

***FIRST
SEEHEIM CONFERENCE ON
MAGNETISM***

September 9, 2001 – September 13, 2001

Seeheim, Germany



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. BaFe₁₂O₁₉ thin film was epitaxially grown on single crystalline sapphire (001) substrate with (BaM (00 l))/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_{C0} was 4.9 kOe at room temperature under an applied field of 15 kOe annealed at 1023 K for 2 hours.