Supplementary Material

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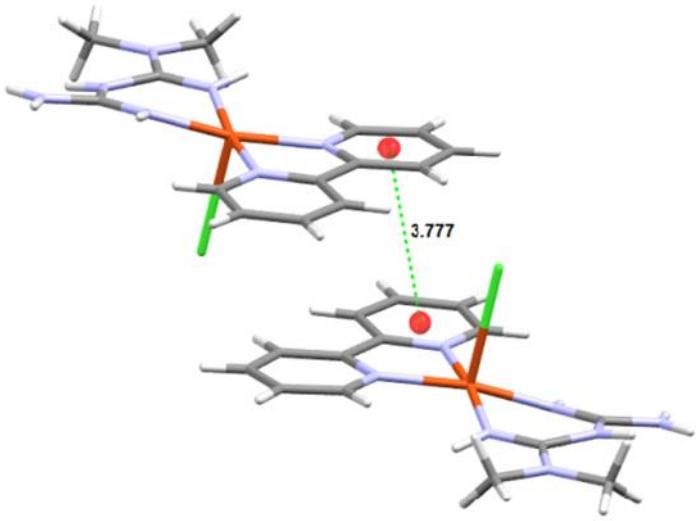

Figure S1. Capped stick representation of **Compound 1,** showing the distance between centroids of adjacent rings of bipyridine molecules.

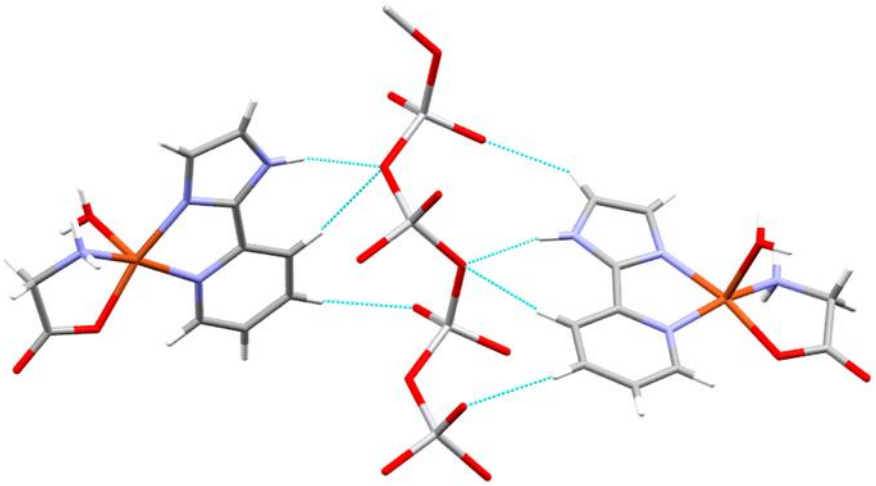

Figure S2. Capped stick representation of the hydrogen bond interactions of a growing metavanadate chain between layers of **Compound 2.**

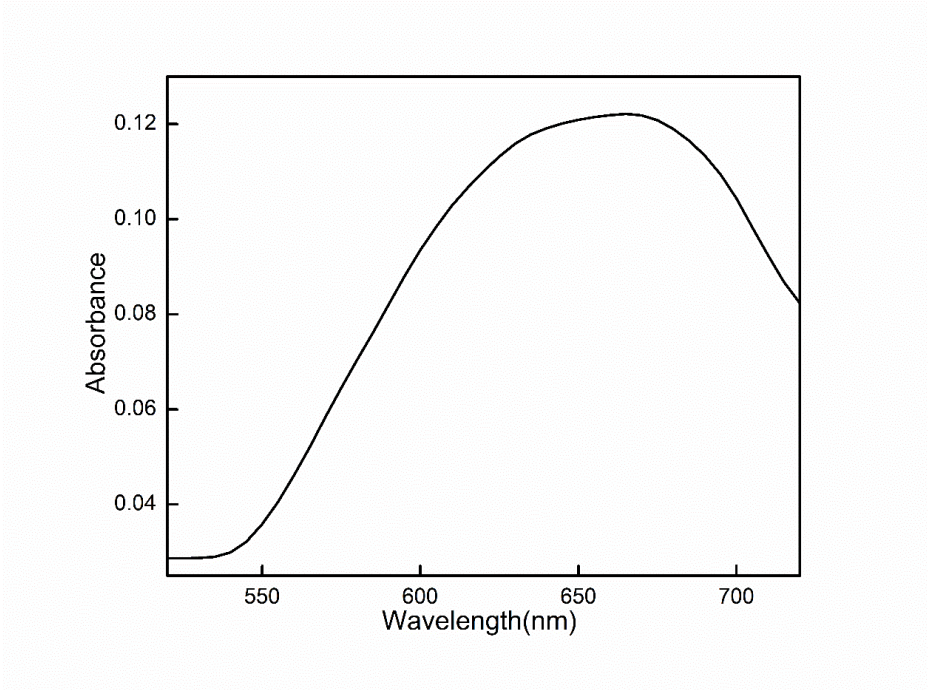

Figure S3. Visible spectrum of **Compound 1.**

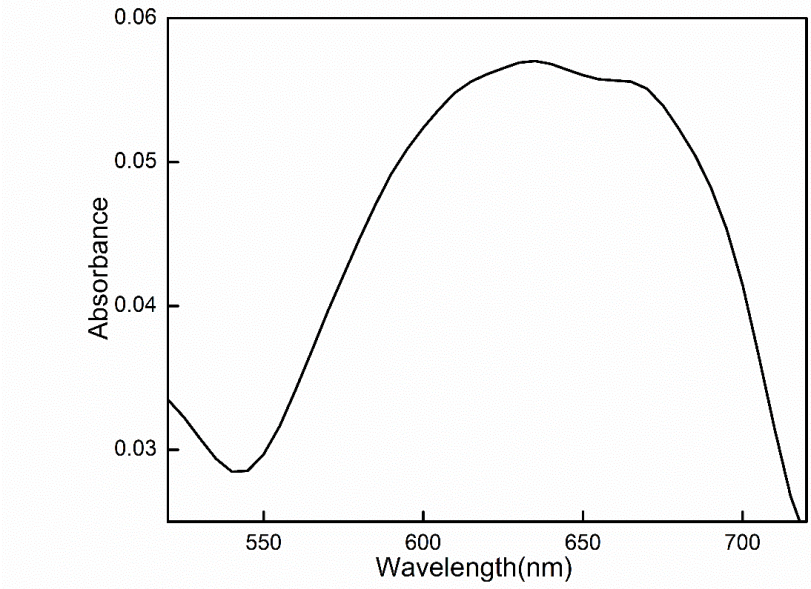

Figure S4. Visible Spectrum of **Compound 2**.

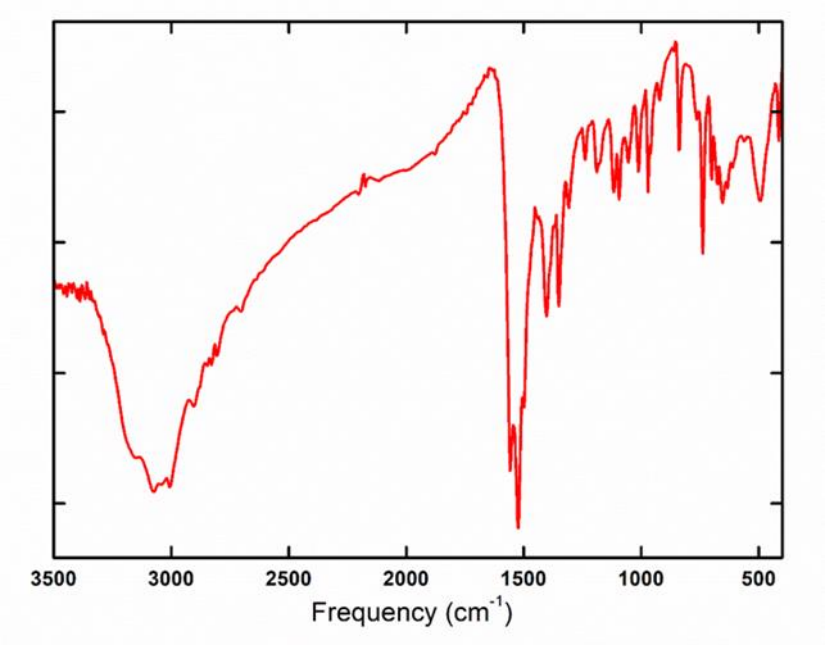

Figure S5. The infrared spectrum of **Compound 1**.

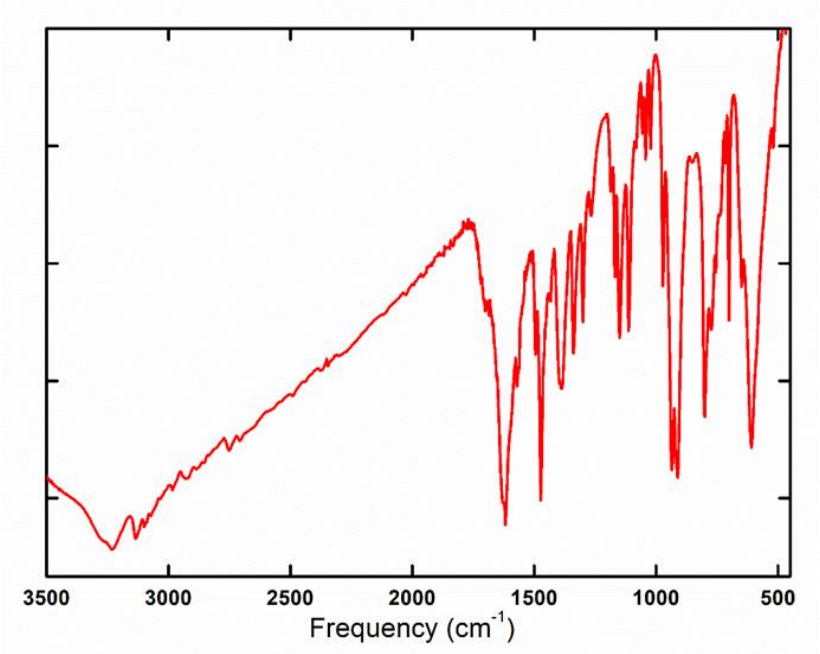

Figure S6. The infrared spectrum of **Compound 2.**

Table S1. Fractional atomic coordinates and isotropic or equivalent isotropic displacement parameters (Å^2) for **Compound 1.**

	X	y	z	U_{iso}*/U_{eq}
Cu1	0.60984 (3)	0.33069 (3)	0.45565 (2)	0.03412 (10)
Cl2	0.87935 (8)	0.19152 (7)	0.46484 (7)	0.04906 (17)
Cl3	1.31805 (9)	0.36561 (7)	0.10889 (6)	0.05270 (19)
N8	0.8329 (3)	0.5067 (2)	0.22254 (19)	0.0415 (5)
N6	0.8503 (2)	0.5601 (2)	0.44002 (18)	0.0345 (4)
H6	0.934711	0.604433	0.438060	0.041*
N4	0.6887 (3)	0.4954 (2)	0.5736 (2)	0.0390 (5)
N18	0.5119 (2)	0.2687 (2)	0.58910 (18)	0.0353 (4)
N11	0.6729 (3)	0.3966 (2)	0.32120 (19)	0.0405 (5)
H11	0.621437	0.363299	0.249466	0.049*
N12	0.8668 (3)	0.6694 (2)	0.6516 (2)	0.0431 (5)
H12A	0.839717	0.683245	0.727516	0.052*
H12B	0.938672	0.718067	0.636080	0.052*
N20	0.4788 (2)	0.1737 (2)	0.34283 (19)	0.0356 (4)
C5	0.7971 (3)	0.5723 (2)	0.5578 (2)	0.0305 (4)
C7	0.7815 (3)	0.4838 (2)	0.3250 (2)	0.0322 (4)
C13	0.4043 (3)	0.1693 (2)	0.5459 (2)	0.0352 (5)
C19	0.3841 (3)	0.1166 (2)	0.4060 (3)	0.0374 (5)
O25	0.8522 (3)	0.0861 (3)	0.1500 (3)	0.0846 (8)
H25A	0.856553	0.101485	0.229323	0.127*
H25B	0.946290	0.102207	0.134009	0.127*
O26	0.0441 (3)	0.1625 (3)	−0.0146 (3)	0.0802 (8)
H26A	0.111085	0.221718	0.026505	0.120*
H26B	0.093067	0.095594	−0.054527	0.120*
C17	0.5416 (4)	0.3186 (3)	0.7147 (3)	0.0468 (6)
H17	0.617209	0.385738	0.745258	0.056*
C14	0.3246 (3)	0.1207 (3)	0.6263 (3)	0.0494 (7)
H14	0.251129	0.052193	0.594172	0.059*
C15	0.3544 (4)	0.1739 (3)	0.7538 (3)	0.0562 (8)
H15	0.300440	0.142249	0.808812	0.067*
C24	0.2776 (3)	0.0157 (3)	0.3436 (3)	0.0501 (7)
H24	0.213652	−0.022467	0.388091	0.060*
C21	0.4690 (4)	0.1287 (3)	0.2175 (3)	0.0471 (6)

Table S2. Bond lengths for **Compound 1**.

Atom-Atom	Length/Å	Atom- Atom	Length/Å
Cu1-Cl2	2.7562(8)	N11-C7	1.300(3)
Cu1-N4	1.946(2)	N12-C5	1.336(3)
Cu1-N18	2.0309(19)	N20-C19	1.361(3)
Cu1-N11	1.955(2)	N20-C21	1.331(3)
Cu1-N20	2.044(2)	C13-C19	1.489(4
N8-C7	1.341(3)	C13-C14	1.378(4)
N8-C9	1.460(4)	C19-C24	1.387(4)
N8-C10	1.464(4)	C17-C16	1.382(4
N6-C5	1.385(3)	C14-C15	1.370(4)
N6-C7	1.386(3)	C15-C16	1.381(5)
N4-C5	1.288(3)	C24-C23	1.374(4)
N18-C13	1.351(3)	C21-C22	1.388(4)
N18-C17	1.347(3)	C22-C23	1.362(5)

Table S3. Bond Angles for **Compound 1**.

Atom-Atom-Atom	Angle/°	Atom-Atom-Atom	Angle/°
N4-Cu1-Cl2	97.51(8)	C21-N20-C19	118.1(2)
N4-Cu1-N18	94.52(8)	N4-C5-N6	121.8(2)
N4-Cu1-N11	87.06(9)	N4-C5-N12	123.6(2)
N4-Cu1-N20	167.29(9)	N12-C5-N6	114.6(2)
N18-Cu1-Cl2	91.57(6)	N8-C7-N6	116.3(2)
N18-Cu1-N20	80.11(8)	N11-C7-N8	123.9(2)
N11-Cu1-Cl2	96.29(7)	N11-C7-N6	119.8(2)
N11-Cu1-N18	171.72(9)	N18-C13-C19	114.2(2)
N11-Cu1-N20	96.67(8)	N18-C13-C14	121.9(2)
N20-Cu1-Cl2	94.16(6)	C14-C13-C19	123.9(2)
C7-N8-C9	124.5(2)	N20-C19-C13	115.2(2)
C7-N8-C10	119.4(2)	N20-C19-C24	121.9(2)
C9-N8-C10	115.7(2)	C24-C19-C13	122.8(2)
C7-N6-C5	126.71(19)	N18-C17-C16	123.1(3)
C5-N4-Cu1	127.86(17)	C15-C14-C13	119.6(3)
C13-N18-Cu1	115.76(16)	C14-C15-C16	119.6(3)
C17-N18-Cu1	126.44(17)	C23-C24-C19	118.1(3)
C17-N18-C13	117.8(2)	N20-C21-C22	123.0(3)
C7-N11-Cu1	129.10(17)	C23-C22-C21	118.0(3)
C19-N20-Cu1	114.29(16)	C22-C23-C24	120.9(3)
C21-N20-Cu1	127.50(19)	C15-C16-C17	118.0(3)

Table S4. Fractional atomic coordinates and isotropic or equivalent isotropic displacement parameters (Å²) for **Compound 2.**

	X	y	z	Uiso*/Ueq
Cu1	0.71286 (4)	0.68262 (10)	0.40085 (2)	0.0266 (2)
V2	0.95148 (4)	0.21053 (12)	0.77701 (3)	0.0258 (2)
O3	0.5780 (2)	0.2371 (6)	0.24431 (14)	0.0338 (6)
N18	0.8797 (2)	1.0618 (8)	0.56768 (16)	0.0364 (8)
H18	0.895209	1.070954	0.611129	0.044*
O19	0.5638 (2)	0.9166 (5)	0.37357 (13)	0.0319 (5)
H19A	0.508442	0.857080	0.333968	0.048*
H19B	0.571980	1.095987	0.363003	0.048*
O20	0.9583 (2)	−0.0180 (6)	0.71170 (13)	0.0336 (6)
O7	0.6426 (2)	0.3841 (6)	0.34934 (13)	0.0328 (6)
O21	0.8321 (3)	0.3158 (8)	0.7599 (2)	0.0621 (11)
N8	0.6923 (2)	0.5624 (7)	0.48928 (15)	0.0301 (6)
N6	0.7568 (3)	0.7441 (7)	0.31774 (16)	0.0309 (6)
H6A	0.761922	0.911580	0.310962	0.037*
H6B	0.818598	0.671499	0.322041	0.037*
C9	0.7508 (3)	0.6896 (8)	0.54480 (19)	0.0312 (8)
N15	0.8077 (2)	0.9312 (6)	0.46295 (15)	0.0285 (6)
C5	0.6752 (3)	0.6282 (7)	0.26056 (17)	0.0292 (7)
H5A	0.705772	0.576026	0.225537	0.035*
H5B	0.621080	0.753855	0.241225	0.035*
C4	0.6277 (3)	0.3978 (7)	0.28474 (17)	0.0264 (6)
C16	0.8714 (3)	1.1377 (9)	0.4610 (2)	0.0339 (7)
H16	0.882079	1.209382	0.422362	0.041*
O22	0.9773 (4)	0.0592 (7)	0.84923 (16)	0.0569 (9)
C17	0.9163 (3)	1.2180 (8)	0.5270 (2)	0.0365 (8)
H17	0.962892	1.353643	0.541011	0.044*
C12	0.6186 (4)	0.3148 (10)	0.5606 (2)	0.0444 (10)
H12	0.572563	0.186789	0.564790	0.053*
C14	0.8147 (3)	0.8906 (8)	0.52742 (17)	0.0294 (7)
C13	0.6282 (3)	0.3780 (9)	0.4978 (2)	0.0377 (8)
H13	0.588376	0.288458	0.459888	0.045*
C10	0.7464 (3)	0.6355 (10)	0.6094 (2)	0.0402 (9)
H10	0.787591	0.724344	0.646940	0.048*
C11	0.6777 (4)	0.4430 (10)	0.6163 (2)	0.0466 (10)
H11	0.672426	0.402222	0.659001	0.056*

Table S5. Bond lengths for **Compound 2.**

Atom-Atom	Length/Å	Atom- Atom	Length/Å
Cu1-N2	1.9884(17)	N2-C7	1.375(3)
Cu1-O1	1.9609(15)	N3-C6	1.346(3)
Cu1-N4	1.9925(18)	N3-C8	1.369(3)
Cu1-O3	2.2633(17)	C9-C10	1.512(3)
Cu1-N1	2.0253(16)	C9-O1	1.292(2)
V1-O4	1.6276(18)	C9-O2	1.234(2)
V1-O5	1.8325(16)	C10-N4	1.478(3)
V1-O5^{1}	1.8224(15)	O5-V1^{2}	1.8225(15)
V1-O6	1.6244(19)	C2-C1	1.383(3)
C5-C6	1.457(3)	C2-C3	1.367(4)
C5-C4	1.380(3)	C8-C7	1.374(3)
C5-N1	1.356(3)	C1-N1	1.338(3)
N2-C6	1.333(3)	C3-C4	1.379(4)

Table S6. Bond Angles for **Compound 2.**

Atom-Atom-Atom	Angle/°	Atom-Atom-Atom	Angle/°
N2-Cu1-N4	98.91(7)	C7-N2-Cu1	140.96(15)
N2-Cu1-O3	99.04(7)	C6-N3-C8	107.59(18)
N2-Cu1-N1	81.75(7)	O1-C9-C10	115.88(17)
O1-Cu1-N2	167.50(7)	O2-C9-C10	120.80(18)
O1-Cu1-N4	82.75(7)	O2-C9-O1	123.31(19)
O1-Cu1-O3	92.87(7)	N4-C10-C9	109.57(16)
O1-Cu1-N1	94.02(7)	C9-O1-Cu1	114.75(13)
N4-Cu1-O3	99.42(7)	N2-C6-C5	119.34(18)
N4-Cu1-N1	167.74(8)	N2-C6-N3	110.6(2)
N1-Cu1-O3	92.54(6)	N3-C6-C5	129.99(18)
O4-V1-O5	107.50(9)	V1^{2}-O5-V1	125.87(8)
O4-V1-O5^{1}	108.49(9)	C3-C2-C1	119.5(2)
O51-V1-O5	115.09(3)	C10-N4-Cu1	107.10(13)
O6-V1-O4	107.04(13)	N3-C8-C7	106.8(2)
O6-V1-O5^{1}	108.79(9)	C8-C7-N2	108.3(2)
O6-V1-O5	109.63(10)	N1-C1-C2	121.7(2)
C4-C5-C6	125.7(2)	C2-C3-C4	119.5(2)
N1-C5-C6	112.29(17)	C3-C4-C5	118.7(2)
N1-C5-C4	122.0(2)	C5-N1-Cu1	114.18(14)
C6-N2-Cu1	112.35(15)	C1-N1-Cu1	127.22(15)
C6-N2-C7	106.68(18)	C1-N1-C5	118.60(18)

Table S7. Compiled Bonds (Å) and Angles (°) for Selected Extended Vanadate Structures.

	$NaVO_3$	NH_4VO_3	KVO_3	Compound 2
VO1	1.653(1)	1.640(4)	1.643(6)	1.6276(18)
VO2	1.643(1)	1.647(4)	1.639(6)	1.6244(19)
VO3	1.882(3)	1.803(1)	1.806(2)	1.8224(15)
VO4	-	-	-	1.8325(16)
O1-V-O2	108.45(7)	107.3(1)	110.1(3)	107.50(9)
O1-V-O3	135.75(6)	111.0(3)	111.5(2)	108.49(9)
O2-V-O3	115.60(7)	110.2(2)	110.0(2)	115.09(3)