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Ni(60Å)/Cu/Si(100) 박막의 자성에 대한 1 MeV C+ 이온 방사 효과

Effects of 1 MeV C^+ irradiation on the magnetic properties of Ni(60Å)/Cu/Si(100)

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The effects of 1 MeV C ion irradiation with various ion dose and flux on epitaxial Ni(60Å)/ Cu/Si(100) which possessing perpendicular magnetic anisotropy (PMA) After ion irradiation, the magnetic and structural properties were analyzed by the magneto-optical Kerr effect (MOKE) and grazing incident diffraction (GID) 1 MeV C ion irradiation was performed into Ni/Cu thin films with various ion doses ranged from 1 to 7 5x1015 ions/cm^2 As increasing ion dose, the coercivity of Ni/Cu thin film decreased from 16 2 %(1x10^{15} ions/cm^2) to 72 1 %(7 5x10^{15} ions/cm^2) It means that the spin reorientation toward in-plane magnetization induced by ion irradiation depends on the ion dose It is known that the magnetic anisotropy of Ni/Cu is closely related to the magnetoelastic anisotropy of strained Ni film due to the lattice mismatch with the Cu(001) layer From the GID measurement, as increasing ion dose, the peak position of Ni moves gradually toward the bulk Ni(200) peak position and the half width of the Cu(200) peak is getting narrow It implies the fact that the relaxation of the strain and grain growth induced by ion irradiation is a function of ion dose In order to investigate ion flux effect, 1 MeV C^+ irradiation with a dose of 1x10^{16}/cm^2 was carried out by varying ion flux (100, 380 nA/cm^2) As increase of ion flux, the coercivity of Ni/Cu thin film decreased and spin orientation more rapidly changed from PMA to in-plane It is concluded that ion dose and flux plays an important role of modification of the magnetic properties of Ni/Cu thin film