Effect of Interfaces on Magnetic Properties in FeRh Thin Films

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FeRh alloy systems have been studied since 1938. This alloy has approximately an equiatomic composition and a phase transition around 370 K. The phase transition is ferromagnetic – antiferromagnetic transitions explained by a strong dependence of the exchange interaction on the crystalline lattice parameter. Due to this property, the FeRh alloy has a big potential for technological applications such as magnetic sensors, switchers, storage devices and so on. Thus for this reason, it is necessary to know how to manipulate magnetic properties and transition temperature of the alloy.

In this study effects of growing parameters, using buffer and cap layers on magnetic ordering and phase transition have been studied. FeRh thin films were grown by sputter technique on MgO (100) substrate at different growing conditions. Rh and Pt were deposited on MgO(100) substrate and on FeRh film to study effect of buffer layer and cap layer were. Structural properties of the film were investigated by X-ray diffraction. Magnetization measurements were performed as a function of temperature by using PPMS. And ferromagnetic resonance spectra were registered and the results were analyzed for the ferromagnetic films.

As a result of our magnetization measurements and analysis, growing temperature has noteworthy effect on magnetic properties and structure of FeRh thin films. Depending of growth temperature and annealing time, ferromagnetic ordered (FMO) and antiferromagnetic ordered (AFMO) samples were observed at room temperature (RT) which refers to changing chemical environment by temperature. Phase transition temperatures were manipulated successfully by using buffer and cap layers.

Biography:

Perihan Aksu has completed her MS degree from Ataturk University, Turkey and continues PhD studies at Gebze Technical University, Turkey. She has number of presentations on international conferences. She has been working as researcher in Nanotechnology Research Center since 2012.