Nd_2Fe_{14}B$ magnets under a licensing agreement between Outokumpu and Sumitomo Special Metals. Swift Levick will also be acquiring manufacturing equipment from the Magnets Division of Treibacher Chemische Werke AG, Treibach, Austria, which has recently announced it will cease the production of rare earth magnet materials.

Breakthrough on the Manufacture of Fluoride Glasses

A new process for making heavy metal fluoride glass was recently announced by Cerem of Grenoble, France. Most fluoride glasses contain rare earth materials, the best known is ZBLAN, which has the composition $55ZrF_4$-$18BaF_2$-$6LaF_3$-$4AlF_3$-17NaF. The first samples prepared by the Cerem process are claimed to be 100 times more transparent than the silica glass used to make the current optical fibers. They also noted that the impurity content of the Cerem fluoride glass is 100 to 1000 times less than the best fluoride glasses made today. This high level of purity is due to a production process which eliminates the contact between the glass and its container during cooling. This is achieved by a cushion of gas 20 - 50μ thick which

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supports the material during production and prevents it from touching the crucible walls. The gas flow rate is less than one liter per minute which is sufficient to create an aerostatic lubrication effect. The first optical fiber produced from the Cerem process will be tested later this year. Cerem, which is associated with of the French Commission for Atomic Energy, noted that even if the optical heavy metal fluoride glass is as good as expected it will take three years to develop a commercial product. For more information about these heavy fluoride glass optical fibers see **RIC Insight**, **1** [3] May 1988; **4** [10] October 1991; and **4** [11] November 1991.

Lasers in Medicine

In the past few months the U.S. Federal Food and Drug Administration (FDA) has approved the use of a number of rare earth lasers in various medical and surgical procedures. Laser Photonics of Orlando, Florida was given permission to sell a holmium laser for the treatment of lower back pain and sciatica due to a degenerative disk. The holmium laser diskectomy procedure results in quicker recoveries and shorter hospital stays.

Another holmium laser system, manufactured by Summit Technology, Inc. of Waltham, Massachusetts has been given approval by the FDA to be used in treating glaucoma and other disorders such as astigmatism, near- and far-sightedness, and corneal irregularities caused by injury or disease. Glaucoma is the second leading cause of blindness in the USA.

The FDA has also given Laserscope Surgical Systems of San Jose, California clearance to market its laserscope system for thoracoscopic lung tissue applications. Their system uses a Nd:YAG laser, which can vaporize, coagulate, debulk and ablate lung tissue in addition to incision and excision procedures.

Recovery of High Value Rare Earths

Ames Specialty Metals, Inc (ASM) announced that they have developed a series of propriety technologies for the processing and recovery of the high value rare earth elements. Their rare earth scrap reclamation production process is aimed at recovering terbium from magneto-optic data storage discs (see **RIC Insight**, **2** [10] October 1989; **4** [7] July 1991; and **4** [12] December 1991). ASM, which is a subsidiary of Edge Technologies, Inc., of Ames, Iowa, USA, estimates that their process of reclaiming terbium will save customers 30% to 50% of their material costs. The process involves extracting the rare earths into salts or metals or alloys or combinations thereof. ASM estimates that the EDRAW (erasable direct read after write) magneto-optical storage discs accounts for about 20% of the optical data storage market today, and by 1997 will have increased to 35%. ASM states that their processes can be used to recover other rare earths with equivalent savings.

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