NMR Study of Geometrically Frustrated Compounds $Mn_2Br(OH)_3$

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NMR studies of $Mn_2Br(OH)_3$ are carried out at low temperature to clarify the spin state. This compound shows two antiferromangetic transitions[1] at 3.3K and 2.4K. In the antiferromagnetic phase less than 2.4K six proton NMR lines are observed in the frequency range from 8 to 29MHz. The existence of the peaks shows the order of Mn moments. The Mn magnetic moments point the peculiar directions in the local crystal axis. The line width is much broader than usual antiferromagnet. The broad line width shows the spin fluctuation of this compound. These results are similar to those of $Mn_2Cl(OH)_3$. But the spin arrangement is not the same as $Mn_2Cl(OH)_3$. With increasing temperature NMR frequency decreases similary to usual antiferromagnet. The decrease is caused by the decrease of thermal average of the Mn moment. But at $T > 2.0$K the change in NMR frequency is not observed (independent of temperature). The reason is unknown. With increasing temperature the NMR intensities sharply decrease and disappear at 2.15K. In the antiferromagneteic phase between 2.4K and 3.3K any NMR signals are not observed in zero applied field.

[1]M. Hagihala et al., J. Phys : Condens. Matter **18**, 145281 (2004)