

Co/Au multilayers with designed coercive field gradient

B. Szymański^a, M. Matczak^{a,b}, D. Lengemann^c, M. Schmidt^a, D. Engel^c,
A. Ehresmann^c, F. Stobiecki^a

^aInstitute of Molecular Physics, PAS, M. Smoluchowskiego 17, 60-179 Poznań, Poland

^bFaculty of Technical Physics, Poznań University of Technology, Nieszawska 13a,
60-965 Poznań, Poland

^cInstitute of Physics and Centre for Interdisciplinary Nanostructure Science and
Technology, University of Kassel, Heinrich-Plett-Strasse 40, D-34132 Kassel, Germany

We present the influence of a precisely tailored fluence gradient upon bombardment by 10 keV He⁺ ions on magnetic properties of sputtered Ti/Au/(Co 0.8nm/Au 1nm)_N multilayers ($N = 1, 2, 3$). The Co/Au multilayers (Mls) with chosen cobalt thickness $t_{\text{Co}} = 0.8$ nm show strong perpendicular anisotropy and for $N \leq 3$ a rectangular hysteresis loop in perpendicularly applied field making them attractive for various applications. Samples were irradiated in a way ensuring a precise change of the ion dose (from 0 up to 10^{15} He⁺/cm²) along the determined coordinate in the sample plane. The influence of the ion bombardment on magnetic properties of the Mls was investigated with MOKE by taking local hysteresis loops from submillimeter areas along the ion dose gradient. We show that for all investigated films the intentional bombardment by light ions induces a well determined, almost linear, gradient of coercive field. This makes the Mls very attractive for magnetic particle manipulations [1].

[1] M. Urbaniak et al., Phys. Rev. Lett. 105, 067202 (2010)

13.4 cm

Subject category :

5. Nano-structure, Surfaces, and Interfaces

Presentation mode :

poster

Corresponding author :

B. Szymański

Address for correspondence :

ul. Mariana Smoluchowskiego 17, 60-179 Poznań, Poland

Email address :

szyman@ifmpan.poznan.pl

9.7 cm