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Azimuthal angular dependence of exchange bias in FeMn/Py bilayers with Ta/Cu hybrid underlayers: Effect of deposition sequence and sense of rotation KI-YEON KIM, Korea Atomic Energy Research Institute, HYEOK-CHEOL CHOI, CHUN-YEOL YOU, Inha University — We have investigated the azimuthal angular dependent exchange bias of bottom-pinned Py(5nm)/FeMn(5nm) and top-pinned FeMn(5nm)/Py(5nm) bilayers prepared at the same deposition condition except deposition order by vector MOKE experiment. It was found that exchange biased (EB) direction is not collinear with an applied magnetic field during deposition. Second, the critical angle at which the phase of a transverse loop reverses is once (160° @CCW, 170 $\sim$ 175° @CW) for Py/FeMn bilayer and twice (155 $\sim$ 160°, 340 $\sim$ 345° @CCW, 10 $\sim$ 15°, 195-200° @CW) for FeMn/Py bilayer. Therefore, phase of transverse loop remains the same as the initial transverse loop or reverse after 360° rotation, depending on deposition sequence. Third, hysteresis is observed in the transverse magnetization component only if hysteresis loops are measured consecutively between cw and ccw directions over the angular range including the critical angle. This is considered to originate from thermally activated irreversible rearrangement of uncompensated AF spins via interface exchange coupling. Fourth, exchange bias field and coercivity of top-pinned FeMn/Py bilayers with Ta/Cu underlayers are enhanced compared with those of bottom-pinned Py/FeMn bilayers. This is in consistent with our previous results.

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