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Tunable magnetic anisotropy in perpendicular exchange-coupled CoFeB/(Co/Pt) films LONG YOU, OUKJAE LEE, Department of Electrical Engineering and Computer Sciences, University of California at Berkeley, TERRELL GLENN, Department of Physics, Morehouse College, HARON ABDEL-RAZIQ, SAYEEF SALAHUDDIN, Department of Electrical Engineering and Computer Sciences, University of California at Berkeley — Spintronic materials with strong perpendicular magnetic anisotropy (PMA), such as Co/Pd, Co/Pt and Co/Ni multilayers, have been introduced to improve the functional performance of STT devices (e.g. enhanced thermal stability, scalability and switching speeds of spin memory/logic). Furthermore, by coupling magnetic layers with PMA and longitudinal magnetic anisotropy (LMA), added benefits such as a variable magnetization tilt angle and tunable damping have been shown. In our study, we discuss how to precise control the anisotropy tilt angle by coupling the PMA hard layer (Co/Pt) with an in-plane soft layer (IMA, CoFeB). Due to the competition between the PMA and IMA, the tilted angle can be tuned by varying thickness of IMA. The stack of Pt(5nm)/Co (1nm)/CoFeB(Xnm)/MgO (2nm) (x varied from 0 to 1nm) was deposited by magneto-sputtering system. The magnetic properties were investigated by vibrating sample magnetometer and anomalous Hall effect . The electric transport of microscale devices comprised of that stack were also studied by our probe station with electromagnet. The experiments show the magnetic anisotropy can be tuned well by changing thickness of in plane layer and open a promising new avenue to next generation spintronics devices.

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