

Multiferroic multilayer as a base for future spintronics nanodevices

J. Pawlak,¹ A. Żywczak,² and M. Przybylski^{1,2}

¹*Faculty of Physics and Applied Computer Science,*

²*Academic Centre for Materials and Nanotechnology,
AGH University of Science and Technology, Kraków, Poland*

Multiferroic tunnel junction (MTFJ) is promising device for future memory with discrete and different logic states which are controlled by combination of electric and magnetic fields. The goal of ongoing research is ferroelectric and ferromagnetic properties, especially at room temperature (RT), represented as high values of Tunnel Electroresistance (TER) and Tunnel Magnetoresistance (TMR). A key aspect is the appropriate preparation of sample allowing epitaxial growth. The thin layers were prepared by Pulsed Laser Deposition on atomically smooth monocrystalline SrTiO₃ (STO) substrate. Ferromagnetic metal layers La_{0.67}Sr_{0.33}MnO₃ (LSMO) are separated by a layer of ferroelectric insulator - BaTiO₃ (BTO). The same structure of LSMO, BTO and STO (perovskite) and similar lattice constant makes possible to obtain high quality heterostructures. Magnetic measurements confirm different magnetic coercivity of top and bottom LSMO layer, which allow to obtain their parallel and antiparallel magnetization orientation. The modification of interfaces of BTO by thin MgO allows to increase the value of TER effect.