INTERLAYER EXCHANGE COUPLING ACROSS Cu/Ti/Cu SPACER LAYER

J. Dubowik [a], B. Szymański [a], F. Stobiecki [a] and K. Roell[b]

[a] Institute of Molecular Physics, Polish Academy of Sciences, Poznan, Poland

[b]Department of Physics, University of Kassel, Kassel, Germany

9.7 cm

The effect of introducing ultrathin Ti dopant layer on interlayer exchange coupling across spacer layer (S=Cu/Ti/Cu) was investigated in AF/F_1/S/F_2 spin-valves (SV) with NiO as an antiferromagnetic (AF) bias substrate and ferromagnetic layers (F_1, F_2) of Co. A sequence of SV with a fixed thickness of Ti layers (t_{Ti} = 0, 0.27, 0.54 nm) and a variable thickness of Cu ($1 \leq t_{Cu} \leq 5$ nm) was prepared using sputtering technique. The effective coupling energy (J) across S layer was determined from the magnetization reversals in AF/F_1 and in the complete SV structures. The experimental J(t_S) dependences (t_S=2t_{Cu}+t_{Ti}) determined for various t_{Ti} show that the effective coupling is dominated by the ferromagnetic coupling (magnetostatic and a coupling due to pinholes) with a substantial contribution of the oscillatory (RKKY-type) exchange coupling. Fitting to the experimental data gives clear evidence of the effect of Ti dopant on the oscillatory exchange coupling. Introducing of ultrathin Ti dopant layer into Cu spacer increases the period and decreases the amplitude of the RKKY oscillations and seems to have no effect on the ferromagnetic contribution to the interlayer coupling.

13.4 cm

Subject category :

2. Magnetic Films, Surfaces and Multilayers

Presentation mode :

poster

Corresponding author :

B. Szymanski

Address for correspondence :

Institute of Molecular Physics

ul. Smoluchowskiego 17

60-179 Poznan, Poland

Email address :

szyman@ifmpan.poznan.pl