

## News Briefs

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### MAGNETIC WOOD

The University of Iwate, Japan, has developed wooden material with magnetic properties. This was achieved by combining a process for impregnating a magnetic fluid in wooden fibre structure and a drying process. The technique can be applied to all kinds of timber. During the development stage, four different approaches were tested: coating the surface of a sample with magnetic fluid, immersing the sample in magnetic fluid for 1 to 7 days, forcibly injecting magnetic fluid into the wood by placing a container with the fluid and the wood inside a vacuum desiccator, and forming a vacuum, and depressurising, then pressurising to impregnate the magnetic fluid. The maximum magnetic permeability was obtained by the compression process. With this process, the sample is first dried for 3 hours at 85°C followed by impregnation of the magnetic fluid into the sample under the pressure of 7 kg/cm<sup>2</sup>. The sample is subsequently dried for 8 hours. The surface of the wood is then coated with lacquer to prevent evaporation of the magnetic fluid. Compared with magnetic materials consisting of metals and ceramics, magnetic wood has a soft feel, workability of wood and excellent characteristics such as the magnetic shielding effect and magnetic attraction. The material can be used for high-frequency heating and for production of advanced furniture, electric equipment and acoustic devices.

### TOP QUARK DISCOVERED

Physicists from the Fermilab's Tevatron proton-anti-proton collider declared that they had finally discovered the top quark. The top quark is the final letter in the alphabet of Standard Model particles. According to this picture, all matter is composed of six strongly-interacting subnuclear particles, the quarks, and six weakly-interacting particles, the leptons. Both sextets are neatly arranged as three pairs in order of increasing mass.

The fifth quark, the 'beauty' or 'b' quark, was also discovered at Fermilab, back in 1977. Since then physicists have been eagerly waiting for the top to turn up, but have been frustrated by its heaviness — the top is some 40 times the mass of its 'beautiful' partner. Not only is the top quark the heaviest by far, but it is the only quark which has been actively hunted.

After carefully trimming the raw 6 trillion collision sample to 40 million promising events, this information was painstakingly sifted, looking for signs of the daughter particles into which the top quark decays. In two series of experiments, 43 and 17 tops events were found and the masses of 176 GeV and 199 GeV were reported. (*Cern Courier*, April/May 1995).

### **MAGNETIC WATER IN MEAT AND MILK PRODUCTION**

It has been reported that Wamag Ltd (Prague, Czech Republic) and the Research Institute for Livestock Production (Prague) completed a two-year investigation of the effect of magnetic treatment of drinking water on cattle. It was found that the magnetically treated water increased weight of calves by 9.5%, of bulls by 6.5%, and the milk output of cows by 9.9%, compared to groups of animals that were given untreated water.

### **A COMPARISON OF DRY MAGNETIC SEPARATORS**

A recent paper by Jirestig and Forssberg, both of the University of Technology, Luleå, Sweden (HGMS— A new high-gradient magnetic separator, *Aufbereitungstechnik* **36** (1995), 257) presents a very interesting comparison of the efficiency of four dry high-intensity magnetic separators, namely Permroll, High Force, IMR and Sala Dry HGMS. It was observed that Permroll, High Force and Dry HGMS operating at 2 Tesla gave the calcite and dolomite concentrates of similar brightness, in the particle size range  $-450+38\text{ }\mu\text{m}$ . The efficiency of the induced magnetic roll separator (IMR) was slightly inferior. On the other hand, high brightness obtained with the belt separators (Permroll and High Force) was achieved at the great expense of the recovery. At  $38\text{ }\mu\text{m}$ , only about 5% of the material reported into the magnetic fraction for the Sala Dry HGMS, while Permroll, and particularly High Force suffered significant losses (up to 80%) to the magnetics. On the other hand, particles larger than  $450\text{ }\mu\text{m}$  tended to clog the matrix of the Dry HGMS separator.

### **HAND-HELD NEAR-FIELD PROBES**

The sources of electromagnetic emissions from all sorts of equipment, including cables and connectors, can be pinpointed with the Scan EM-H and Scan EM-E hand-held near-field probes from Credence Technologies (USA). The Scan EM probes use an array of five light-emitting diodes and a small acoustic transducer to indicate relative field strength in the immediate vicinity of the radiation source. The Scan-E responds to electric fields from 5 MHz to 1 GHz, the Scan EM-H senses magnetic fields from 100 kHz to 100 MHz.

### **LIMS FOR HEAVY MEDIA RECOVERY**

Climaxx Equipment (USA) manufactures its own patented line of permanent wet drum magnetic separators for the recovery of heavy media for dense media applications. The Climaxx separators feature a wide angle magnet assembly in a tank designed to take advantage of the magnet configuration. Improved efficiency of separation is claimed.