

Crystal structure and multiferroic properties of the BiFeO₃-ReFeO₃-BaTiO₃ solid solutions

Jeong Seog Kim¹, Chae Il Cheon¹, Wha-Sook Oh², Pyung Woo Jang³

¹ Dept. of Materials Science and Engineering, Hoseo University, Asan, Chungnam, 336-795 Korea

² Neutron Physics Dept., Hanaro Center, KAERI, Taejon, 305-600 Korea

³ Dept. of Physics, Chongju University, Chongju, Chungbuk, 360-764 Korea

* Corresponding author : e-mail: kimjungs@office.hoseo.ac.kr, phone 041-540-5762, FAX:041-548-3502

The binary and ternary solid solutions, BiFeO₃-BaTiO₃, BiFeO₃-ReFeO₃-BaTiO₃ (Re = rare earth) have been explored for attaining ferromagnetic ferroelectrics in bulk ceramics and understanding the effect of rare earth orthoferrites ReFeO₃ on the spontaneous magnetization. The coexistence of ferromagnetism and ferroelectricity has been observed over the composition range of $0.2 \leq x \leq 0.4$ in the (1-x)BiFeO₃-xBaTiO₃. The most superior ferromagnetic ferroelectrics obtained in this study are the BF-DF-BT ternary solid solutions. The spontaneous magnetization strongly depends on both the type and amount of the substitution components, LaFeO₃, PrFeO₃, and BaFeO_{2.5} rather than the degree of G-type antiferromagnetic ordering. The crystal structures have been analysed using the RT and high temperature neutron and XRD diffraction data.

References

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