

Abstract Submitted
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High temperature annealing of MgO based perpendicular MTJ with Co/Pd multilayers M. TOFIZUR RAHMAN, ANDREW LYLE, HUI ZHAO, JIAN-PING WANG, Electrical and Computer Engineering Dept., University of Minnesota — MgO based perpendicular MTJ (pMTJ) are becoming increasingly demanded due to their thermal stability and unlimited cell aspect ratio [1]. Promising results are reported for pMTJs with TbFeCo or Co/Pt (Pd,Ni) MLs but these materials could not withstand high temperature annealing above 250°C. However, annealing at or above 300°C is required to fully crystallize the MgO. We fabricated Sub/Pd/(Co/Pd)_n/CoFeB/MgO/CoFeB/Pd/(Co/Pd)_n/Pd pMTJ structure by engineering the exchange coupling between CoFeB and (Co/Pd)_n and the interface morphology of Co and Pd in (Co/Pd)_n layers and annealed at different temperatures up to 350°C. To clarify the thermal effects on the free layer completely, we also studied the annealing of the free layer only. The perpendicular squareness of the free layer and the full stack after annealing at 350°C are 0.90 and 1, respectively. The existence of good perpendicular anisotropy at high temperature is ascribed to the sharp and defect-free interfaces. Field and spin torque switching results will also be presented.

[1] H. Meng, APL, **88**, 172506 (2006),]M. Nakayama, JAP, 103, 07A710.

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