Supporting Information

Large Magnetic Anisotropy of a Decorated Spin-Chain System $K_2Co_3(MoO_4)_3(OH)_2$

Bhakti Patel,[a] Feng Ye,[b] W. L. N. C. Liyanage,[c] Carolyn Buchanan,[c] Dusting A. Gilbert,[c,d] Joseph W. Kolis,[a] Liurukara D Sanjeewa[e,f*]

[a]*Department of Chemistry and Center for Optical Materials Science and Engineering Technologies (COMSET), Clemson University, Clemson, SC 29634-0973, USA*
[b]*Neutron Scattering Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831, USA*
[c]*Department of Physics and Astronomy, University of Tennessee, Knoxville, Tennessee 37996, USA*
[d]*Materials Science and Engineering, University of Tennessee, Knoxville, Tennessee 37996, USA*
[e]*University of Missouri Research Reactor (MURR), University of Missouri, Columbia, MO 65211, USA*
[f]*Department of Chemistry, University of Missouri, Columbia, MO 65211, USA*

**Corresponding Author*

Table SI1. X-ray single crystal refinement parameters of $K_2Co_3(MoO_4)_3(OH)_2$.

Figure SI1: Magnetic susceptibilities, χ = M/H, of $K_2Co_3(MoO_4)_3(OH)_2$ as a function of temperature under an applied field of 500 Oe along the *a*-axis.

Figure SI2: Magnetic susceptibilities, χ = M/H, of $K_2Co_3(MoO_4)_3(OH)_2$ as a function of temperature under an applied field of 500 Oe along the *c*-axis.

Table SI1. X-ray single crystal refinement parameters of $K_2Co_3(MoO_4)_3(OH)_2$. The data were refined in the orthorhombic crystal system space group *Pnma* (No. 62) and the unit cell parameters are a = 17.9394(4) Å, b = 6.0836(2) Å, c = 12.3969(4) Å, V = 1352.95 Å^3 and Z = 4.

Atom	*x*	*y*	*z*	U_{eq}	Wyckoff
K(1)	0.36091(6)	0.25000	-0.03775(4)	0.0224(4)	4*c*
K(2)	0.25395(7)	0.25000	0.66356(5)	0.0342(5)	4*c*
Co(1)	0.40172(1)	0.25000	0.25767(6)	0.0104(1)	4*c*
Co(2)	0.55509(5)	0.50205(4)	0.31399(6)	0.0157(4)	8*d*
Mo(1)	0.44026(5)	0.75000	0.11421(4)	0.0116(5)	4*c*
Mo(2)	0.60608(4)	0.25000	0.56580(5)	0.0128(1)	4*c*
Mo(3)	0.20163(6)	0.25000	0.32692(1)	0.0102(5)	4*c*
O(1)	0.51170(3)	0.25000	0.23014(2)	0.0112(5)	4*c*
O(2)	0.58890(3)	0.75000	0.40268(3)	0.0255(6)	4*c*
O(3)	0.52041(6)	0.75000	0.20028(5)	0.0137(5)	4*c*
O(4)	0.38722(5)	0.51118(3)	0.14285(3)	0.0167(5)	8*d*
O(5)	0.15512(5)	0.01456(2)	0.27677(3)	0.0142(3)	8*d*
O(6)	0.56721(4)	0.00932(3)	0.62578(2)	0.0160(3)	8*d*
O(7)	0.47202(4)	0.75000	-0.01787(1)	0.0222(3)	4*c*
O(8)	0.58443(6)	0.25000	0.42432(4)	0.0162(3)	4*c*
O(9)	0.29397(4)	0.25000	0.28221(4)	0.0145(1)	4*c*
O(10)	0.70082(5)	0.25000	0.58552(5)	0.0145(2)	4*c*
O(11)	0.19817(3)	0.25000	0.46601(3)	0.0346(1)	4*c*

Figure SI1: Magnetic susceptibilities, χ = M/H, of $K_2Co_3(MoO_4)_3(OH)_2$ as a function of temperature under an applied field of 500 Oe along the *a*-axis.

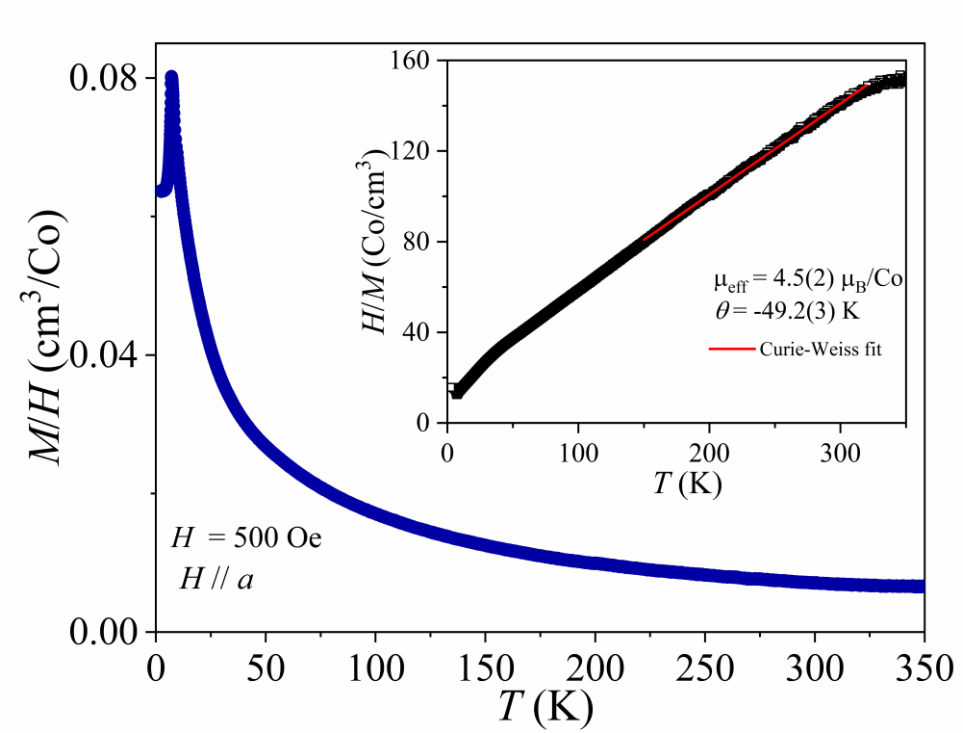

Figure SI2: Magnetic susceptibilities, χ = M/H, of $K_2Co_3(MoO_4)_3(OH)_2$ as a function of temperature under an applied field of 500 Oe along the *c*-axis.