해 · 외 · 논 · 문 · 동 · 향

1

◦ 논문제목

Development of CoX/Pd multilayer perpendicular magnetic recording media with granular seed layers

◦ 저자/소속

Yukiko Kubota, , Dieter Weller, Mei-Ling Wu, Xiaowei Wu, Ganping Ju, Duane Karns and Jun Yu

Seagate Research, Seagate Technology LLC, 2403 Sidney Street, Suite 550, Pittsburgh, PA 15203-3116, USA

◦ 논문요지

CoCrRu-based granular seed layers are studied to control the hysteresis properties of CoX/Pd multilayer based perpendicular magnetic recording media. Proper choice of the CoCrRu growth conditions is found to reduce the hysteresis slope parameter and to improve the switching field distribution, suggesting that this granular seed layer is effective in producing exchange decoupled columnar structures. The results are confirmed by magnetic force microscopy studies of recorded patterns as well as by DC/AC-erase noise measurements, remanent coercivity studies and microstructural observations by transmission electron microscopy.

◦ 출 처

Journal of Magnetism and Magnetic Materials Volumes 242-245, Part 1, April 2002, Pages 297-303

2

◦ 논문제목

Enhancement of magnetic properties of Co/Pd multilayered perpendicular magnetic recording media by using Pd/Si dual seedlayer

◦ 저자/소속

J. Kawaji [a], T. Asahi, [a,b], T. Onoue [b], J. Sayama [a], J. Hokkyo [b], T. Osaka [a], b and K. Ouchic

[a] School of Science and Engineering, Waseda University, 3-4-1 Okubo, Shinjuku-ku, Tokyo 169-8555, Japan

[b] Advanced Research Institute for Science and Engineering, Waseda University, 3-4-1 Okubo, Shinjuku-ku, Tokyo 169-8555, Japan

[c] Akita Research Institute of Advanced Technology, 4-21, Sanuki, Araya, Akita 010-1623, Japan

◦ 논문요지

Effects of the introduction of a Pd/Si dual seedlayer on the microcrystalline structure and magnetic properties of [Co/Pd]n multilayered perpendicular magnetic recording media were investigated. The Pd/Si dual seedlayer was composed of a Pd upper seedlayer and a Si under seedlayer. The Pd upper seedlayer with a thickness of up to 10nm markedly increased the coercivity of [Co/Pd]n multilayered media in the direction perpendicular to the film surface. The highest coercivity of 7.8kOe was obtained for the [Co/Pd]10 medium with a Pd(10nm)/Si(100nm) dual seedlayer. The Pd upper seedlayer not only facilitated the formation of regular interfaces between the Co and Pd layers, but also reduced the thickness of the deteriorated initial layer in the [Co/Pd]n multilayer, resulting in enhancement of the magnetic anisotropy field. The [Co/Pd]n multilayered medium with the Pd/Si dual seedlayer exhibited weak intergranular exchange coupling between [Co/Pd]n grains, which led to excellent read · write characteristics.

◦ 출 처

Journal of Magnetism and Magnetic Materials Volume 251, Issue 2, October 2002, Pages 220-228-

3

• 논문제목

FePt/BN granular films for high-density recording media

• 저자/소속

M. Daniil [a], P. A. Farber [a], H. Okumura [a], G. C. Hadjipanayisa and D. Weller [b]

[a] Department of Physics and Astronomy, University of Delaware, 223 Sharp Laboratory, 19716 Newark, DE, USA

[b] Seagate Technology, Pittsburgh, PA 15203-2116, USA

• 논문요지

FePt particles with the high magnetocrystalline anisotropy L10 structure and particle sizes between 3 and 15nm have been fabricated by annealing FePt/BN multilayers with bilayer thicknesses in the range of 2.5 · 200A, at 600° C and 700° C. Films with thicker bilayer thicknesses were found to have a strong(1 1 1) texture, which is less developed in thinner bilayer films. For a particular bilayer thickness(FePt-20 A/BN-40A), a special type of textured ordering is observed in the X-ray diffraction patterns, in which the c-axis of all the particles has a perpendicular component. Magnetic measurements showed that a wide range of coercivities (2 · 18kOe) could be obtained in the films by varying the bilayer thickness and the annealing temperature and time. The concentration of BN was found to control the interparticle interactions, which for certain BN values led to decoupling of the FePt grains.

• 출 처

Journal of Magnetism and Magnetic Materials Volume 246, Issues 1-2, April 2002, Pages 297-302

4

• 논문제목

Electrochemical deposition of novel nanostructured magnetic thin films for advanced applications

• 저자/소속

Nicolae D. Sulianu, Department of Solid State Physics, Faculty of Physics, Al.I.Cuza University, 11 Blvd. Carol I, 6600, Iai, Romania

• 논문요지

Nanostructured Ni---W films (140 nm) containing from zero to 18-wt.% W have been electrolytically processed and analyzed. XRD, SEM and TEM investigations revealed that films consist of Ni columnar nanoparticles of fcc-type whose [111] axis is oriented perpendicular to the film plane and have 140nm tall and d=6 · 27 nm in diameter. Depending on film composition, two types of nanostructures were observed; (a) single-phase nanostructure(<7-wt.%W, d=14 · 27nm), and (b) two-phase nanostrueture(7 · 18-wt.%, d=6 · 14nm). The particle size dependence of saturation magnetization, in-plane and, respectively, perpendicular coercivity is typical for a single-domain Ni particle system, and can be controlled by W content. Typical film containing 13-wt.% W behaves that a system of perpendicular Ni columns 12 · 13nm in diameter embedded in an amorphous Ni---W matrix with perpendicular magnetic anisotropy. Such film has the following magnetic parameters: Ms=420, Hc//=49, H=118, Hk=455kA m−1, quite high squareness ratio S=0.6 and very high coercivity squareness S*=0.83. It is conclude that such a film may be used as a perpendicular magnetic recording media with ultrahigh density.

• 출 처

Materials Science and Engineering B Volume 95, Issue 3, 1 September 2002, Pages 230-235-

5

◦ 논문제목

Segmental Anisotropy in Strained Elastomers Detected with a Portable NMR Scanner

◦ 저자/소속

K. Hailu, R. Fechete, D. E. Demco and B. Blumich[1]
Institut fur Technische Chemie und Makromolekulare Chemie, Rheinisch-Westfalische, Technische Hochschule, Worringerweg 1, D-52056, Aachen, Germany

◦ 논문요지

Single-side NMR is particularly suitable for measurements of segmental anisotropy induced in elastomers by uniaxial forces or local strain. Proton transverse nuclear magnetic relaxation was investigated with the NMR-MOUSE by recording the Hahn-echo decay in cross-linked natural rubber bands. This provided information on the dependence of the Hahn-echo decay on the angle between the direction of the uniaxial stretching force and the axis defined direction perpendicular to the magnet pole faces of the NMR-scanner. The anisotropy effect on the Hahn-echo decay is correlated with the extension ratio, and it is more evident in the liquid-like regime of the decay. A weaker segmental anisotropy is detected by 1H solid- and Hahn-echo decays recorded by multi-pulse sequences. A qualitative understanding of the angular dependence is obtained by an analytical theory of the Hahn-echo decay adapted to the case of stretched elastomers and to strongly inhomogeneous magnetic fields. Using angular-dependent 1H residual second van Vleck moments and correlation times reported previously [P.T. Callaghan and E.T. Samulski, Macromolecules30, 113 (1997)] from stretched natural rubber bands the segmental anisotropy measured in inhomogeneous magnetic fields by the Hahn-echo decay was numerically simulated. As an example of a macroscopic distribution of local segmental anisotropy, 1H Hahn-echo decays were measured by the NMR-MOUSE sensor in a stretched cross-linked natural rubber plate with a circular cut in the center.

◦ 출 처

Solid State Nuclear Magnetic Resonance Volume 22, Issues 2-3

6

◦ 논문 제목

Improvement in the crystallinity of ZnO thin films by introduction of a buffer layer

◦ 저자/소속

Toshiyuki Nakamura [a], Yasusei Yamada [b], Takeshi Kusumori [b], Hideki Minoura [a], Hachizo Muto [a,b*]
[a] The Graduate School of Engineering, Gifu University, 1-1 Yanagido, Gifu 501-1193, Japan
[b] National Institute of Advanced Industrial Science and Technology (AIST) Chubu, 2266-98 Anagahora, Shimoshidami, Moriyama-ku, Nagoya 436-8560, Japan

◦ 논문요지

The influence of pre-deposition of homo-buffer layers on film quality is studied as functions of temperature and duration of pre-deposition, for zinc oxide(ZnO) crystalline films prepared by pulsed laser deposition on sapphire(0001) substrates. This preparation technique is necessary to prepare high quality films suitable for the development of ZnO devices. Crystallinity and surface morphology were characterized by X-ray diffraction(XRD), reflection high energy electron diffraction and scanning electron microscopy. The line width of the rocking curve observed for ZnO(0002) XRD of ZnO films decreases(to 0.09° from 0.2-0.38°) upon introduction of a buffer layer of ZnO itself at a

low temperature approximately 500° C, indicating the formation of high quality films. The surface morphology and flatness were also improved. The film prepared under optimal conditions shows a high optical transmittance of ~90% with a steep falloff at 380 nm and a fairly small carrier concentration (1.8×10^{17}cm $^{-3}$). These results imply that the buffer layer relaxes the strain due to lattice mismatch between ZnO and sapphire(by 18%) and improves the film crystallinity.

· Keywords : thin film; Epitaxy; Pulsed laser deposition; Self-buffered ZnO film; Crystallinity

• 출 처 : Thin Solid Films 411(2002) 60-64

7

• 논문 제목

Piezoelectric thin AlN films for bulk acoustic wave (BAW) resonators

• 저자/소속

H.P. Loebl [a,*], M. Klee [a], C. Metzmacher [a], W. Brand [a], R. Milsom [b], P. Lok [c]

[a] Philips Research Laboratories, Weisshausstrasse 2, D-52066 Aachen, Germany

[b] Philips Research Laboratories, Cross Oak Lane, Redhill, Surrey RH1 5HA, UK

[c] Philips Semiconductors, MSI, Gerstweg2, NL-6534 AE Nijmegen, The Netherlands

• 논문요지

Thin film bulk acoustic wave(BAW) resonators and filters are well suited for mobile communication systems operating at high frequencies between 0.5 and 10GHz. Piezoelectric thin film materials investigated for bulk acoustic wave devices within Philips include AlN thin films. The relationship between sputter deposition conditions, AlN films structure, electromechanical coupling factor kt and relevant electrical parameters of BAW devices is discussed.

• 출 처

Materials Science and Engineering B00 (2002) 1-4

8

• 논문 제목

Li_2CO_3 doped ZnO films prepared by RF magnetron sputtering technique for acoustic device application

• 저자/소속

Walter Water [a], Sheng-Yuan Chu [a,*], Yung-Der Juang [b], Shih-Jeh Wu [c]

[a] Department of Electrical Engineering, National Cheng Kung University, 1 University Road, Tainan, Taiwan

[b] Tainan Teachers College, Tainan, Taiwan

[c] Department of Mechanical Engineering, I-Shou University, Kaohsiung, Taiwan

• 논문요지

It is necessary for zinc oxide film to have high resistivity for piezoelectric applications. The ZnO films have been deposited by RF sputtering deposition system using Li-doped ZnO ceramics as the target and high oxygen ratio (100% oxygen) for high film resistivity. The maximum resistivity of ZnO film measured was $10^8\Omega$cm in our experiments, and stronger intensity of c-axis orientation was grown at 50% oxygen ratio. Postdeposition annealing ZnO films in vacuum circumstance were found to relieve stress, avoid the electrode oxidation and increase resistivity one order. The preferred deposition conditions and annealing condition were obtained for piezoelectric application. Then, an over-mode resonator was made and showed a large return loss of 42dB at the center frequency of about 2GHz after annealing for 1h in vacuum circumstance at 400° C.

· Keywords : ZnO; RF sputtering; Annealing; Over-mode resonator

◦ 출 처 : Materials Letters 3927 (2002)

9

◦ 논문 제목

Physical and structural properties of ZnO sputtered films

◦ 저자/소속

Walter Water, Sheng-Yuan Chu*
Department of Electrical Engineering, National Cheng Kung University, 1 University Rd., Tainan, Taiwan

◦ 논문요지

In this paper, poly-crystal zinc oxide(ZnO) films with c-axis(002) orientation have been successfully grown on the silicon substrate by r.f. magnetron sputtering technique. The deposited films were characterized as a function of deposition temperature, argon oxygen gas flow ratio, and r.f. power. Crystalline structures, stress and roughness characteristics of the films were investigated by X-ray diffraction(XRD), scanning electron microscopy(SEM) and atomic force microscopy(AFM) measurement. By controlling deposition parameters and annealing temperature, we could improve intrinsic stress and surface roughness of ZnO film. Preferred deposition condition was found to show good film quality for SAW device applications.

◦ 출 처 : Materials Letters 55 (2002) 67-72

10

◦ 논문 제목

Control of temperature coefficient of frequency in zinc oxide thin Film bulk acoustic wave resonators at various frequency ranges

◦ 저자/소속

Y. Yoshino [a,*], M. Takeuchi [a], K. Inoue [a], T. Makino [a], S. Arai [a], T. Hata [b]
[a] R&D Division, Murata Mfg. Co., Ltd., 2-26-10 Tenjin Nagaoka-kyo, Kyoto 617-8555, Japan
[b] Department of Electrical and Electronic Engineering, Kanazawa University, 2-40-20 Kodatsuno Kanazawa, Ishikawa 920-8667, Japan

◦ 논문요지

Two types of piezoelectric bulk acoustic wave resonators have been fabricated at various frequency ranges using zinc oxide(ZnO) piezoelectric thin films with negative temperature coefficient of frequency (TCF) and substrates with positive TCF. One is a 3.58MHz resonator made of ZnO thin film on ELINVAR, which is known to be able to control its TCF by heat-annealing conditions. The other is a 200MHz resonator made of ZnO thin film on a membrane of SiO_2 which has positive TCF. The TCF of the 3.58MHz resonator is controlled by heat-annealing temperature of ELINVAR alloy, and that of the 200MHz resonator is also controlled by the thickness ratio between ZnO and SiO_2. The TCFs of both resonators are optimized to about 2ppm/° C though methods to control TCF are different. As a result of the experiments, it is clarified that TCF of piezoelectric bulk acoustic wave resonators can be controlled in the range of MHz to several hundreds of MHz range combining some kinds of materials that have different TCF values.

◦ 출 처

Vacuum Volume 66, Issues 3-4, 19 August 2002, Pages 467-472

✚ 담당위원 : 김경환 교수(경원대)