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Magnetic Properties of a Coordination Polymer $[\text{Mn}_3(\text{OH})_2\text{Na}_2(\text{3-cnba})_6]_n$ TAN YUEN, CHYAN LONG LIN, Physics Dept., Temple University, PRINCY VARUGHESE, JING LI, Dept. of Chemistry & Chemical Biology, Rutgers University, JING-TANG LI, JUN TAO, RONG-BIN HUANG, LAN-SUN ZHENG, Dept. of Chemistry and State Key Laboratory for Physical Chemistry of Solid Surface, Xiamen University, Xiamen 361005, China — Magnetic properties of $[\text{Mn}_3(\text{OH})_2\text{Na}_2(\text{3-cnba})_6]_n$ (3-Hcnba = 3-cyanobenzoic acid), a newly discovered three-dimensional coordination polymer, were investigated using magnetic susceptibility $M(T)/H$ and isothermal magnetization $M(H)$. The crystal structure of $[\text{Mn}_3(\text{OH})_2\text{Na}_2(\text{3-cnba})_6]_n$ is triclinic with a space group $P-1$. The lattice parameters are $a = 6.663 \text{ \AA}$, $b = 12.971 \text{ \AA}$, $c = 14.161 \text{ \AA}$, $\alpha = 70.13^\circ$, $\beta = 88.43^\circ$, and $\gamma = 76.47^\circ$. The results of $M(T)/H$ on powder samples show that the effective moment μ_{eff} of Mn^{2+} is $5.88 \mu_B$ at temperatures above 100 K, close to the expected value for a free Mn^{2+} ion. Below 3 K, $[\text{Mn}_3(\text{OH})_2\text{Na}_2(\text{3-cnba})_6]_n$ orders antiferromagnetically. A sudden slope change in $M(H)$ measured at is observed at a very small critical field of $H_c \approx 20 \text{ G}$, suggesting a metamagnetic transition. Above 20 kG, $M(H)$ starts to saturate, reaching a value equivalent to $1.7 \mu_B$ per Mn^{2+} ion. The magnetic behavior of the complex is interpreted in terms of an effective ferrimagnetic Mn(II) chains in which spin moments are linked by interactions in an AF-F-AF (F = ferromagnetic and AF = antiferromagnetic) sequence in the triangular magnetic repeating unit.

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