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Low temperature magnetic properties of antiferromagnetic rings V6 and V7 studied by NMR[1] YUJI FURUKAWA, Iowa State University , HIROKI OSHIO, TAKUTO MATSUMOTO, University of Tsukuba, Japan — The recent progress in synthesizing odd-member antiferromagnetic (AF) ring molecules gives us the opportunity to investigate spin frustration effects on magnetic properties in systems with small number of magnetic ions. $Na_7[(VO)_7Na_7(H_2O)_7(\beta\text{-}CD)_{14})_2]59D_2O$ (in short, V7) is known to be one of the odd-member AF rings, in which seven V^{4+} (S=1/2) ions make an almost coplanar ring shape. Magnetic susceptibility measured at T=1.8 -300K follows a Curie-Weiss law with a Weiss temperature of -0.5K. This indicates an AF interaction between V^{4+} spins is of order of 0.5K. In order to investigate ground state magnetic properties of the spin frustrated V7 ring, we have carried out proton NMR measurements at low temperatures down to 0.05K using a dilution refrigerator. We also carried out proton NMR in another non-frustrated ring system (V6) which is comprised by six V^{4+} ions for a comparison. NMR spectrum line width in V7 increases with decreasing temperature down to 0.05K. On the other hand, for V6, line width shows a peak around 0.2K and decreases below the temperature. These results clearly indicate that these systems have a different magnetic ground state and the ground state of V6 is a spin singlet state but V7 has a magnetic ground state.

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