Annealing and partial oxidation of exchange-biased FeNi / FeMn structures

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Multilayered structures combined ferromagnetic and antiferromagnetic layers has been widely used in many magnetoresistive devices. Heating is due standard techniques demand or carried out to achieve certain properties. The ability of manganese to oxidize before the iron, can lead to formation ferromagnetic layer inside of FeMn-layer. This effect creates additional opportunities for the formation of practical properties. In this work we have carried out studies of the samples containing layers Fe20Ni80/Fe50Ni50 obtained by magnetron sputtering technology. Annealing was carried out at temperatures from 100 to 400 C in a vacuum or in a mixture of N_2 and 0.5% O_2. For as-deposited FeNi/FeMn layers the strong peaks on the X-ray diffraction patterns at about 43.6 and 44.4 grad demonstrate a high degree of fcc FeMn(111) and FeNi(111) orientation respectively. The peak intensity of FeMn(111) decreases with the increase of the annealing temperature. Moreover, for the samples annealed in gas mixture the peaks arising from the formation of α-Fe(Mn) phase and MnO started to appear.