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AV-05. The effect of proton irradiation on magnetic properties of lithium ferrites. *S. Hyun*[1], T. Kouh[1], S. Kim[1] and C. Kim[1] *1. Department of Physics, Kookmin University, Seoul, South Korea*

We have investigated the effect of proton irradiation on magnetic properties of lithium ferrites. $Li_{0.5}Fe_{2.5}O_4$ powders have been fabricated by the sol-gel method. Following the annealing at 700 °C, these samples have been proton-irradiated with 1, 5 and 10 pC/μm^2. Analysis of XRD patterns by Rietveld refinement method show that these samples have ordered cubic spinel structures with space group of $P4_332$. We have observed that the corresponding lattice constant a_0 linearly increases from 8.3301 to 8.3314 Å with increasing proton irradiation. Compared to non-irradiated sample, which has the saturation magnetization (M_s) of 66.4 emu/g and oxygen occupancy of 3.998 at room temperature, the values of magnetization and oxygen occupancy at room temperature are 66.0, 62.6 and 60.8 emu/g, and 3.984, 3.945 and 3.927, respectively, for 1, 5 and 10 pC/μm^2 irradiated powders. Also, the

coercivity (H_c) decreases from 175.6 to 154.0 Oe with increasing proton irradiation. The Mössbauer spectra taken at room temperature show that the values of isomer shift (δ) for the tetrahedral (A) and octahedral (B) sites are consistent with the Fe^{3+} valence state. Electric quadrupole splitting values are found to be -0.02573, -0.02220, -0.01815 and -0.01676 mm/s for the A sites, which increases with the proton irradiation. On the contrary, electric quadrupole splitting values for the B sites are decreasing with 0.012, 0.009, 0.004 and 0.002 mm/s. The results suggest that the proton irradiation induces the oxygen vacancy defects, which in turn leads to the changes in magnetic properties.