

Temperature Dependence of Exchange Bias and Coercivity in Ferromagnetic Layer Coupled with Polycrystalline Antiferromagnetic Layer

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Abstract: The temperature dependence of exchange bias and coercivity in a ferromagnetic layer coupled with an antiferromagnetic layer is discussed. In this model, the temperature dependence comes from the thermal instability of the system states and the temperature modulated relative magnetic parameters. Moreover, the thermal fluctuation of orientations of easy axes of antiferromagnetic grains at preparing has been considered. From the present model, the experimental results can be illustrated qualitatively for available magnetic parameters. Based on our discussion, we can conclude that soft ferromagnetic layer coupled by hard antiferromagnetic layer may be very applicable to design magnetic devices. In special exchange coupling, we can get high exchange bias and low coercivity almost independent of temperature for proper temperature ranges.

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