DOMAIN STRUCTURES OF FERROMAGNETICALLY COUPLED $(Fe_{97}Al_3)_{85}N_{15}/Al_2O_3$ MULTILAYERS

M. Żołądź[1], T. Stobiecki[1], M. Otto[2] and K. Röll[2]

[1] Department of Electronics, University of Mining and Metallurgy, Kraków
[2] Universität Gh Kassel, Experimentalphysik IV

$(Fe_{97}Al_3)_{85}N_{15}/Al_2O_3$ multilayers are very promising new magnetic materials for poles and shields in ultra high density storage technology because of their excellent soft magnetic properties and high saturation magnetization. In our former paper we reported structural and magnetic properties and now we present observations of the magnetic domain structure using Kerr microscopy in the longitudinal geometry. Due to small rotation angle and very weak intensity contrast the real time image processing of the domains observation was performed. The strength of ferromagnetic (FM) coupling as a function of the spacer thickness of Al_2O_3 was investigated. We conclude that strong FM-coupling, strong uniaxial anisotropy and coherent rotation of the magnetization has been observed for the spacer thickness in the range of 0.2nm≤t≤1nm, however weak FM-coupling, patch domains and 360^0 walls occur for the spacer thickness of t=2.5nm. The spacer thickness of t≥5nm is characterized by transition from weak FM- coupling to the decoupling state where complex interlayer interactions and different types of the domain walls were observed.

ABSTRACT CATEGORY: **2** Magnetic Films, Surfaces and Multilayers

Tomasz Stobiecki
Department of Electronics
University of Mining of Metallurgy
30-059 Kraków
tel: (+48 12) 617 2596
fax: (+48 12) 617 3550
e-mail: stobieck@uci.agh.edu.pl