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Equipment and Products

A SEPARATOR OF NON-FERROUS SCRAP

Goudsmit Magnetic Systems of the Netherlands have introduced a non-ferrous scrap separator based on the magnetic repulsion by eddy-currents. The machine is designed to remove the non-ferrous metal fraction from shredder residues from which the ferrous contents have already been separated magnetically.
The machine is equipped with a 400 mm conveyor belt which can run at 0.2 to 0.5 m/s. A rapidly rotating magnetic roll fitted at the end of the belt generates the eddy currents.

A SUPERCONDUCTING MAGNET TO PROPEL A SHIP

The world's first ship propelled by a superconducting magnet is to be commissioned in Kobe, Japan. The Yamamoto 1 manufactured by Mitsubishi Heavy Industries Ltd. was scheduled to sail by the end of February 1992. The 280-tonne, 26 m long and 10 m wide Yamamoto will travel at a top speed of 8 knots, although after further improvements the speed of at least 100 knots will be attainable. It is predicted that superconducting ships will be ready for commercial use around 2010.
(The Japan Daily, January 20, 1992).

MAGNETIC BOND PRODUCES NEW ALLOY

A new alloy of aluminium and lead for use in hydraulic bearings and in which the metals are held together by magnetic levitation has been developed by Israel's OTI programme. The new alloy is said to be half the price of existing copper and tin alloys used in most standard vehicle engines and offers better frictional properties.

MAGNETIC SEPARATOR TO PURIFY ALUMINIUM OXIDE

A permanent magnet separator has been supplied by Eriez Magnetics Ltd.to Washington Mills Electrominerals, Manchester, U.K. for the removal of ferrous contamination from coarse aluminium oxide. The oxide is used to make grinding wheels, other abrasive products and refractories.

COIL STORES MAGNETIC ENERGY

What is said to be the world's first superconducting magnetic energy storage coil with only a 0.01 per cent power loss has been successfully tested by Mitsubishi Heavy Industries Ltd. and Kansai Electric Power Co. The test was performed on a Nb-Ti superconducting coil with a rated power output of 400 kJ, with a charge/discharge speed of 1 T/s. The test was the first phase of a research project for development of a 2.5 MJ toroidal superconducting coil system to stabilize an electric power system by controlling voltage and frequency fluctuations through the charge/discharge of stored power.

SUPERCONDUCTING HGMS FOR KAOLIN PROCESSING

Carpco Superconducting Magnetic Separation Ltd. announced the award of a contract for its second superconducting Cryofilter HGMS from a European kaolin plant. Start-up is scheduled for the second half of 1992. The first Cryofilter installed in Cornwall, U.K. in 1989 is used to improve the brightness of kaolin.

RARE EARTH FE-B MAGNETS MADE BY THERMAL DEFORMATION

According to China Rare Earth Information Centre, Department of Materials Science of the Beijing University have prepared the rare-earth Fe-B permanent magnets by thermal deformation techniques. Magnetic properties of REFEB magnets produced by hot extrusion are: B_r = 1.16 - 1.2 T, H_{ci} = 1193.7 - 1352.8 kA/m (15 - 17 kOe), $(BH)_{max}$ = 238 - 254 kJ/m^3 (30 - 32 MGOe), and those of magnets obtained by hot rolling are: B_r = 1.02 T, H_{ci} = 779.9 kA/m (9.8 kOe), $(BH)_{max}$ = 171 kJ/m^3 (21.5 MGOe).

RARE EARTH MAGNETS USED IN AEROSPACE

Considerable achievement has been made in the development in rare-earth-based aerospace materials. Rare-earth permanent magnets have been used for aircraft motors, while high-strength RE-based Mg alloy, RE-based superalloy and RE-Ti alloy have been used in the manufacture of aircraft parts. RE-based heat-resistant coating material is used for surface protection of aircraft parts.
(China Rare Earth Information Centre, February 1922).

A SUPERCONDUCTING FRICTIONLESS MAGNETIC BEARING

Argonne National Laboratory and United Technologies Corp., U.S.A. have jointly built a near-frictionless magnetic bearing to be used for the development of flywheels which are highly efficient energy storage devices for possible utilization in space, electric utilities and other commercial and government applications. The experiments have shown that a superconducting magnetic bearing can have about 25 times less friction than the best existing magnetic bearings and about 1000 times less friction than bearings found in today's cars and trucks. The UTRC-Argonne bearing stator material is an yttrium- barium-copper oxide compound, a high-temperature superconducting material. The magnetic rotor is a Sm-Co permanent magnet. The permanent magnetic rotor attached to the flywheel sits above the disk-shaped superconducting stator. Cooling the superconductor to about 170 K induces an equal but opposite magnetic field that causes the magnet to float above the disk. When tested in a vacuum at 77 K, the bearing achieved rotor speed of 200 000 rpm and a 4×10^{-6} drag-to-lift ratio. It is about 25 times less friction than the highest reported drag-to-lift ratio 1×10^{-4} for both conventional and superconducting magnetic bearings.