

스핀밸브 박막에서 교환바이어스의 자유층 NiFe 두께 의존성과 열적 효과  
Exchange bias dependence on NiFe thickness of free layer and its thermal effect

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Enhancement of the exchange bias and optimization of the structure have been the focus that many researchers studied, recently [1]. In this report, magnetic properties of MTJs with structure of Si/Ta (5)/Cu (10)/Ta (5)/Ni<sub>80</sub>Fe<sub>20</sub> (2)/Cu (5)/Mn<sub>75</sub>Ir<sub>25</sub> (10)/Co<sub>70</sub>Fe<sub>30</sub> (2.5)/Al-O (1.5)/Co<sub>70</sub>Fe<sub>30</sub> (2.5)/Ni<sub>80</sub>Fe<sub>20</sub> (t)/Ta (5) (t=0, 10, 30, 60 and 100 nm, respectively) were investigated. The relationship between the structure and magnetic parameters of interfacial exchange coupling and interlayer coupling in as-deposited and annealed junctions was studied. The temperature dependence of exchange coupling was considered.

The measurement of the magnetization curves below room temperature was carried out using SQUID (Superconducting Quantum Interference Device) magnetometer; and temperature dependence of exchange coupling, derived from MR curve, was investigated in the cryogenic chamber. The crystalline structure was examined by X-ray diffraction.

In the case of these samples, the exchange bias decreases with increased temperature due to thermal effect. X ray diffraction indicates the improvement of (111) texture of IrMn and increased crystallite sizes after annealing. Owing to the increased grain size of NiFe in the free layer, the interlayer coupling enhances after annealing.

Reference

[1] K. Yagami, M. Tsunoda, and M. Takahashi, J. App. Phy, 89, 6609 (2001).