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Magnetic field induced ferroelectric transition of quantum spin chain system $Rb_2Cu_2Mo_3O_{12}$ YUKIO YASUI, YUDAI YANAGISAWA, RYUJI OKAZAKI, ICHIRO TERASAKI, Department of Physics, Nagoya University, YASUHIRO YAMAGUCHI, TSUYOSHI KIMURA, Graduate School of Engineering Science, Osaka University — Dielectric and magnetic properties have been studied for $Rb_2Cu_2Mo_3O_{12}$, which includes quasi one-dimensional spin 1/2 chains formed of edge-sharing CuO_4 square planes called CuO_2 ribbon chains. The system does not exhibit a magnetic transition above temperature $T > 2$K owing to quantum fluctuation and low dimensionality. We have observed anomalous increase of dielectric constant ε with decreasing T below $\sim$ 50 K, which is originated from growing a short range ordering of a helical magnetic structure. For an external magnetic field $H > 0.5$T, a peak structure is observed in the $\varepsilon - T$ curves at $T_c \sim 8$K and the ferroelectric polarization has been observed below T_c. However, the magnetic susceptibility and specific heat do not have anomaly at T_c for $H > 0.5$T. The anomalous increase of ε and field-induced ferroelectric transition are found to be suppressed by impurity doping such as Zn and Ni atoms to the Cu sites. These results indicate that the ferroelectric transition is found to be induced by applying field without magnetic transition which strongly suggests a new type of ferroelectric transition triggered by the magnetism of frustrated quantum spin systems.

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