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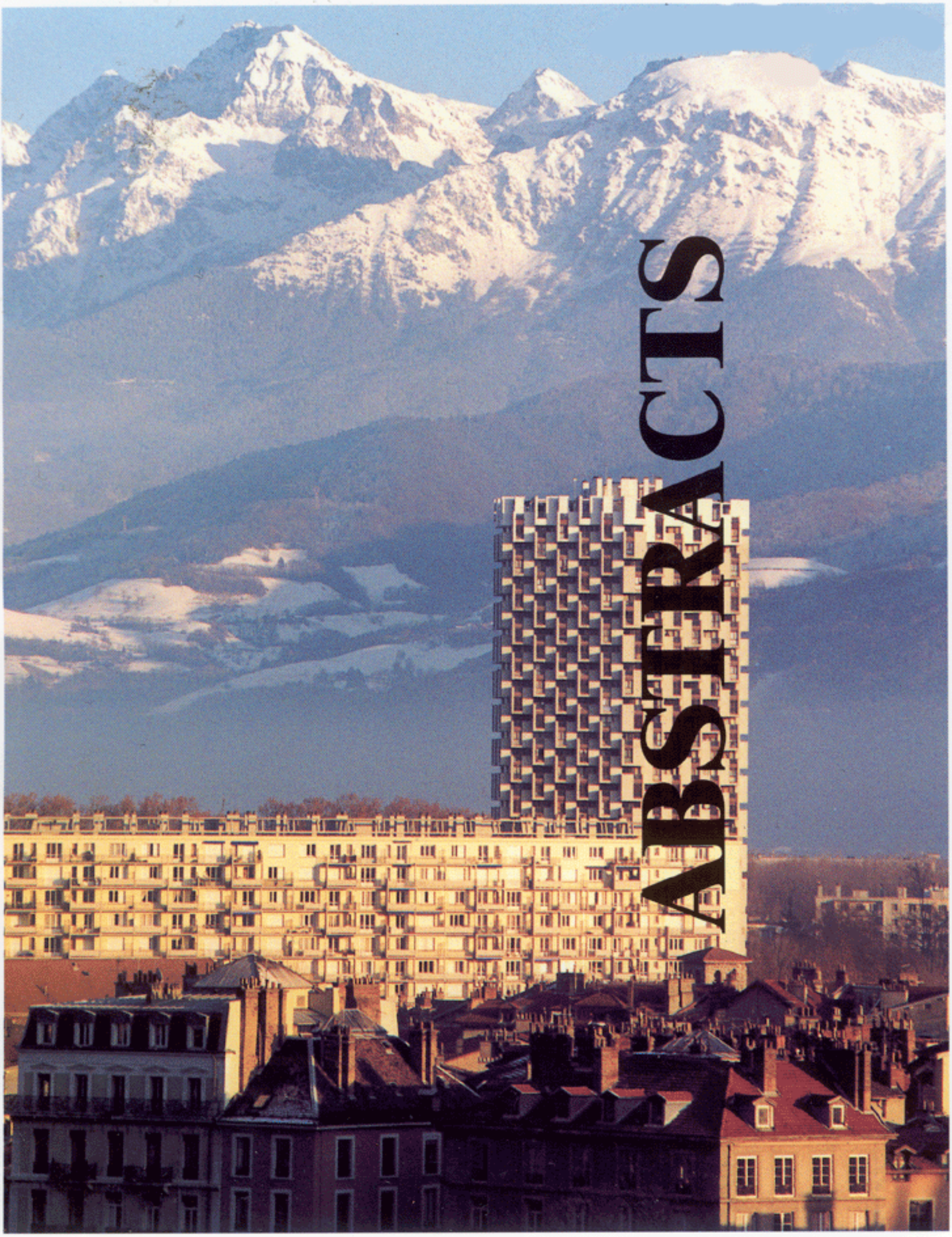

Tu-B1-P7 B029

EFFECT OF THERMAL FLUCTUATION ON READ / WRITE PROPERTIES OF AFC RECORDING MEDIA

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Recently antiferromagnetically coupled (AFC) recording media have been proposed to decrease media noise and improve thermal stability. The effect of the material constants of the underlayer on thermal stability is investigated in this paper by micromagnetic computer simulation. The calculation conditions are the same as used in Ref. 1. The change in the magnetization structure was obtained by the Monte Carlo method with the initial state obtained in Ref. 1.

The readout signal just after recording was observed to increase by about 30% in the largest case. This is due to the change in the magnetization structure of the underlayer which occurs immediately after recording because of thermal fluctuation. However, as the media noise also increses, the SNR hardly changes during this period.

Thermal stability was examined by the change in the SNR with time. The decrease in the SNR was delayed about 100 times the single layer case. The best combination of material constants was found to be $A=0.1\times10^{-6}$ erg/cm, Ms=600 emu/cm^3, and Hk= 2 kOe. This is considered due to the increased tendency of the magnetic moments of the underlayer to orient antiparallel to those of the recording layer affected by both inter-layer exchange coupling and thermal fluctuation, which improves thermal stability through magnetostatic coupling.

[1] Y. Nakatani, et. al., JEMS'01 abstract.

Tu-B1-P8 B037

CRYSTAL STRUCTURE AND MAGNETIC PROPERTIES OF Co-FERRITE FILMS

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Amorphous rare earth-transition metal like the compound of Tb-Fe-Co system is used for the recording layer of the high-density magneto optical medium. We have also studied the recording layer of Tb-Fe-Co system. But the recording layer is easily scratched and is susceptible to oxidation. Therefore, the protection film is indispensable. And it is the multilayered structure. Therefore, the magneto optical medium takes time to produce as a multilayered structure. Another hand, the oxide magneto optical recording medium is excellent in anti-corrosion, is chemically stable and is hard. Therefore, as for it, a protection film does not necessity. And it has the high permeability of light. Making light interfere in it can efficiently increase the Faraday rotation angle. Therefore, a dielectric film is not needed.

This study used reactive rf-sputtering equipment with a cobalt and an iron coupling targets. The forming of the reaction with oxygen gas produces the iron cobalt oxide films. The crystallographic structure was evaluated by an X-ray diffraction. The magnetic anisotropy was measured by a vibrating sample magnetometer.

As a result from an XRD measurements, these were almost single-phase Co-ferrite thin films, which were prepared under the O_2 partial pressure regions from 5 to 60 %.

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SMALL ANGLE NEUTRON SCATTERING STUDIES OF LONGITUDINAL MAGNETIC RECORDING MEDIA.

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We have used small angle neutron scattering (SANS) to study the microscopic magnetisation of CoCrPtTa based longitudinal recording media. In contrast to previously reported studies in this area, which have used unrealistically thick magnetic layers, we have made use of samples of actual recording media.

By utilising the anisotropic neutron magnetic scattering arising from the magnetised grains, we have been able to separate the magnetic scattering from the nuclear contribution. It is thus possible to comment on the size, shape and local distribution of the magnetisation within the grains. Due to the particularly narrow grain size distribution of some of the systems studied, this information can be remarkably detailed. We will present data on a range of systems varying in both grain size and grain size distribution.

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Tu-B1-P10 B053

MAGNETIC PROPERTIES OF $Ba_{1-X}Sr_XFe_{12}O_{19}$ GROWN BY A SOL-GEL METHOD

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$Ba_{1-X}Sr_XFe_{12}O_{19}$ were prepared by a sol-gel method. Apart from the advantage of low temperature processing a sol-gel route makes it possible to obtain nano-particle materials[1]. Magnetic and structural properties of $Ba_{1-X}Sr_XFe_{12}O_{19}$ (x=0.0, 0.25, 0.5, 0.75, and 1.0) were characterized by SEM, Mössbaure spectroscopy, x-ray diffractometry (XRD), and vibrating sample magnetometry (VSM). The result of XRD measurements shows that the *a* and *c* lattice parameters decrease with increasing x from a=5.898 Å and c=23.215 Å for x=0.0, to a=5.889 Å and c=23.050 Å for x=1.0. Mössbaure spectra of $Ba_{0.5}Sr_{0.5}Fe_{12}O_{19}$ have been taken at various temperatures from 15 to 800 K, and each spectra for a temperature below the Curie temperature (T_C=740 K) was fitted with five subspectra of Fe sites in the structure (*4f*$_2$, *2a*, *4f*$_1$, *12k*, and *2b*). The area fractions of the subspectra at 15 K were 16.7, 9.0, 16.0, 50.0, and 8.3 %, respectively. The *2b* site had a very large quadrupole splitting. The isomer shifts indicated that the valence state of the Fe ions was ferric (Fe^{3+}). The saturation magnetization M_S was 55 *emu/g*, and coercivity H_C was 5.1 kOe at room temperature under an applied field of 15 kOe. This value seem to be suitable for high density recording media.

[1]C. S. Kim, S. W. Lee, and S. Y. An, J. Appl. Phys., **87**(9), 6244 (2000).