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Magnetic field-induced spontaneous polarization reversal in multiferroic $\mathbf{Mn_{0.85}Co_{0.15}WO_4}$[1] N. POUDEL, K.-C LIANG, Y.Q. WANG, Y.Y. SUN, B. LORENZ, TCSUH and Dept. of Physics Univ of Houston, F. YE, Neutron Scattering Science Division, Oak Ridge National Laboratory, J.A. FERNANDEZ-BACA, Neutron Scattering Science Division, Oak Ridge National Laboratory and Dept. of Physics and Astronomy Univ of Tennessee, C.W. CHU, TCSUH and Dept. of Physics Univ of Houston and Lawrence Berkeley National Laboratory — In this work, we report the effect of c-axis magnetic field in magnetic and ferroelectric properties of multiferroic $Mn_{1-x}Co_xWO_4$ for x=0.15,0.135, and 0.17. For x=0.15, which is the critical doping that separates ground state AF5 and AF2/4 magnetic phases, the positive b-axis polarization(P_b) is reversed spontaneously at $\sim$ 7K, when the magnetic field along c-axis is $\geq 20kOe$ even for the positive poling voltage. From the polarization measurement for x=0.135 and 0.17, we found that P_b originates from both AF5 and AF2/4 phases, however, c-axis magnetic field of $\geq 20kOe$ is needed for former case which is the effect of spin flop transition. Magnetic data for x=0.135 clearly show the existence of spin flop transition in a c-axis magnetic field. By comparing similar data for x=0.15 we conclude that the spin flop also happens in the AF5 phase which coexists with AF2/4 magnetic structure. The polarization reversal is explained by a coupling of different domains preserving the chirality of the spiral spin structure.

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