

—News Briefs—

US BUREAU OF MINES CLOSED

After 85 years of its existence the US Bureau of Mines has been abolished, effective January 1996. In September 1995 a joint House-Senate Conference, meeting to decide on the Department of Interior's Appropriations Bill for fiscal 1996 voted to slash the Interior's net discretionary funding by almost \$870 million to \$6 billion, 8% below the 1995 funding level. The Bureau was a major casualty and it is anticipated that as many as 1100 jobs will go. A total sum of \$64 million has been appropriated to cover the cost of its closure.

The minerals information collection has been transferred to the US Geological Survey but carries a significantly reduced budget of \$16m. The new mailing address is 983 National Centre, Minerals Information, US Geological Survey, 12201 Sunrise Valley Drive, Reston, Virginia 22092. The Bureau's Alaska minerals assessments has been transferred to the Bureau of Land Management. Some of the Bureau's other functions, primarily related to health and safety research, will be transferred to the Department of Energy. The remainder of the Bureau's programmes were closed.

REMOVAL OF IRON CURTAIN HELPS MAGNET EXPORTS

Boxmag-Rapid of Birmingham, UK, has secured an order for equipment to refurbish the metal recovery complex of JSC Solnechny GOK in Russia. The complex specialises in the extraction and processing of non-ferrous metal ores at their plant in the Khabarovsk region. The contract includes the supply of a new high-intensity wet magnetic separator along with spare parts for refurbishing similar equipment which Boxmag-Rapid originally supplied to JSC Solnechny GOK in 1986. The magnetic separators are used in the processing of wolframite.

HOMOGENEITY OF SUPERCONDUCTIVITY IN $YBa_2Cu_3O_x$

Japan Atomic Energy research Institute investigated the homogeneity of high-purity $YBa_2Cu_3O_x$ (123) single crystals at different oxygen concentrations by means of the higher-harmonic susceptibility. The superconductivity at the onset temperature of 93.8 K was observed in samples of hypostoichiometric composition ($x = 6.87$). Also, they succeeded in obtaining 123 single crystals of the optimum stoichiometry ($x = 7.00$) which showed a sharp single transition at 92.5 K corresponding to the occurrence of the homogeneous superconductivity.

BOXMAG—RAPID MAGNETS FOR TAIWANESE SHIP BUILDERS

Boxmag—Rapid supplied lifting magnets to China Shipbuilders of Kaohsiung, Taiwan in a £50k contract. The 21 individual rectangular lifting magnets, used for plate profile handling within the shipyard can all be individually controlled. The entire system, including all control gear and standby batteries, was specifically tailored to meet the needs of the client. The project took 90 days to be designed, supplied and installed. According to the client, a key element of the purchasing criteria was the absence of arcing from the control panel when the magnet lift and drop contactors were actuated.

SYNTHESIS OF NEW SUPERCONDUCTORS

National Institute for Research in Inorganic Materials (Japan) succeeded in synthesis of several new superconductors the critical temperature of which ranged from 60 K to 117 K. These superconductors were synthesized at 1200 C to 1300 C, under 5 to 6×10^9 pascal. The superconductors are carbonate gallium system, barium or aluminium system compound. The highest critical temperatures are 117 K for carbonate system, 107 K for gallium system, 50 K for barium system. The Institute says that synthesis of a stable compound at room temperature under super-high pressures permits production of new substances and that it would not be impossible to synthesize a new superconductor the critical temperature of which would exceed that of thallium system superconductor.

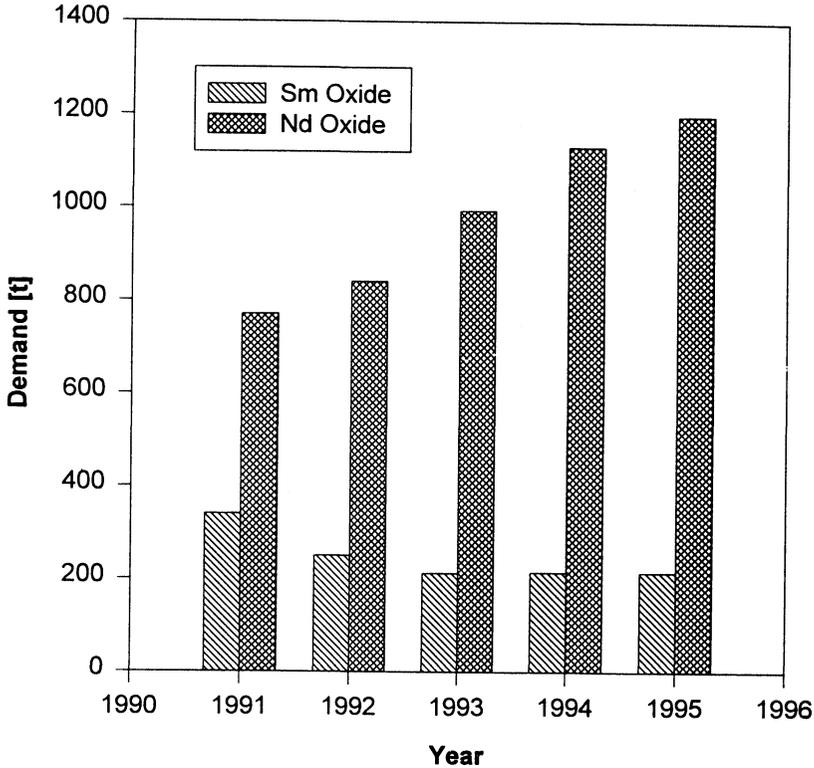
A SUPERCONDUCTING TAPE WITH HIGH J_c

Fujikura Ltd. and Engineering Research Association for Superconductive Generation Equipment and Materials (Japan) have jointly succeeded in developing a practical metallic tape conductor that is produced by physical vapour-deposition of a yttrium-based superconducting material on a metal tape. The critical current density exceeds 1 MA/cm^2 . The yttrium-based oxide superconductor is claimed to have excellent superconducting characteristics at liquid nitrogen temperature and the critical current density characteristics do not deteriorate even when influenced by a magnetic field.

DEMAND FOR Nd MAGNETS STRONG

Demand for neodymium sintered magnets has been strongly, particularly in Japan, especially for hard disk drives. Production of rare earth magnets showed a 15% year-on-year increase in the first half of 1995 and it is thought that neodymium magnets accounted for almost all this growth. In addition, production of neodymium bonded magnets has shown a sharp rise as these magnets have begun to be used in HDD spindle motors. The Japanese demand for rare earths, in 1991 to 1995 is shown in the following diagram. Neodymium-based magnetic powder is not produced in Japan but is all imported from Magnequench. (*Source: Roskill's Letter from Japan, November 1995*).

Japanese Demand for Rare Earths



MAGNETS IN A WASHING POWDER PLANT

Boxmag-Rapid has won an order to supply equipment to remove tramp iron from a washing powder plant in Italy. The Boxmag-Rapid SupaGrill has been installed at Levers plant in Casalpusterlengo, Italy. Originally a metal detector was used on its own. Further investigation led to the conclusion that the specification of a magnetic extractor, working in conjunction with the metal detector, would result in a more efficient solution to the problem. A series of ferritic magnet rods arranged in a grill pattern and housed in a draw which in turn is located in a square section of a ducting were used.

A ROOM-TEMPERATURE ORGANOMETALLIC MAGNET

Previous efforts at synthesizing "molecular magnets" have generally resulted in compounds exhibiting magnetic ordering only at low temperatures; the one notable

exception is an amorphous compound based on vanadium and tetracyanoethylene. Now the room-temperature barrier has again been broken, this time by a member of the Prussian blue family of organometallic compounds. Verdaguer and co-workers report (*Nature* 378, 14 December 1995, p. 701) that a novel Prussian-blue-like phase behaves as a magnet below a critical temperature of 320 K. The saturation magnetisation is limited to 0.15 Bohr magnetons, owing to the weak value of the resulting spin per repeat unit. The coercivity is also weak; at 10 K the value of the coercive field is only 10 Oe. Although the interest of this finding is currently scientific rather than practical, one of the challenges with molecule-based magnets is to find applications as a result of their specific properties such as low density, transparency, insulating character, magneto-optical properties and tunable Curie temperatures.

PERMANENT MAGNET COURSE AVAILABLE ON VIDEO

The Metal Powder Industries Foundation sponsored the P/M Magnetic materials & applications Short Course on June 27-28, 1995 in Philadelphia, USA. The course was recorded on videotape and these tapes are now available on eight VHS (NTSC and PAL) cassettes. The video course is available for US\$900 plus postage and handling from MPIF, 105 College Road East, Princeton NJ 08540-6692, USA. Fax: 609-987-8523.

CONSORTIUM FOR ADVANCED MAGNETS

In an attempt to revitalize and support permanent magnet research and development, a new consortium based on university, national laboratory and industrial collaboration has been formed in USA. The objectives of the Consortium for Advanced Magnets (CAM) include: drawing road maps to the year 2000 and beyond for materials, technologies and products that will lead to improving the magnetic properties of existing magnets and to discovering better and less expensive magnets. More information can be obtained from the Physics Department of the University of Delaware in Newark, DE, USA.

ELECTROMAGNETIC SEPARATION ACTIVITY IN SWEDEN

There has been some activity in magnetic and electrical separation in Sweden. Two wet carousel HGMS separators are reportedly being installed at the LKAB pilot plant to recover hematite. The separators are one-head SALA HGMS 120-10-10 units. The Luleå University is involved in an industrial project on treatment of industrial minerals by electrical technique and the waste treatment and scrap recycling is being looked into by MHS and eddy-current techniques.