

Abstract Submitted
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Magnetocurrent of a multiferroic resonant tunneling diode¹ NAM-MEE KIM, HEESANG KIM, Soongsil University — We study the resonant tunneling magnetoresistance of a multiferroic resonant tunneling diode, which is hybridized of ferroelectric double barriers and a ferromagnetic quantum well. Magneto-current is calculated, focusing on its dependence on ϕ , the angle between an external magnetic field and the spontaneous magnetic field in the diluted magnetic semiconductor quantum well, by using the non-equilibrium Green's function method. The magneto-current varies from zero to 440%, and the spin polarization of the current varies from zero to 1 by changing the angle ϕ . We also perform controlling of the transmission energy level by reversing the direction of dipole polarization in ferroelectric barriers. Therefore, the magneto-current and its current spin polarization through this multiferroic resonant tunneling diode can be manipulated either by the direction of the external magnetic field in the diluted magnetic semiconductor quantum well or by the direction of the dipole polarization in ferroelectric barriers. This study shows the possible application of this structure to a multiferroic spin device to control the amount of current and spin polarization of current through it.

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