

Neel transition of (Mg,Fe)O and its pressure dependence

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(Mg,Fe)O is one of the major constituents of the Earth's lower mantle. Magnetic transition and crystal structure of (Mg,Fe)O is important for understanding the origin of distortion mechanism of iron-rich minerals. In this study, we have measured the magnetization-temperature relation of (Mg,Fe)O with several compositions to study the Mg-Fe dependence of the Neel temperature by using SQUID magnetometer. Moreover, we have determined the pressure dependence of Neel temperature of (Mg,Fe)O up to 1 GPa by using piston cylinder pressure cell modified for magnetic measurement.

At ambient pressure, our results show the Neel temperature increases continuously with increasing Fe content, but its slope changes at around (Mg_{0.5},Fe_{0.5})O, suggesting a possible change of the magnetic structure in antiferromagnetic state.

The pressure dependence of increase of Neel temperature of (Mg,Fe)O become smaller at the lower iron content and we could not observe a significant pressure effect in the composition with iron content less than 60 %. If the magnetic transition contributes to the structural distortion, our result indicate that the structural phase boundary of (Mg,Fe)O shifts to higher pressure with Mg content.

Keywords: (Mg,Fe)O, Neel transition