

BR15

Electrical and Magnetic Properties of $(1-x)\text{CoFe}_2\text{O}_4$ - $(x)\text{BaTiO}_3$ Composites

Atchara Khamkongkhaeo¹, Teerapon Yamwong², and Santi Maensiri^{1,3*}

¹Department of Physics, Faculty of Science, Khon Kaen University, Khon Kaen, 40002, Thailand.

²National Metals and Materials Technology Center (MTEC), Thailand Science Park, Pathumthani, 12120, Thailand

³Integrated Nanotechnology Research Center (INRC), Khon Kaen University, Khon Kaen, 40002, Thailand.

*Corresponding author: Atchara Khamkongkhaeo, e-mail: atchara_k@hotmail.com

The magnetoelectric composites, namely $(1-x)\text{CoFe}_2\text{O}_4$ - $(x)\text{BaTiO}_3$ (CF-BT) in which x varies as 0.3, 0.4, 0.5, 0.6, 0.7, 0.8 and 1.0 have been prepared by wet ball milling method using nanopowders of CoFe_2O_4 (35-55 nm) and BaTiO_3 (85-128 nm) as starting materials. The compacted CF-BT samples were sintered at 1200°C for 24 hours in air to obtain CF-BT composites. The structure of the sintered CF-BT composites was studied by XRD technique. Morphology of the CF-BT composites was revealed by SEM. The magnetic properties of composite samples were measured using vibrating sample magnetometry (VSM). Room temperature magnetization results showed a ferromagnetic behavior for all the CF-BT composite, having the values of specific magnetic moment (M_s) in the range of 15-46.5 emu/g at 10 kOe. M_s decreased with increasing the BaTiO_3 concentration. The dielectric properties were determined as a function of the temperature ranging from -50 to 200°C at 7 KHz. The dielectric constant did not depend on the parameter x . The effects of parameter x on the electrical and magnetic properties of the materials were discussed.

BR16

Characterization of CoCr_2O_4 on Pt(111) Grown by Using Pulse Laser Deposition

Kang Ryong Choi, Seung Je Moon, Taejoon Kouh, In Bo Shim, Sam Jin Kim, and Chul Sung Kim*

Department of Physics, Kookmin University, Seoul 136-702, Korea

*Corresponding author: Chul Sung Kim, e-mail: cskim@kookmin.ac.kr

CoCr_2O_4 (CCO) materials shows multiferroic effect that ferroelectricity and ferromagnetism co-exist[1,2]. CCO film was deposited on Pt/Ti/Si/SiO₂ substrates by Pulse Laser Deposition (PLD). The CCO film were prepared using KrF(248 nm) excimer lasers and with a pressure of 100 mTorr, substrate temperatures of 700°C. The crystal structure was found to be oriented {111} planes by means of X-ray diffraction (XRD) with Cu radiation. The thickness and morphology of film were measured by scanning electron microscopy (SEM) and atomic force microscopy (AFM). The magnetic properties were measured using a Superconducting Quantum Interference Device (SQUID). The ferrimagnetic transition was observed at around 95 K, which was determined as Néel temperature and spiral magnetic transition temperature (T_s) was 21.5 K, while the T_s of bulk CCO was 28.0 K. We note that lowering of CCO film in T_s is closely related to the preferred orientation of {111} direction.

REFERENCES

- [1] Y. Yamasaki, et al., Phys. Rev. Lett. **96**, 207204 (2006).
- [2] S. -W. Cheong and Maxim Mostovoy, Nature, **6**, 13 (2007).