Supporting Information

A new *S* = 1/2 stacked kagomé lattice compound showing two successive ferromagnetic transitions

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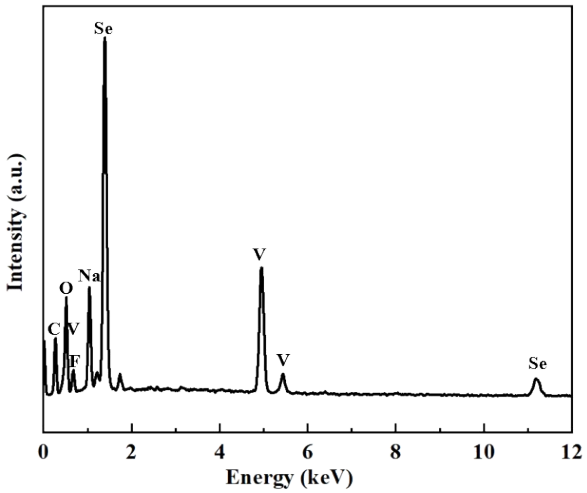

Fig. S1. The energy-dispersive spectrometry (EDS) elemental analyses of $Na_6V_7(SeO_3)_8O_6F_6$.

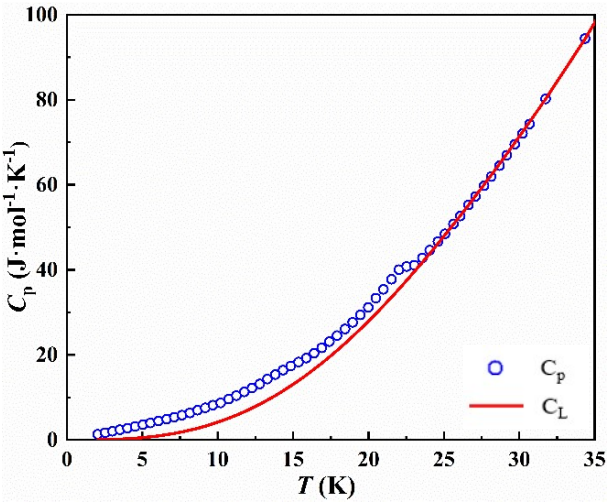

Fig. S2. The heat capacity (C_p) measured under 0 T, where the solid red line represents the simulated lattice contribution ($C_{L)}$.

Table S1. The bond lengths (Å) of $Na_6V_7(SeO_3)_8O_6F_6$.

Bond	Dist.	Bond	Dist.
Na1-O1	2.363(11)	V2-F1[1]	1.973(15)
Na1-O2[6]	2.424(13)	V2-F1[12]	1.7821(15)
Na1-O2[9]	2.775(12)	V2-F1[13]	1.7821(15)
Na1-O3[9]	2.446(12)	V2-F1[10]	1.973(15)
Na1-F1	2.067(16)	V2-F1	1.7821(14)
Na1-F1[5]	2.537(16)	V2-F1[5]	1.973(15)
V1-O1[5]	1.997(10)	Se1-O5[3]	1.696(10)
V1-O2[6]	2.097(11)	Se1-O5[4]	1.696(10)
V1-O3	1.979(9)	Se1-O5	1.696(10)
V1-O4	1.734(10)	Se2-O1	1.729(10)
V1-O4[7]	1.957(10)	Se2-O2	1.702(10)
V1-O5	1.971(10)	Se2-O3	1.713(8)

Symmetry transformations used to generate equivalent atoms:

[1]+Y,1-X+Y,-1/2+Z;[2]+X,+Y,-1+Z;[3]1-Y,1+X-Y,+Z;[4]+Y-X,1-X,+Z;[5]1-Y+X,+X,-1/2+Z;[6]1-Y+X,+X,1/2+Z;[7]1-X,2-Y,1/2+Z;[8]+Y,1-X+Y,1/2+Z;[9]+X,+Y,1+Z;[10]2-X,2-Y,-1/2+Z;[11]2-X,2-Y,1/2+Z;[12]1+Y-X,2-X,+Z;[13]2-Y,1+X-Y,+Z

Table S2 The bond angles (°) of $Na_6V_7(SeO_3)_8O_6F_6$.

Angle	(°)	Angle	(°)
O2-Se2-O3	97.3(4)	F1[11]-V2-F1[5]	173.8(5)
O2-Se2-O1	101.0(5)	F1[10]-V2-F1[11]	82.7(7)
O3-Se2-O1	99.6(4)	F1[10]-V2-F1[12]	101.9(4)
O5-Se1-O5[3]	100.7(4)	F1[10]-V2-F1[2]	173.8(5)
O5[4]-Se1-O5[3]	100.7(4)	F1-V2-F1[12]	173.8(5)
O5[4]-Se1-O5	100.7(4)	F1-V2-F1[5]	101.9(4)
O5-V1-O2[6]	85.2(4)	F1-V2-F1[11]	82.7(7)
O5-V1-O3	167.2(4)	F1[12]-V2-F1[5]	73.25(8)
O5-V1-O1[5]	93.7(4)	F1[12]-V2-F1[2]	73.25(8)
O3-V1-O2[6]	82.1(4)	F1[11]-V2-F1[2]	101.9(4)
O3-V1-O1[5]	85.6(4)	F1[10]-V2-F1[5]	101.9(4)
O4-V1-O5	93.1(4)	F1[2]-V2-F1[5]	73.25(8)
O4[7]-V1-O5	85.5(4)	F1-V2-F1[2]	101.9(4)
O4-V1-O2[6]	177.7(4)	F1[11]-V2-F1[12]	101.9(4)
O4[7]-V1-O2[6]	87.5(4)	F1-V2-F1[10]	82.7(7)
O4-V1-O3	99.6(4)	Se1-O5-V1	124.2(6)

O4[7]-V1-O3	93.1(4)	Se2-O2-V1[2]	122.8(5)
O4-V1-O4[7]	93.90(14)	Se2-O2-Na1[2]	111.7(5)
O4[7]-V1-O1[5]	170.8(4)	Se2-O2-Na1[1]	93.2(4)
O4-V1-O1[5]	95.3(4)	V1[2]-O2-Na1[1]	96.6(4)
O1[5]-V1-O2[6]	83.3(4)	V1[2]-O2-Na1[2]	122.5(5)
O2[6]-Na1-O2[8]	146.4(5)	Na1[2]-O2-Na1[1]	97.5(5)
O2[6]-Na1-O3[8]	101.2(4)	Se2-O3-V1	129.3(5)
O2[6]-Na1-F1[5]	72.8(4)	Se2-O3-Na1[1]	105.3(4)
O3[8]-Na1-O2[8]	58.4(3)	V1-O3-Na1[1]	113.0(4)
O3[8]-Na1-F1[5]	151.2(5)	V1-O4-V1[14]	155.7(5)
F1[5]-Na1-O2[8]	138.2(4)	Na1-F1-Na1[9]	116.2(5)
F1-Na1-O2[6]	137.4(5)	V2-F1-Na1	99.6(6)
F1-Na1-O2[8]	73.3(4)	V2[13]-F1-Na1	142.6(7)
F1-Na1-O3[8]	89.8(5)	V2[13]-F1-Na1[9]	80.5(4)
F1-Na1-F1[5]	77.9(4)	V2-F1-Na1[9]	135.5(7)
F1-Na1-O1	115.9(5)	V2-F1-V2[13]	86.8(5)
O1-Na1-O2[6]	101.4(4)	Se2-O1-V1[9]	124.2(5)
O1-Na1-O2[8]	63.4(3)	Se2-O1-Na1	121.6(5)
O1-Na1-O3[8]	103.7(4)	V1[9]-O1-Na1	114.2(5)
O1-Na1-F1[5]	105.1(5)		

Symmetry transformations used to generate equivalent atoms:

[1]+X,+Y,-1+Z;[2]+Y,1-X+Y,-1/2+Z;[3]+Y-X,1-X,+Z;[4]1-Y,1+X-Y,+Z;[5]1-Y+X,+X,-1/2+Z;[6]1-Y+X,+X,1/2+Z;[7]1-X,2-Y,1/2+Z;[8]+X,+Y,1+Z;[9]+Y,1-X+Y,1/2+Z;[10]2-Y,1+X-Y,+Z;[11]1+Y-X,2-X,+Z;[12]2-X,2-Y,-1/2+Z;[13]2-X,2-Y,1/2+Z;[14]1-X,2-Y,-1/2+Z

Table S3 Atomic coordinates (x 10^4) and equivalent isotropic displacement parameters U(eq) ($Å^2$ x 10^3) for $Na_6V_7(SeO_3)_8O_6F_6$.

Atom	**x**	**y**	**z**	**U(eq)**
Na1	8076(6)	10604(5)	8040(20)	25.5(16)
V1	5539.7(16)	9409.9(17)	2660(15)	6.3(4)
V2	10000	10000	7780(20)	35(2)
Se1	3333.33	6666.67	2358(14)	4.7(5)
Se2	7803.4(9)	12240.0(9)	2718(12)	2.9(3)
O1	8399(8)	12334(8)	5770(20)	6.3(18)
O2	9049(9)	12727(9)	840(20)	9(2)
O3	7205(7)	10736(7)	2150(20)	3.7(19)
O4	4861(8)	9647(8)	0(20)	6.8(19)

O5	4030(8)	8019(9)	3860(20)	8(2)
F1	9542(11)	10750(10)	10007(19)	70(6)

Table S4. Anisotropic displacement parameters ($Å^2$ x 10^3) for $Na_6V_7(SeO_3)_8O_6F_6$.

Atom	**U_{11}**	**U_{22}**	**U_{33}**	**U_{23}**	**U_{13}**	**U_{12}**
Na1	43(4)	8(3)	9(4)	2(3)	-2(3)	1(3)
V1	4.1(9)	4.6(9)	9.8(10)	2.4(12)	3.0(12)	2.0(7)
V2	36(3)	36(3)	35(6)	0	0	17.8(16)
Se1	5.1(6)	5.1(6)	3.8(13)	0	0	2.6(3)
Se2	2.9(5)	2.5(5)	3.1(6)	-0.2(7)	0.6(7)	1.3(4)
O1	7(2)	6(2)	6(2)	0.3(13)	-0.6(13)	3.1(15)
O2	9(2)	9(2)	8(2)	-0.4(13)	0.7(13)	4.4(15)
O3	4(2)	3(2)	4(2)	0.1(13)	0.3(13)	1.8(15)
O4	6(2)	7(2)	7(2)	0.0(13)	0.4(13)	3.2(15)
O5	7(5)	5(4)	11(5)	1(4)	-1(4)	2(4)
F1	27(6)	26(6)	162(19)	28(9)	11(9)	18(5)