

Electric-field modulation of exchange stiffness constant in CoFeB/MgO investigated by spin-wave resonance

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In our previous work, we showed a possible electric-field modulation of the exchange stiffness constant in CoFeB/MgO from the observation of domain structures [1]. In this work, we investigate the electric-field effect on A_S through spin-wave resonance in nanoscale CoFeB/MgO magnetic tunnel junctions. The observed homodyne-detected spectra show multi-peak resonance, indicating the presence of spin-wave modes in addition to uniform mode. The resonance fields are shifted by the application of electric fields mainly due to the modulation of magnetic anisotropy. We find that A_S is also modulated by a few percent by applying 0.4 V/nm from the electric-field dependence of the difference in resonance fields between spin-wave and uniform modes.

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