

News Briefs

SUPERCONDUCTING MAGNETS CONTRACT

Grumman Corporation was awarded a US\$42.7-million US government contract to build 337 superconducting magnets for an atom-smashing project at Brookhaven National Laboratory.

CZECHOSLOVAKIA SUSPENDS ORE PROJECT IN UKRAINE

Czechoslovak government has decided to suspend construction work (mainly magnetic separation section) on an iron ore beneficiation plant at the Dolinska joint venture project near Krivoy Rog in the Ukraine. Escalating completion costs and doubts about the quality of the Ukrainian ore appear to have prompted the decision. Czechoslovakia has already invested some US\$350 million in the project and will have to sell its share at a loss.

BIOLOGICAL EFFECTS OF MAGNETIC FIELD

Although possible links between power transmission lines, Earth magnetic field and cancer have been established in 1979, reliable experimental confirmation has been so far elusive. A newly developed theory proposes that weak magnetic fields such as those generated by the Earth and by electrical appliances may harm cells by allowing free radicals to overproduce and to damage DNA. An increased mobility of increased number of free radicals caused by magnetic field changes increases the number of errors in DNA. These effects occur at very weak magnetic fields of the order of a few mT. such fields are generated by electrical appliances, power lines and the Earth. The effects are no greater if the fields are several Tesla.

GALACTICAL MAGNETIC ANOMALY

A newly discovered remote galaxy 4 billion light years away was found to have a magnetic field of 1 to 4 microgauss, the strength comparable to our own galaxy's field. We see this distant galaxy as it was when the Universe was in its early stages of development and would be thus expected, according to present theories, to generate much weaker magnetic field. The new observation suggests that the magnetic field must have played an important role in the evolution of the Universe, in contrast to the current beliefs.

PRODUCTION OF RARE EARTHS IN CHINA

China's domestic consumption of rare earths increased from 4 222 tonnes in 1986 to 8 286 tonnes in 1991. China's annual of high-purity rare earths increased from

20 tonnes in the early 1980s to 2 900 tonnes in 1991. At present, China processes 1.2 million tonnes of ductile iron, 340 000 tonnes of steel and 120 000 tonnes of aluminium with rare earths. Rare-earth aluminium wire is used in the grid of the Daya Bay nuclear power station and in the transmission lines from the Tianshengqiao power station to Guangzhou. The petroleum and chemical industries consume 2 500 tonnes of rare earths per annum and the country's oil refineries have increased their output by 1.5 million tonnes, worth nearly US\$181 million, thanks to the application of rare earths.

Since 1987 rare earth trace-element fertilizer has been applied to 870 000 hectares of crops, yielding economic return of US\$272 million.

Chinese production of separated rare earth oxides increased considerably in 1991. Output increased from 1 862 t (REO) in 1990 to 2 753 t in 1991. Growth was led by production of neodymium oxide, which increased by 80% from 504.5 t (REO) to 904.8 t. This growth reflected strong demand from producers of magnets.

Exports increased by 30% in terms of volume and 20% in terms of value. Exports of high-purity separated rare earths rose by 162% in terms of volume to reach 2 100 t (REO) in 1991. In terms of value, exports rose by 140% to US\$68.4 million. During 1991 therefore, Chinese exports of high-purity separated rare earths exceeded those of raw materials and intermediate materials in terms of value.

JAPANESE IMPORTS OF NEODYMIUM FOR MAGNETS SOAR

The main increase in Japanese import of rare earth materials was recorded in neodymium oxides, neodymium fluorides and dysprosium oxides, for use in Nd-Fe-B magnets. Imports of neodymium fluorides rose by 340% to 194 t between January and October 1991; imports of dysprosium oxides rose by 300% to 36 t. By contrast, imports of samarium fell by 40 % following adjustments in stock levels by producers of samarium-cobalt magnets. Production of Nd-Fe-B magnets is forecast to show no marked change in 1992. By contrast, stock adjustments of samarium have been completed and it is thought that Japanese demand for samarium will rise in 1992.

Japanese imports of rare earth materials (in tonnes)

	1989	1990	1991 Jan-Oct.
Neodymium	391	433	739
Samarium	179	108	68
Dysprosium	15	18	43

MAGNETS DISTRIBUTE MEDICATION IN A LIVING BODY

A group of researchers at the Hoshi University, Tokyo are using magnets to move medication in a living body. The new method involves mixing medication with

iron-oxide powder and polymers. The medicine is injected or swallowed, and a magnet is used to draw the iron, carrying the dose, to the precise point in the body where it is needed. The magnet is then used to hold the medication at that point for the time required. By using the method, medicine effective against gastric ulcers or cancer can be targeted at predetermined point. This permits the medicine to work locally only on the targeted part of the body and it prevents subsidiary ill effects. The mixture used in animal tests was 20% cinnarizin, 60% iron-oxide powder and 20% methacrylic-acid-based polymer dissolved in alcohol.

KARL STRNAT 1929 – 1992

Karl J. Strnat, the doyen of rare earth permanent magnets, died unexpectedly on May 1, 1992. Dr. Strnat was born in Vienna, Austria and began his career at Wright-Patterson Air Force Base, Ohio, USA which continued until his retirement in 1968. He then served as professor of engineering at the University of Dayton, Ohio, for 22 years until his retirement there in 1990. Among his many contributions to the science and technology of rare-earth permanent magnets was the discovery in 1966 of extraordinary magnetic properties of YCo_5 and in 1967 the demonstration of SmCo_5 as the best permanent magnet of the RCO_5 family.

NEW POWDERS FOR ND-PERMANENT MAGNETS

Ultrafine Powder Technology Inc., Woonsocket, R.I., USA, has recently announced it now produces a neodymium-based line of magnetic powders that are used to produce NdFeB bonded magnets. The company used several patents it holds under licence from the US Navy research laboratories as a basis to develop the powders which are traded under the name MagneFine L1414. A proprietary gas atomization process is used to manufacture powders with particle sizes 2 to 3 μm , compared with a range of 35 to 250 μm for powders produced by conventional atomization processes. The company is capable of producing about 1 600 tonnes of powders annually.

MAGNETS FOR STEEL CAN RECYCLING

Lifting electromagnets are currently operating in waste plants in 26 British municipalities. The magnets are used to extract steel, particularly beverage and household cans and the number of the recycling systems on-stream at waste plants in the U.K. increased by 20 per cent in the first quarter of 1992 compared with the like period a year ago. According to British Steel Plc, more than 20 000 tonnes of steel cans were recycled in the first four months of 1992, which represents the recovery of about 10 per cent, compared to 50 per cent in Germany and the Netherlands.