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Reentrant Morin Transition in Natural Haematite Crystal at Low Temperature SEONG-JOO LEE, HYUNOK JUNG, SOONCHIL LEE, Department of Physics, Korea Advanced Institute of Science and Technology, Daejeon 305-701, Korea, JOONGHOE DHO, Department of Physics, Kyungpook National University, Daegu 702-701, Korea — We investigate the magnetic properties of natural haematite (α -Fe₂O₃) crystal at low temperature using a SQUID and ⁵⁷Fe nuclear magnetic resonance (NMR). The M (T) curve shows that the net magnetization in the (111) plane vanishes at Morin transition occurring around 260 K but reappears as temperature decreases below 30 K. The M(H) curve shows that the hysteresis exists in the (111) plane and the spin-flop transition also occurs when strong external field is applied in parallel with the [111] direction at low temperature. We obtain the NMR spectra in external magnetic field of up to 7 T at 4.2 K. Comparison of the M(H) curve and the field dependence of the NMR resonance frequency suggests that the antiferromagnetic and the weak-ferromagnetic phases coexist at low temperature. Assuming that the weak-ferromagnetic state at low temperature is the same with that above Morin transition, the amount of the weak-ferromagnetic phase in the antiferromagnetic bath at low temperature is about 3 %.

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