FIRST
SEEHEIM CONFERENCE ON MAGNETISM

September 9, 2001 – September 13, 2001
Seeheim, Germany

SCM2001
FIRST SEEHEIM CONFERENCE ON MAGNETISM

PROGRAM AND ABSTRACTS

Supported by
Darmstadt University of Technology
Deutsche Forschungsgemeinschaft
Ulm University, Faculty of Engineering, Materials Division

http://www.tu-darmstadt.de/magnetism
P-077 GROWTH OF NANOCRYSTALLINE BARIUM FERRITE THIN FILMS BY A SOL-GEL METHOD

Sung Yong An, Sang Won Lee, In-Bo Shim, and Chul Sung Kim
Dept. of Physics, Kookmin University, Seoul 136-702, Korea

Nanocrystalline barium hexaferrite thin films with particles in the 40-60 nm size range have been prepared by a sol-gel method. Barium nitrate and iron nitrate were used as starting materials, and were combined so that the composition ratio Ba/Fe=1/10. These were dissolved in methanol and distilled water. The solution was refluxed at 353 K for 24 h. Films were spin-coated onto sapphire substrates. The thin films were annealed at 823 – 1073 K in air for 2 hours. The crystal structures were measured by a XRD. Thermal analysis such as thermogravimetry analysis (TGA) and differential thermal analysis (DTA) were performed on the dried powder obtained from the Ba-ferrite precursor solution. Magnetic properties were measured using a VSM at a maximum applied field of 15 kOe. The patterns for the sample annealed at temperature above 973 K indexed well on the M-type hexagonal structure with lattice constant a=5.891, c=23.200 Å. BaFe_{12}O_{19} thin film was epitaxially grown on single crystalline sapphire (001) substrate with (BaM (001))/sapphire (001) relation. The full width at half maximum of the rocking curve of (008) peak is 0.28 °. The AFM was used to detect the grain size and surface morphology. Surface roughness of the films was between 2 and 4 nm. The perpendicular coercivity \( H_{Cp} \) was 4.9 kOe at room temperature under an applied field of 15 kOe annealed at 1023 K for 2 hours.