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coupling의 Mössbauer 분광학적 고찰 김성백, 이희민, 위지훈, 김삼진, CHEONG S-W.¹, 김철성(국민대학교, 물리학과. ¹Department of Physics, Rutgers University.)

The Fe-doped HoMnO₃ has been prepared with the aim of investigating the spin-lattice coupling that the Mn moments occupy a fully frustrated triangular lattice by Mössbauer technique. A single phase of the HoMn_{0.99}⁵⁷Fe_{0.01}O₃ powder was obtained by standard solid-state reaction method. The crystal structure was refined hexagonal space group P6₃cm with lattice parameters $a_0 = 6.139$ and $c_0 = 11.402$ Å. The magnetic susceptibility follows a Curie-Weiss law behavior, the Curie-Weiss temperature was determined $\theta_{CW} = -18$ K. The effective paramagnetic moment and the magnetic frustration factor were calculated $\mu_{eff.} = 11.2 \mu_B$ and $|\theta_{CW}| / T_N = 0.25$, respectively. The Mössbauer spectra below $T_N = 72$ K exhibit the six-line patterns, which coalesce into two lines above T_N . The electric quadrupole splitting value at T_N was $\Delta E_Q = 1.79 \pm 0.01$ mm/s. It can be accessed an important point, in that the observation of a coupling for the electric and magnetic order parameters was directly possible by Mössbauer spectroscopy.