

Brillouin light scattering Characterizations in thin cobalt films : temperature and pressure dependence

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A systematic study of magnetic properties of thin Co films on Cu buffer layer and Si(100) as a function of substrate temperature and deposition pressure was reported in this work. The microstructure and magnetic properties of Co films with thickness of 60 nm, deposited by DC magnetron sputtering method, have been studied by the methods of the x-ray diffraction (XRD), vibrating sample magnetometry (VSM), and Brillouin light scattering (BLS). A preferential orientation of (200) plane has been observed at variation of pressure and temperature. The plane showed a strong preferred orientation at substrate temperature $T_s = 250^\circ\text{C}$. The magnetization and coercivity obtained by magnetic hysteresis loop were investigated as a function of substrate temperature and deposition pressure. It has been found that the coercivity of Co film on Cu buffer layer at room temperature was larger than that for the film on Si(100) without Cu buffer layer [1]. Using measurements of phase velocity of the Rayleigh surface acoustic wave in p-p Brillouin spectra, we have evaluated the effective elastic constant C_{11} and C_{55} . Concerning the magnetic properties, the detection of both surface and bulk spin waves in p-s spectra has allowed us to determine the magnetic parameters of Co thin films [2].

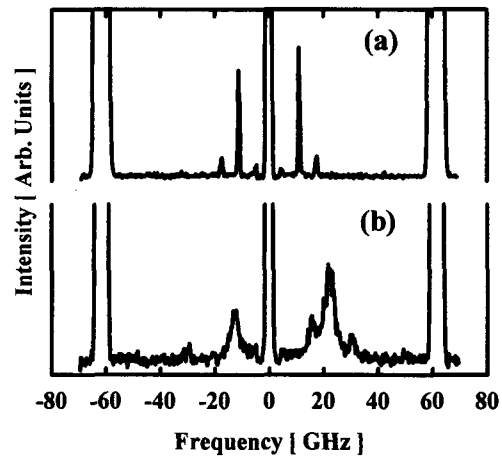


Fig. 1 (a)p-p Brillouin spectrum for an angle of incidence $\theta = 70^\circ$ and (b)p-s Brillouin spectrum of an applied magnetic field $H=600\text{G}$ for the Co film with thickness of 40 nm deposited at room temperature.

References

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