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Magnetic field control of the ferroelectric polarization in multi-ferroic MnWO_4 KOUJI TANIGUCHI, NOBUYUKI ABE, TAKAHISA ARIMA, Institute of Multidisciplinary Research for Advanced Materials, Tohoku University, TAISHI TAKENOBU, YOSHIHIRO IWASA, Institute for Materials Research, Tohoku University — The relationship between magnetic order and ferroelectric properties has been investigated for MnWO_4 . Spontaneous electric polarization is observed in a cycloidal spiral spin phase. The magnetic-field dependence of electric polarization indicates that the noncollinear spin configuration plays a key role for the appearance of ferroelectric phase. Destabilization of the ferroelectric phase and an electric polarization flop from the b direction to the a direction have been observed when a magnetic field is applied along the b axis. On the other hand, the ferroelectric phase is stabilized when a magnetic field is applied along the a -, c - and the spin easy axes. We have also found that the magnetic field induced ferroelectric polarization disappears in a high magnetic field above 12T along the spin easy axis. These phenomena provide us useful information for gigantic magnetoelectric effects because MnWO_4 is a simple system without rare-earth f-moments.

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