

SM-P018

Magnetic and Electric Properties of Multiferroic Ni-doped BiFeO₃

유영준¹, 황지섭¹, 박정수², 이주열², 강지훈³, 김기원⁴, 이광훈⁵, 이보화⁵, 이영백^{1*}

¹한양대학교 물리학과, ²성균관대학교 물리학과, ³국민대학교 나노전자물리학과,
⁴선문대학교 디스플레이공학과, ⁵한국외국어대학교 전자물리학과

Multiferroic materials have attracted much attention due to their own fascinating fundamental physical properties and potential technological applications to magnetic/ferroelectric data storage systems, quantum electromagnets, spintronics, and sensor devices. Among single-phase multiferroic materials, BiFeO₃, in particular, has received considerable attention because the enhanced ferromagnetism was found by the Fe-site ion substitution with magnetic ions. The structural, the magnetic and the ferroelectric properties of polycrystalline BiFe_{1-x}Ni_xO₃ (x=0, 0.01, 0.02, 0.03 and 0.05), which were prepared by the solid-state reaction and the rapid-sintering method, have been investigated. The x-ray diffraction patterns reveal that all the samples are in single phase and show rhombohedral structure with R3c space group. The magnetic properties are enhanced according to the doping content. The Ni-doped BiFeO₃ samples exhibit lossy P-E loop due to the oxygen vacancy. The leakage current density of Ni-doped samples (x=0.01 and 0.02) is increased by four orders of magnitude. On the other hand, the x=0.03 and 0.05 samples show the relative reduction of the leakage current.

Keywords: Multiferroic, Bismuth ferrite, Magnetic property, Electric property