

Exchange coupled NiFe/NiMn bilayer studied by vector network analyzer ferromagnetic resonance

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Vector network analyzer ferromagnetic (VNA-FMR) resonance allows the ferromagnetic resonance to be measured by sweeping the frequency without changing the external field. Therefore the exchange bias field H_{eb} in ferromagnet/antiferromagnet (F/AF) bilayers can be determined using Kittel's formula at different constant values of external field. We can determine back and forth coercivities from a hysteresis loop and usually the H_{eb} field is evaluated as the average value of these back and forth coercive fields. VNA-FMR measurements reveal that exchange field changes during the magnetization reversal of ferromagnetic layer, so evaluating the H_{eb} field from coercive fields, results in imprecise value. Using VNA-FMR and a procedure described in [1], we have determined the exchange bias fields H_{eb} of NiFe/NiMn bilayer at different constant values of external field. The NiFe/NiMn bilayer sample with exchange bias was prepared using magnetron sputtering with a post-deposition vacuum annealing at 1000 Oe.

[1] C. Bilzer et al., J. Appl. Phys. 106, 063918 (2009)

13.4 cm

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9.7 cm