Dependence of exchange bias field on thickness of antiferromagnetic layer in Co(or NiFe)/IrMn structures

V. Rodionova,[1] I. Dzhun,[2] K. Chichay,[1] and N. Chechenin[2]

[1] *Immanuel Kant Baltic Federal University, Innovation park, Kaliningrad 236000, Russia*

[2] *Skobeltsyn Institute of Nuclear Physics, Lomonosov Moscow State University, Moscow 119991, Russia*

Magnetic properties of ferromagnetic/antiferromagnetic thin-films structures for spin-valve applications have been studied. Multilayer structures of Ta/Co/IrMn/Ta and Ta/FeNi/IrMn/Ta were deposited on Si substrate at room temperature by DC magnetron sputtering. Thickness of the antiferromagnetic layer changed from 2 to 60 nm. Uniform forming magnetic field of 420 Oe was applied parallel to the sample's plane during the deposition. The magnetic properties of these structures were obtained from ferromagnetic resonance and vibrating sample magnetometry measurements. Both the coercive force and the exchange bias field were found to be non-monotonic functions of the antiferromagnetic layer thickness. To achieve the maximum effect of the exchange bias the optimal thicknesses were found for each system. More over, it was found the alternative sequence of the deposition (antiferromagnetic layer on the top or below the ferromagnetic layer) leads to dramatic changes of the magnetic properties of bilayer structures.