CR-07. Study of Multiferroic properties of Al doped CuFeO$_2$ by Mössbauer spectroscopy. D. Choi$^1$, I. Shim$^1$ and C. Kim$^1$ I. Physics, Kookmin University, Seoul, South Korea

We have investigated multiferroic properties of Al doped CuFeO$_2$ single crystal using x-ray diffraction, physical property measurement system (PPMS), magnetic property measurement (MPMS), and Mössbauer spectroscopy. The crystal structure of CuFe$_{0.98}$Al$_{0.02}$O$_2$ is determined to be rhombohedral structure with space group of $R-3m$. The spontaneous electric polarization is revealed below 8 K and magnetic moment also shows kinks at 8 K. The hyperfine interactions of magnetic and electric properties of CuFe$_{0.98}$Al$_{0.02}$O$_2$ have been characterized by Mössbauer spectroscopy. Mössbauer spectra of CuFe$_{0.98}$Al$_{0.02}$O$_2$ have been fitted with 4-sextets below 8 K, because the magnetic structure is noncollinear incommensurate. The 4-sublattice reveals different magnetic hyperfine field and electric quadrupole splitting. Furthermore, the difference in electric quadrupole splitting can be contributed to electric polarization around Fe ions. Magnetic Néel temperature ($T_N$) is determined 17 K and isomer shift values is about 0.3 mm/s at all temperatures, which are consistent with high spin Fe$^{3+}$ charge state.