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Electric polarization reversal in multiferroic $TbMnO_3$ with rotating magnetic field direction. NOBUYUKI ABE, SHINTARO OHTANI, Department of Physics, Tohoku University, KOUJI TANIGUCHI, TAKA-HISA ARIMA, IMRAM, Tohoku University, TAISHI TAKENOBU, YOSHIHIRO IWASA, IMR, Tohoku University — Recent extensive studies of magneto-electric multiferroics have revealed that the magnitude and direction of electric polarization can be considerably modified by the application of a magnetic field. $TbMnO_3$ is a prototypical multiferroic which shows the electric polarization flop from $P//c$ to $P//a$ by the application of magnetic field along the b or a axis. We have found that the direction of the magnetic-field induced polarization along the a-axis (P_a) is memorized even in the zero field where P_a is absent. The polarization direction can be reversed by rotating the magnetic field direction in the ab plane. For the memory application of the multiferroic material, such a bistability in zero field and a switching between the bistable states with some noneverlasting stimulus are essential.

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