

# Temperature dependence of magnetic reversal in $\text{Ni}_{80}\text{Fe}_{20}/\text{Au}/\text{Co}/\text{Au}$ multilayers

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In the contribution we present results concerning temperature changes of magnetic properties of  $[\text{Ni}_{80}\text{Fe}_{20}(2\text{ nm})/\text{Au}(t_{\text{Au}})/\text{Co}(t_{\text{Co}})/\text{Au}(t_{\text{Au}})]_{10}$  multilayers (ML) with  $t_{\text{Au}} = 1.5, 2.2, 3.0\text{ nm}$  and  $t_{\text{Co}} = 0.6, 0.8\text{ nm}$ . Hysteresis loops of investigated thin film structures were measured using vibrating sample magnetometer in temperature range from 175 to 423 K. It is known that in such MLs Permalloy layers exhibit in-plane anisotropy while the Co layers, sandwiched between Au, possess strong perpendicular anisotropy. Measured loops are characteristic of a system composed of weakly coupled layers with two different, mutually perpendicular, easy axes (Fig. 1a and 1b). Due to a weak coupling magnetization reversal of Py layers and Co layers takes place almost independently and allows us to determine their magnetic parameters. It is also easy to see that a shape of a central part of hysteresis loops taken with magnetic field applied perpendicularly to the sample plane (Fig. 1a, c, d) strongly suggests existence of stripe domain structure in our MLs. We are convinced that it is related to magnetization reversal of Co layers which can be described by nucleation field  $H_{\text{N}\perp}^{\text{Co}}$  and saturation field  $H_{\text{S}\perp}^{\text{Co}}$ . The shape of hysteresis loops is preserved in the whole temperature range of measurements indicating presence of stable stripe domains. Temperature dependence of above mentioned parameters will be presented. It is important for possible application of the MLs as magnetic storage media with perpendicular arrangement of bit cells.

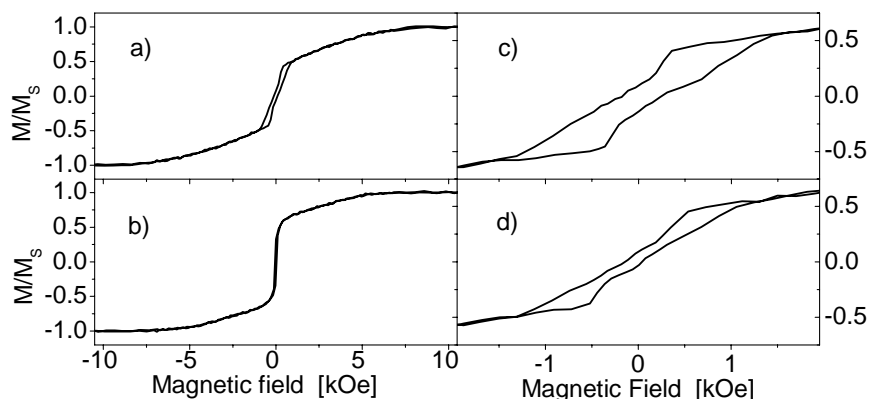


Fig. 1. Hysteresis loops of the MLs with  $d_{\text{Au}} = 2.2\text{ nm}$  and  $d_{\text{Co}} = 0.8\text{ nm}$  measured at room temperature with magnetic field perpendicular (a) and parallel (b) to the sample plane. A central part of hysteresis loops of the MLs with  $d_{\text{Au}} = 1.5\text{ nm}$  and  $d_{\text{Co}} = 0.6\text{ nm}$  taken at 175 K (c) and 423 K (d) in perpendicular configuration

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