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Gigantic optical magneto-electric effect in CuB_2O_4 MITSURU SAITO, KOUJI TANIGUCHI, TAKAHISA ARIMA, Tohoku University — It has been recognized since 1960s that magneto-electric (ME) materials may also show an optical magneto-electric (OME) effect showing up as a change in optical absorption with reversal of the propagating direction of light. The OME effect is an interesting object of scientific research and provides possibilities for applications. However, the changes in absorption coefficient ever discovered were very small (less than 0.2 %). We present a gigantic OME effect in a noncentrosymmetric weak ferromagnet CuB_2O_4 , in which the absorption coefficient changes by a factor of three with reversal of a very weak magnetic field of 300 Oe. This magnitude of OME effect enables us to observe it by a CCD camera with linearly polarized near-infrared and visible light. Spectroscopic study and comparison of OME effect with magnetization indicate an important role of canted antiferromagnetic spin ordering and local symmetry of a square Cu^{2+} site. The gigantic OME effect can be applicable to optical devices like magnetic switching of color in the future.

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