

Néel transition in (Mg,Fe)O: A possible change of magnetic structure

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ABSTRACT

The Néel temperature (T_N) of $(\text{Mg}_{1-X}\text{Fe}_X)\text{O}$ and its compositional dependence have been studied with a superconducting quantum interference device (SQUID) in the temperature range 5–300 K at constant magnetic field of 1000 Oe. We determined the magnetic phase diagram at ambient pressure. As the T_N constantly increased with iron content, we found a kink in the paramagnetic-antiferromagnetic boundary at around $X = 0.5$, which suggests a possible change of the magnetic structure in the antiferromagnetic state. We propose that the magnetic boundary ends at $X = 0.12(1)$ and 0 K. Our results show that the pressure of the rhombohedral distortions of (Mg,Fe)O can be very sensitive to Fe content if the structure distortion is correlated to magnetic ordering.

Keywords: Néel transition, SQUID, (Mg,Fe)O, magnetic structure, low temperature