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Magneto-Optical Data Storage Materials

Extensive work is being undertaken on a variety of thin film materials which may be suitable for magneto-optical recording applications. During the information storage process small magnetic domains in a perpendicularly magnetised layer have their direction of magnetisation reversed, while subsequent retrieval is facilitated by the optical readout of changes occurring in the linear polarisation of light reflected from the various domains on the magnetic surface.

The necessary properties of materials to be used for this purpose include: a suitably high polar Kerr rotation, high intrinsic anisotropy perpendicular to the film plane, sufficiently high coercive force, good reflectivity and corrosion/oxidation resistance. A platinum-manganese-antimony intermetallic compound with a C1b phase has attracted considerable interest for this application, partly because it displays high Kerr rotation at room temperature. The preparation of suitable homogeneous films has proved to be difficult, however, but a recently reported Japanese investigation has shown that the properties of PtMnSb films can be improved significantly by varying both the preparation and the annealing conditions ("The Influence of Deposition Conditions on the Magnetic Properties of PtMnSb Films", S. Ohnuma, A. Kunimoto and T. Masumoto, *IEEE Trans. Magn.*, 1988, **24**, (6), 2551–2553).

Their samples were prepared by radio frequency sputtering a 1 micrometre film onto a silica substrate, the target being pieces of platinum supported on a manganese-antimony backplate. The magnetic properties of the as-deposited films were strongly related to the pressure of the argon sputter gas, and to the temperature of the substrate during the deposition stage. Too high argon gas pressure, or too low substrate temperature failed to produce the C1b structure. A suitably high readout signal requires a high Kerr rotation angle, and for all the samples this could be increased by annealing them at temperatures above 350°C, which also increased the coercive field.

Nuclear Fusion Reported

As this issue of *Platinum Metals Review* was being prepared for the press it was reported that Professor Martin Fleischmann, of the University of Southampton, England, and Professor Stanley Pons, of the University of Utah, U.S.A., had claimed to have achieved controlled nuclear fusion within a simple electrochemical cell. The process apparently depends upon the notable ability of palladium to absorb hydrogen/deuterium. Their experiment was carried out in an insulated flask containing deuterium oxide (heavy water). Electrolysis of the heavy water using a palladium cathode and a platinum anode splits the heavy water into oxygen and deuterium, and the latter is absorbed by the palladium. In fact it is claimed that so much deuterium enters the palladium lattice structure that the deuterium nuclei begin to fuse together, releasing large amounts of heat, which could be used, for example, for the generation of electricity.

The efforts currently being made to repeat the experiment described by Professors Fleischmann and Pons will be followed with the greatest interest, as their work seems to offer the possibility of a major new source of energy, which should be environmentally compatible.