Layered structures for magnetoelectronics

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The main goal of the present study was to describe the correlations between multilayer deposition processes, magnetization reversal and GMR effect according to the schedule: technology→structure→properties.

The essence of the work was to obtain multilayers of a type FM/NM represented by $Ni_{80}Fe_{20}$/Cu and layered hybrid structures FM_1/NM/FM_2 (trilayers $Ni_{80}Fe_{20}$/Co/CuAgAu/Co and $Ni_{80}Fe_{20}$/Co/Au/Co as well as hybrid multilayers $Ni_{80}Fe_{20}$/CuAgAu/Co) with optimal from application point of view parameters characterizing the GMR effect which allow to use these structures as magnetic field sensors.

As a result, due to the adequate technological process control we were able to describe the optimal technological condition which allows us to produce layered structures with R(H) dependences desirable from application point of view.

The examined multilayers and hybrid layered structures seems to fulfill the requirements given by modern technique to elements which can be applied as high sensitive magnetic field sensors. In particular it is related to multilayers ($Ni_{80}Fe_{20}$/CuAgAu/Co)*15 and hybrid trilayer structures $Ni_{80}Fe_{20}$/Co/CuAgAu/Co for which we have obtained GMR field sensitivity 6.8 and 5.2 %/Oe, respectively. So high field sensitivities of the GMR effect locate them among world leading layered structures which can be utilize as magnetic field sensors.

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