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Electrical and Magnetic Properties of (1-x)$CoFe_2O_4$-(x)$BaTiO_3$ Composites

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The magnetoelectric composites, namely (1-x)$CoFe_2O_4$-(x)$BaTiO_3$ (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^{0}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. Ms decreased with increasing the $BaTiO_3$ concentration. The dielectric properties were determined as a function of the temperature ranging from -50 to 200^{0}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.

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

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$CoCr_2O_4$(CCO) materials shows multiferroic effect that ferroelectricity and ferromagnetism co-exist[1,2]. CCO film was deposited on Pt/Ti/Si/SiO_2 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^{0}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(SQIUD). 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).