Magnetic Thermal Hysteresis in (Co, Fe)/Tb Multilayers

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Arlington, Arlington, TX, 76019 — In plane and out of plane magnetic thermal hys-
teresis have been measured to investigate the ferrimagnetic behavior of (Co, Fe)/Tb
multilayers. Due to antiferromagnetic coupling between the (Co, Fe) and Tb, the
multilayers behave like artificial ferrimagnets. For [Co (30Å)/Tb (45 Å)]₈ the mea-
surement of magnetic moment (M) as a function of temperature shows that magnetic
phase transition occurs at different temperatures during the heating (superheating)
and cooling (supercooling) cycles resulting in a characteristic bow-tie shaped ther-
mal hysteresis curve for M (T). The width of the thermal hysteresis was measured
to be to be around 90 K in an external magnetic field of 2000 Oe. Increasing the
field to 4000 Oe reduces the thermal hysteresis width to about 40 K and above 6000
Oe the thermal hysteresis disappears. Co/Tb multilayers with thicker layers show
the same trend, however, the width of the thermal hysteresis is generally smaller at
a given magnetic field.

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