

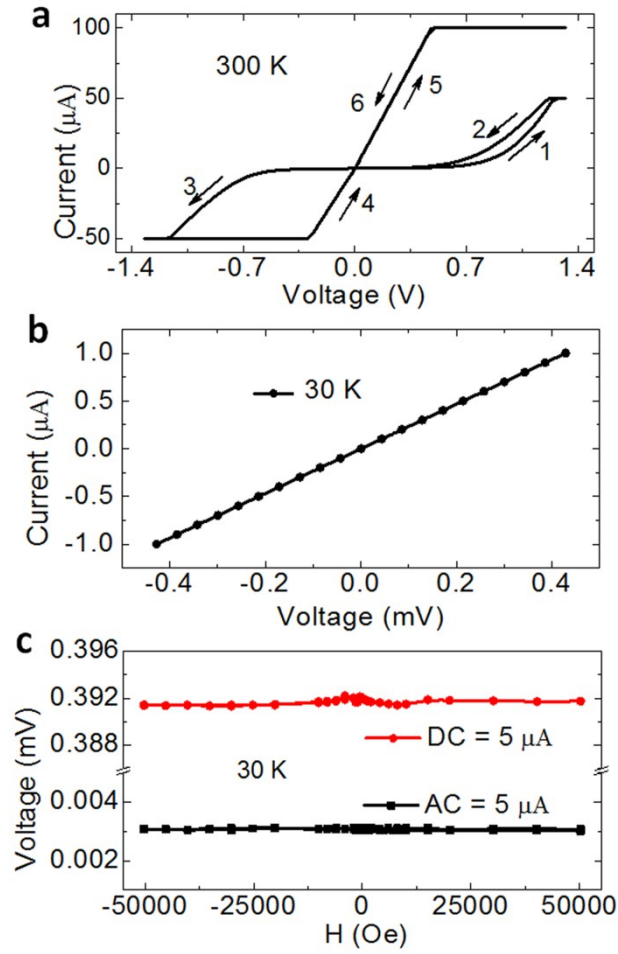
Supporting Information for

Electrically tunable tunneling rectification magnetoresistance in magnetic tunneling junctions with asymmetric barriers

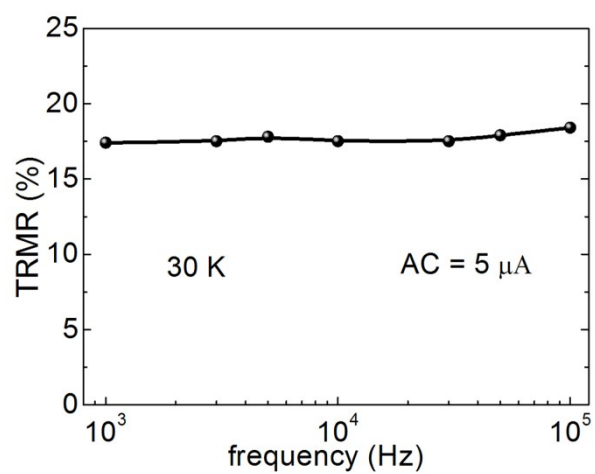
Jing Wang,^a Qikun Huang,^a Peng Shi,^a Kun Zhang,^a Yufeng Tian,^{a,*} Shishen Yan,^{a,*}
Yanxue Chen,^a Guolei Liu,^a Shishou Kang^a and Liangmo Mei^a

^a School of Physics, State Key Laboratory of Crystal Materials, Shandong University,
Jinan 250100, China.

*Address correspondence to: yftian@sdu.edu.cn and shishenyan@sdu.edu.cn



Supplementary Figure S1. Transport properties of the studied MTJs after a soft-breakdown. (a) The I-V characteristic of the studied MTJ. (b) The I-V curve of the soft-breakdown MTJ, where the linear I-V curve is observed. (c) The conventional MR (marked as DC) and TRMR (marked as AC) results.



Supplementary Figure S2. Frequency dependence of the TRMR. The low temperature TRMR measured at different AC frequency, which keeps a constant up to the highest measurable frequency of the Keithley 6221.