Electronic Supplementary Information

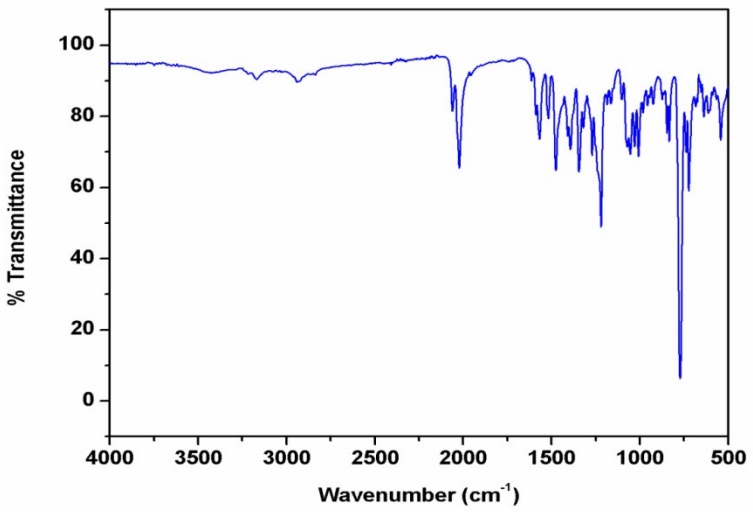
Slow relaxation of the magnetization in two cobalt(III)/cobalt(II) dimers

Rabi Sankar Sarkar[a], Carlos J. Gómez-García[b],Michael G. B. Drew[c]and Shouvik Chattopadhyay*

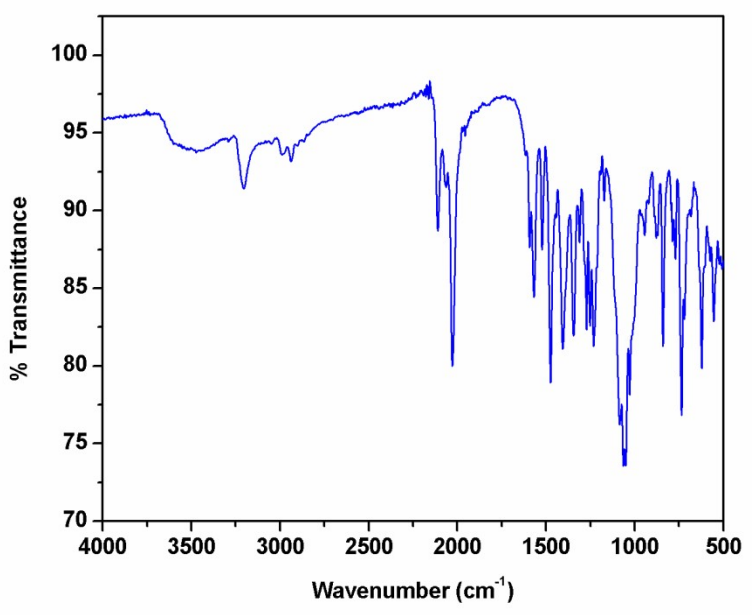
[a]*Department of Chemistry, Inorganic Section, Jadavpur University, Kolkata - 700032, India.e-mail: shouvik.chem@gmail.com*

[b]*Departamento de QuímicaInorgánica. Universidad de Valencia. C/ Dr.Moliner 50, 46100Burjasot (Valencia) Spain.*

[c]*School of Chemistry, The University of Reading, P.O. Box 224, Whiteknights, Reading RG6 6AD, UK*



FigureS1.IR spectrum of compound**1**.



FigureS2.IR spectrum of compound**2**.

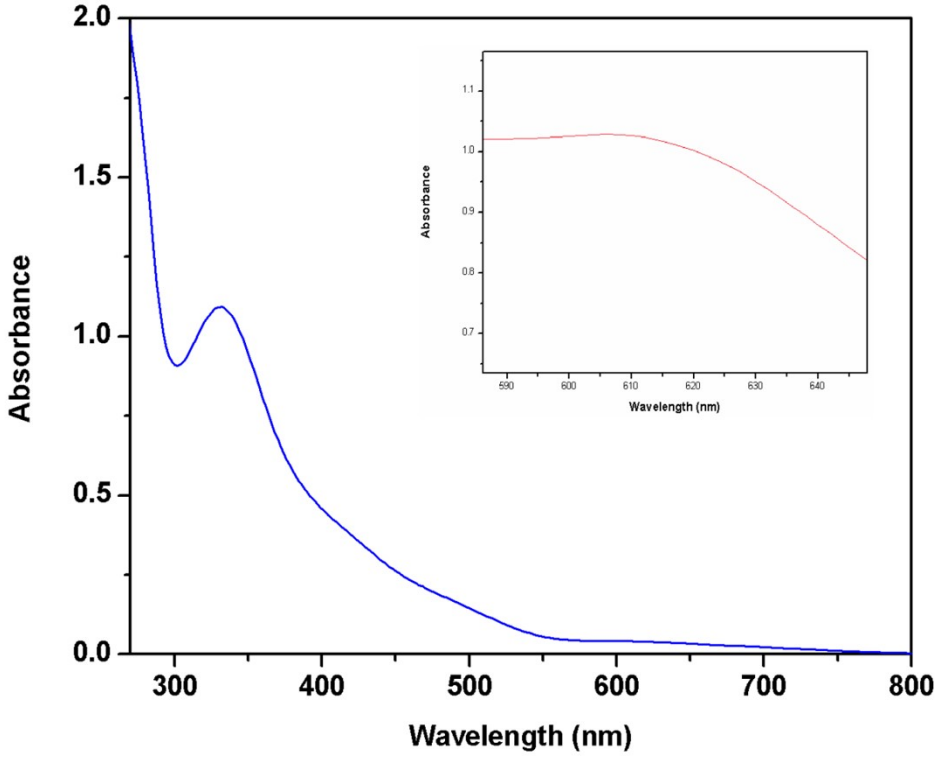


Figure S3.Electronic spectrum of compound **1** in acetonitrile. Inset shows the d-d absorption band in the visible region.

BVS calculation

The bond valance sum(BVS) calculations allow the calculation of the oxidation state of the cobalt centres of both independent dimers in both compounds. Despite the long distortions from the octahedral geometry of the Co2 and Co4 centres in both compounds, the results clearly indicate that in both compoundsthe Co1 and Co3 centres are in the +3 oxidation state whereas the Co2 and Co4 centres are in the +2 oxidation state (Table S1).

TableS1.Bond valance sum(BVS) calculations for all the cobalt ions in compounds **1** and **2**.

Compound	Dimer	Cobalt centre	BVS of Cobalt
1	**1A**	Co1	2.84
		Co2	1.78
	1B	Co3	2.96
		Co4	1.99
2	**2A**	Co1	2.70
		Co2	1.96
	2B	Co3	2.99
		Co4	2.22

Table S2. Magnetic parameters of all the reported cobalt(II)/cobalt(III) dimers showing FI-SMM behaviour.

CCDC	Co(II)	H (mT)	U_{eff} (K)	τ_0 (s)	A (s^{-1})	C (K^{-n} s^{-1})	n	Ref
NINJAX	$Co^{II}O_5Cl$	100	11.37	$6.1x10^{-6}$	-	-	-	66
NINJIF	$Co^{II}O_5Br$	100	20.86	$1x10^{-6}$	-	-	-	66
RASQAG	$Co^{II}O_6$	100	16.1(7)	$7.1(9)x10^{-6}$	$1.0(2)x10^{6}$	$0.76(3)x10^{-3}$	9	67
		200	18.0(10)	$3.2(7)x10^{-6}$	$2.3(2)x10^{5}$	$0.87(8)x10^{-3}$	9	
		400	24.4(4)	$5.9(5)x10^{-7}$	$1.43(9)x10^{4}$	$1.2(6)x10^{-3}$	9	
GASMOF	$Co^{II}O_6$	50	16.4	$4.29x10^{-7}$	$2.019x10^{3}$	-	-	68
		100	19.0	$2.81x10^{-7}$	$1.682x10^{3}$	-	-	
		250	15.3	$7.71x10^{-7}$	$1.341x10^{3}$	-	-	
GASMUL	$Co^{II}O_6$	50	22.3	$4.61x10^{-7}$	$4.81x10^{2}$	-	-	68
		100	32.3	$0.82x10^{-7}$	$2.275x10^{2}$	-	-	
		250	35.2	$0.50x10^{-7}$	$1.006x10^{2}$	-	-	
XEHNIL	$Co^{II}O_5N$	140	-	-	$170(3)x10^{2}$	2.7(1)	6.2(3)	69
XEHNOR	$Co^{II}O_5N$	100	-	-	$3.5(2)x10^{2}$	0.57(3)	6.4(3)	
XEHNUX	$Co^{II}O_5N$	140	-	-	$5(1)x10^{2}$	15(4)	5.2(2)	
XEHPAF	$Co^{II}O_5N$	100	-	-	$32(5)x10^{2}$	17(6)	6.7(3)	
1	$Co^{II}O_5N$ $Co^{II}O_5Cl$	90	7.3(2)	$6.9(3) \times 10^{-6}$	$2.0(2) \times 10^{3}$	$5.88(5) \times 10^{-2}$	9	This work
2	$Co^{II}O_5N$ $Co^{II}O_6$	50	5.3(2)	$5.9(1) \times 10^{-6}$	$1.2(7) \times 10^{3}$	$3.26(9) \times 10^{-2}$	9	This work