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Spin-torque switching in magnetic tunnel junctions with a Co/Ni multilayer electrode having a reduced demagnetizing field TAKAHIRO MORIYAMA, THEODORE GUDMUNDSEN, PINSHANE HUANG, LUQIAO LIU, DAVID MULLER, DANIEL RALPH, ROBERT BUHRMAN, Cornell University — The critical current for spin-torque-driven switching of an in-plane magnetized free layer is approximately proportional to the perpendicular demagnetizing field of the free layer. In previous work, we demonstrated experimentally that by reducing the demagnetizing field the switching current can be decreased significantly (at least a factor of 5) without compromising the thermal stability of the free layer [1]. This work was carried out using all-metal spin valve devices having a small electrical resistance unsuitable for applications. Here we report the fabrication of magnetic tunnel junctions with in-plane magnetized Co/Ni-based magnetic free layers having a reduced demagnetizing field compared to conventional CoFeB layers. We describe the magnetoresistance properties of these junctions and their spin-transfer switching characteristics.

[1] L. Liu et al., Appl. Phys. Lett. 94, 122508 (2009).

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