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Magneto-Optical Recording Materials

In 1989 the attention of readers of this Journal was drawn to research work being carried out at the Philips Research Laboratories and at E. I. du Pont de Nemours on layered cobalt and platinum structures, which were considered to have potential for magneto-optical recording. In the same issue an abstract of a paper from the Sony Corporation Research Center describing some magneto-optical properties of ultrathin cobalt/platinum and cobalt/palladium layers, also indicated the potential of these materials for high density recording. Continuing interest was demonstrated during 1990 by further reports from these organisations, and from elsewhere.

Progress continues to be made in the subject, as can be gathered from the recent literature which includes, among others, papers from the three establishments named earlier.

According to a combined paper from the first two establishments, large magnetic anisotropy and coercivity in platinum/cobalt multilayers is dependent on sharp interfaces between the layers. Krypton and xenon are better mass-matched to the platinum sputtering target than argon, and their use results in less energetic bombardment by reflected gas neutrals during the film growth. Thus interfacial mixing of the platinum and cobalt films is reduced, and magnetic properties improved. Another way to reduce the mixing of the platinum and cobalt layers, caused by energetic reflected argon atoms, is to sputter at high pressure; this increases the number of collisions that the atoms make before arriving at the substrate, and so reduces their energy (P. F. Carcia and W. B. Zeper, *IEEE Trans. Magn.*, 1990, **26**, (5), 1703–1705).

A further paper from the Sony Corporation gives a review of previous studies on the magnetic properties of cobalt-platinum and cobalt-palladium systems, before going on to describe and discuss current work on cobalt/platinum and cobalt/palladium multilayers. Magnetic hysteresis of the multilayers, their magneto-optical properties, and the effect of sputtering conditions and underlayers on the coercivity, were considered. With large Kerr rotation at shorter wavelengths, and high resistance to corrosion, ultrathin multilayers of both pairs of materials are considered to be promising candidates for high density magneto-optical recording. An examination of dynamic read/write characteristics of the materials was made, with ultrathin multilayers deposited on photo-polymerisation glass substrates, pre-grooved with 1.6μm pitch. Carrier-to-noise ratios of 53 and 46 dB, at 780 nm, were seen for cobalt-platinum and cobalt/palladium, respectively. A higher ratio will be achieved by refining the noise level and optimising the disc structure (S. Hashimoto and Y. Ochiai, *J. Magn. Magn. Mater.*, 1990, **88**, (1&2), 211–226).

Osmium and Ruthenium Complexes

Recent work on organic oxidations by osmium and ruthenium oxo complexes has been the subject of review No. 22 in the TMC Literature Highlights series (W. P. Griffith, *Trans. Met. Chem.*, 1990, **15**, (3), 251–256).

The most important osmium oxidant is OsO_4 which, when functioning catalytically, is one of the most effective, selective and efficient organic oxidants. Ruthenium complexes in the higher oxidation states are more powerful oxidants than their osmium analogues. While ruthenium(VI) complexes are mild, effective oxidants, osmium(VI) complexes have virtually no oxidative properties. (71 Refs.)