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Magnetic-field-induced spin flop transition and magnetoelectric effect in $Ca_2Fe_{2-x}Al_xO_5$ NOBUYUKI ABE, TAKA-HISA ARIMA, University of Tokyo, NGUYEN KHANH, TAKAHIKO SASAKI, Tohoku University — $Ca_2Fe_{2-x}Al_xO_5$ compounds with $x > 0.5$ have the same crystal structure as brownmillerite, where (Fe,Al)O_6 octahedron layers and (Fe,Al)O_4 tetrahedron layers alternately stacks. The space group is orthorhombic Ibm2, which allows the presence of spontaneous polarization along the c-axis. These materials also exhibit the antiferromagnetic transition at the 350K $\sim$ 570K. We have investigated the magnetoelectric effect of single crystals. In a magnetic field applied along the spin easy axis, a metamagnetic transition is observed to accompany an anomaly of the electric polarization and the dielectric constant. The anomalies can be ascribed to a noncollinear spin arrangement in the domain walls between two magnetic phases and/or the spin direction dependent modulation of the metal-ligand hybridization.

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