Magnetization steps on the spin liquid ground state of the $S = \frac{1}{2}$ kagome-like antiferromagnet $\text{Cu}_3\text{V}_2\text{O}_7(\text{OH})_2\text{H}_2\text{O}$ HIROYUKI YOSHIDA, YOSHIHIKO OKAMOTO, TAKASHI TAYAMA, TOSHIRO SAKABIBARA, MASASHI TOKUNAGA, AKIRA MATSUO, YASUO NARUMI, KOICHI KINDO, MAKOTO YOSHIDA, MASASHI TAKIGAWA, ZENJI HIROI, ISSP, Univ. of Tokyo, VOLBORTHITE COLLABORATION — The ground state of the $S = \frac{1}{2}$ KAFM is expected to be a spin liquid with a finite spin gap $\Delta \sim J / 20$. Here, we report the magnetic properties of $S = \frac{1}{2}$ KAFM $\text{Cu}_3\text{V}_2\text{O}_7(\text{OH})_2\cdot\text{H}_2\text{O}$ studied by magnetization, specific heat and V NMR measurements. Neither magnetic long-range order nor a spin gap has been detected down to 60 mK, in spite of a large antiferromagnetic interaction $J = 86$ K, suggesting a gapless spin liquid. Surprisingly, we observed three step-like increases in magnetization at $H_{S1} = 4.3$, $H_{S2} = 25.5$, and $H_{S3} = 46$ T, which implies that there exist at least four kinds of spin liquid or other quantum state under magnetic fields.

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