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Electric Polarization Controllable Magnetoresistance of Magnetic Ferroelectric Tunnel Junctions[1] MEI FANG, YANMEI WANG, Fudan University, DALI SUN, University of Utah, XIAOSHAN XU, University of Nebraska at Lincoln, WENTING YANG, LIFENG YING, Fudan University, JIANG LU, HO NYUNG LEE, Oak Ridge National Laboratory, JIAN SHEN, Fudan University, FUDAN UNIVERSITY TEAM, UNIVERSITY OF UTAH COLLABORATION, UNIVERSITY OF NEBRASKA AT LINCOLN COLLABORATION, OAK RIDGE NATIONAL LABORATOY COLLABORATION — The tunneling of electrons through ferroelectric material sandwiched by ferromagnetic electrodes, dubbed magnetic ferroelectric tunnel junctions (MFTJs), can be affected by not only the magnetic alignments between the two ferromagnetic electrodes, but also the electric polarization of the ferroelectric layer, which is right for multi-functional device applications. With additional degree of freedom to control carrier propagation through the multi layers in MFTJs, the effects of electric polarization on tunneling magnetoresistance (TMR) need to be clarified. In this work, we investigate the TMR response during the switching process of electric polarization of the ferroelectric layer. Using a parallel connection mode for polarized up and polarized down domains of the PZT layer, the percentage of switched domain and its corresponding TMR are determined. The calculation results agree well with the experiments data.

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