Giant Magnetoresistance Effect in Ni-Fe-Mo Alloys

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Abstract
The properties of ferroelectricity and ferromagnetic in the magnetic materials have been extensively discussed recently. These magnetic materials can be used to fabricate novel microelectronic devices. In this study, the electrical properties of the magnetic materials consisting of nickel (Ni), iron (Fe) and molybdenum (Mo) were investigated. The chemical compositions of these Ni-Fe-Mo magnetic materials were measured with energy diffraction spectroscopy (EDS), while their crystalline structures were determined from X-ray diffraction (XRD). Magnetic shielding has been observed in the magnetic materials sintered at temperatures 400°C and 600°C. Both FeNi3 and MoNi crystal structures were found in the magnetic materials as determined from X-ray diffraction (XRD). In addition, giant magnetic resistance (GMR) effect was observed in the low magnetic field in these magnetic materials. The MR ratio is about 15% in the magnetic material sintered at 600°C. It reveals that both FeNi3 and MoNi crystal structures contribute to the giant magnetic resistance (MR) in these magnetic materials.

Keywords: giant magnetoresistance (GMR), shielding effect, Ni-Fe-Mo

References