Specific-heat and magnetocaloric-effect study of the $S=1/2$ frustrated-chain antiferromagnet $\text{Cu}_3(\text{CO}_3)_2(\text{OH})_2$\(^1\) Y. YOSHIDA, B. ANDRAKA, Y. TAKANO, University of Florida, H. TSUJII, Kanazawa University, Y. INAGAKI, Kyushu University, H. KIKUCHI, Fukui University — Azurite, $\text{Cu}_3(\text{CO}_3)_2(\text{OH})_2$, is a natural mineral in which the $S=1/2$ spins of $\text{Cu}^{2+}$ form frustrated chains. The magnetization of this material exhibits a plateau at 1/3 of the saturation value, at magnetic fields between 16 T and 26 T applied in the chain direction, and the specific heat at zero field shows a broad peak at 4 K followed by a sharp peak at 1.8 K \([1]\). We have measured specific heat up to 18 T and found that the broad peak gets smaller with increasing field and disappears above 10 T. The sharp peak begins to separate into a peak and a shoulder at 5 T, and the temperature difference between these anomalies becomes larger up to 13 T. These observations are well supported by magnetocaloric-effect data taken at the same time. In the plateau region, an exponential temperature dependence is observed in the specific heat at low temperatures, indicating an energy gap for low-lying excited states. Detailed specific-heat and magnetocaloric-effect data and the magnetic phase diagram up to 18 T will be presented. \([1]\) H. Kikuchi \textit{et al}, Phys. Rev. Lett. 94, 227201 (2005)

\(^1\)Supported in part by the NHMFL In-House Research Program and the DOE through DE-FG02-99ER45748.

Y. Yoshida
University of Florida

Date submitted: 21 Nov 2006