Exchange bias in NiFe/FeMn bilayers deposited at different Argon pressures values

J. V. de Siqueira, P. R. Kern, O. E. da Silva, M. Carara

Universidade Federal de Santa Maria - RS - Brazil

J. N. Rigue, F. Beck

Universidade Federal de Santa Maria - CS - RS - Brazil

In this work we have studied the Exchange bias (EB) phenomenon in bilayers of Ta/NiFe/FeMn/Ta, deposited at different Argon pressure values (1.5, 3 and 6 mTorr), in order to evaluate its influence and to optimize the phenomenon. Masks were used during the deposition to define the direction of electric current in relation to the direction of anisotropy in the measurements of anisotropic magnetoresistance (AMR). The samples were grown by magnetron sputtering system on glass substrates, with an applied magnetic field (H \(1 \text{kOe}\)) in the samples’ plane in order to define the anisotropy direction. The polycrystalline character of the samples was checked by X-ray diffractometer in a Brag-Brentano geometry (\(\theta - 2\theta\)), revealing that the NiFe and FeMn grow towards (111) direction. The angular dependence of the magnetoresistance was measured at different applied magnetic field and fitted. In order to fit the AMR curves, the equilibrium angle of the magnetization was determined using a coherent rotation model with three energies terms (Zeeman, uniaxial and unidirectional). The experimental curves were well adjusted and the magnetic parameters describing the system were obtained. The preliminary results show that when we used a lower Argon pressure in the deposition is obtained a better crystallographic texture in the film.