Supporting Information Tables and Figures

Table S1. Atom coordinates and displacement parameters (Å^2) for finchite from Sulfur Springs Draw.

Atom	*x/a*	*y/b*	*z/c*	U_{eq}	U^{11}	U^{22}	U^{33}	U^{23}	U^{13}	U^{12}
U	0.18608(8)	0.02240(9)	-0.00273(7)	0.0096(3)	0.0063(5)	0.0069(5)	0.0155(5)	0.0003(5)	0.0002(5)	0.0003(4)
Sr	0.3406(3)	0	0.25	0.0120(7)	0.0121(16)	0.0087(16)	0.0151(11)	0.0009(12)	0	0
K	0.3406(3)	0	0.25	0.0120(7)	0.0121(16)	0.0087(16)	0.0151(11)	0.0009(12)	0	0
Ca	0.3406(3)	0	0.25	0.0120(7)	0.0121(16)	0.0087(16)	0.0151(11)	0.0009(12)	0	0
V	0.0306(4)	0.3475(5)	0.0444(3)	0.0105(9)	0.0062(19)	0.0065(17)	0.019(2)	-0.0003(15)	0.0008(15)	-0.0003(13)
O1	0.1698(16)	0.0622(19)	-0.1095(10)	0.012(3)	0.008(6)	0.014(6)	0.0155(17)	0.000(3)	0.001(3)	0.004(4)
O2	0.2088(15)	-0.0215(19)	0.1048(10)	0.0090(18)	0.005(5)	0.007(3)	0.0157(18)	0.001(2)	0.002(2)	-0.001(3)
O3	-0.0127(15)	0.360(2)	0.1395(10)	0.011(2)	0.007(5)	0.006(6)	0.019(3)	-0.001(3)	0.002(3)	0.000(4)
O4	-0.0950(15)	0.4384(18)	-0.0230(10)	0.010(3)	0.005(5)	0.007(4)	0.018(5)	-0.001(4)	0.003(4)	0.001(4)
O5	-0.0124(14)	0.1548(19)	0.0141(10)	0.0100(14)	0.006(2)	0.007(2)	0.017(3)	0.000(3)	0.001(2)	0.0001(18)
O6	0.1997(15)	0.2890(18)	0.0374(10)	0.0101(12)	0.006(2)	0.0065(19)	0.018(3)	0.0017(18)	0.002(2)	0.000(2)
OW1	0.2525(18)	0.275(2)	0.2211(12)	0.019(3)	0.026(8)	0.009(3)	0.022(5)	-0.003(3)	-0.009(6)	0.004(4)
OW2	0.5208(17)	0.182(2)	0.3187(12)	0.019(4)	0.020(6)	0.016(7)	0.022(7)	-0.003(6)	-0.007(6)	-0.002(5)
OW3	0.006(3)	0	0.25	0.036(7)	0.045(19)	0.023(16)	0.039(18)	-0.018(18)	0	0

*Sr site occupancy = 0.88, K site occupancy = 0.17, Ca site occupancy = 0.10.

Table S2. Atom coordinates and displacement parameters (Å^2) for finchite from the Pandora mine.

Atom	*x/a*	*y/b*	*z/c*	U_{eq}	U^{11}	U^{22}	U^{33}	U^{23}	U^{13}	U^{12}
U	0.18569(9)	0.02193(11)	-0.00379(6)	0.0283(5)	0.0209(7)	0.0200(7)	0.0441(8)	-0.0002(4)	0.0000(4)	0.0011(4)
Sr*	0.3337(4)	0	0.25	0.0305(9)	0.033(2)	0.0255(17)	0.033(2)	0.0020(14)	0	0
Ca*	0.3337(4)	0	0.25	0.0305(9)	0.033(2)	0.0255(17)	0.033(2)	0.0020(14)	0	0
Ba*	0.3337(4)	0	0.25	0.0305(9)	0.033(2)	0.0255(17)	0.033(2)	0.0020(14)	0	0
V1	0.0298(4)	0.3455(5)	0.0431(2)	0.0274(10)	0.022(2)	0.020(2)	0.040(3)	0.0015(17)	0.0014(19)	0.0002(19)
O1	0.1696(16)	0.058(2)	-0.1080(13)	0.048(5)	0.024(12)	0.034(11)	0.086(16)	-0.021(10)	0.007(9)	-0.002(9)
O2	0.2080(16)	-0.0228(19)	0.1011(13)	0.041(5)	0.009(9)	0.033(11)	0.082(15)	-0.023(9)	0.008(8)	-0.003(8)
O3	-0.0075(15)	0.3552(18)	0.1386(10)	0.033(4)	0.026(10)	0.024(9)	0.049(11)	-0.001(8)	0.001(7)	0.009(8)
O4	-0.0949(15)	0.4351(18)	-0.0219(10)	0.027(4)	0.019(9)	0.010(8)	0.051(11)	0.007(7)	0.005(7)	0.004(7)
O5	-0.0114(15)	0.155(2)	0.0118(10)	0.038(5)	0.021(10)	0.041(11)	0.054(12)	0.000(8)	-0.003(8)	0.004(8)
O6	0.1989(15)	0.2921(17)	0.0339(11)	0.031(4)	0.029(10)	0.008(8)	0.055(11)	0.003(7)	0.000(8)	-0.007(7)
OW1	0.252(2)	0.282(3)	0.2265(14)	0.067(6)	0.058(16)	0.075(16)	0.069(15)	0.000(12)	-0.003(11)	0.014(13)
OW2	0.507(2)	0.183(2)	0.3222(11)	0.055(6)	0.082(16)	0.041(11)	0.043(12)	-0.012(9)	-0.007(10)	-0.022(11)
OW3	0.029(4)	0	0.25	0.088(13)	0.12(4)	0.08(3)	0.07(3)	-0.021(17)	0	0

*Sr site occupancy = 0.50, Ca site occupancy = 0.28, Ba site occupancy = 0.22.

Table S3. Selected bond distances (Å) for finchite from Sulfur Springs Draw.

U–O1	1.776 (17)	Sr–Ow1**	2.555 (17)	V–O3	1.613(17)
U–O2	1.802 (17)	Sr–Ow1	2.555 (17)	V–O5	1.767(16)
U–O4*	2.317 (16)	Sr–O2**	2.732 (17)	V–O6	1.825(17)
U–O5§	2.354 (15)	Sr–O2	2.732 (17)	V–O4	1.868(16)
U–O5	2.361 (15)	Sr–Ow2**	2.669 (18)	V–O4§	1.968(16)
U–O6‡	2.378 (16)	Sr–Ow2	2.669 (18)	<*V–O*>	1.808
U–O6	2.362 (16)	Sr–O3†	2.638 (17)		
<*U–O$_{yl}$*>	1.790	Sr–O3*	2.638 (17)		
<*U–O$_{eq}$*>	2.354	<*Sr–O*>	2.648		

Symmetry transformations used to generate equivalent atoms: (*) *x*-1/2, −*y*-1/2, *z*; (§) −*x*, -*y*, -*z*; (‡) −*x*+1/2, *y*+1/2, −*z*; (**) *x*, -*y*, −*z*+1/2; (†) *x*-1/2, *y*-1/2, -*z*-1/2.

Table S4. Selected bond distances (Å) for finchite from the Pandora mine.

U–O1	1.74 (2)	Sr–Ow1**	2.58 (2)	V–O3	1.612(17)
U–O2	1.77 (2)	Sr–Ow1	2.58 (2)	V–O5	1.761(19)
U–O4*	2.328(15)	Sr–O2**	2.77 (2)	V–O6	1.821(16)
U–O5§	2.351 (14)	Sr–O2	2.77 (2)	V–O4	1.844(16)
U–O5	2.354 (16)	Sr–Ow2**	2.658 (18)	V–O4§	2.021(16)
U–O6‡	2.351 (14)	Sr–Ow2	2.658 (18)	<*V–O*>	1.812
U–O6	2.391 (15)	Sr–O3†	2.752 (16)		
<*U–O$_{yl}$*>	1.755	Sr–O3*	2.752 (16)		
<*U–O$_{eq}$*>	2.355	<*Sr/Ba–O*>	2.69		

Symmetry transformations used to generate equivalent atoms: (*) *x*-1/2, −*y*-1/2, *z*; (§) −*x*, -*y*, -*z*; (‡) −*x*+1/2, *y*+1/2, −*z*; (**) *x*, -*y*, −*z*+1/2; (†) *x*-1/2, *y*-1/2, -*z*-1/2.

Table S5. Bond valence analysis for Sulfur Springs finchite. Values are expressed in valence units.

Atom	O1	O2	O3	O4	O5	O6	Ow1	Ow2	Ow3	Σ_{cat}
U	1.77	1.67		0.56	0.51 × 2→↓	0.51 × 2→↓				**6.04**
Sr		0.20 × 2→	0.24 × 2→				0.29 × 2→	0.23 × 2→		**1.92**
V			1.62	0.65 0.84	1.09	0.93				**5.13**
Σ_{an}	**1.77**	**1.87**	**1.86**	**2.05**	**2.11**	**1.95**	**0.29**	**0.23**	**0.00**	

*All bond valence parameters are from Gagné and Hawthorne (2015).

Table S6. Bond valence analysis for Pandora mine finchite. Values are expressed in valence units.

Atom	O1	O2	O3	O4	O5	O6	Ow1	Ow2	Ow3	Σ_{cat}
U	1.91	1.79		0.55	0.52 × 2→↓	0.50 × 2→↓				**6.29**
Sr/Ba		0.20 × 2→	0.21 × 2→				0.31 × 2→	0.26 × 2→		**1.98**
V			1.64	0.56 0.88	1.09	0.96				**5.13**
Σ_{an}	**1.91**	**1.99**	**1.85**	**1.99**	**2.13**	**1.96**	**0.31**	**0.26**	**0.00**	

*All bond valence parameters are from Gagné and Hawthorne (2015). Sr–O and Ba–O valence sums have been scaled according to occupancy.

Table S7. Powder X-ray diffraction data (d in Å) for finchite from the Pandora mine.

I_{obs}	d_{obs}	d_{calc}	I_{calc}	hkl
100	8.19	8.1880	100	0 0 2
14	6.48	6.5939	1	1 1 0
4	6.08	6.1167	5	1 1 1
		5.9079	2	0 1 2
21	5.14	5.1949	8	2 0 0
		5.1357	16	1 1 2
		4.9517	2	2 0 1
6	4.354	4.3865	6	2 0 2
		4.2828	3	2 1 1
32	4.249	4.2663	23	0 2 0
		4.2048	7	1 1 3
39	4.093	4.0940	36	0 0 4
		3.9012	1	2 1 2
		3.8367	3	1 2 1
19	3.790	3.7835	15	0 2 2
		3.7631	2	2 0 3
5	3.622	3.6911	2	0 1 4
10	3.504	3.5551	2	1 2 2
		3.4781	3	1 1 4
		3.4432	1	2 1 3
19	3.292	3.2970	16	2 2 0
		3.2321	2	2 2 1
33	3.205	3.2155	8	2 0 4
		3.2090	16	3 1 0
		3.1982	2	1 2 3
22	3.082	3.0584	15	2 2 2
		3.0089	2	2 1 4
58	2.987	2.9877	47	3 1 2
8	2.898	2.9539	16	0 2 4
		2.8413	1	1 2 4
		2.7664	1	3 1 3
12	2.731	2.7433	5	1 3 0
		2.7293	4	0 0 6
		2.7056	2	1 3 1
5	2.614	2.6012	7	1 3 2
12	2.577	2.5975	1	4 0 0
		2.5678	7	2 2 4
		2.5654	1	4 0 1
8	2.525	2.5256	5	3 1 4
		2.5218	4	1 1 6
4	2.458	2.4663	1	2 3 1
		2.4511	1	1 3 3
		2.4162	1	2 0 6
		2.3865	1	2 3 2
		2.3236	1	2 2 5
2	2.302	2.2991	3	0 2 6
		2.2790	1	1 3 4
		2.2690	1	2 3 3
		2.2186	1	4 2 0
5	2.201	2.2048	3	1 1 7
		2.1980	2	3 3 0
7	2.137	2.1332	3	0 4 0
17	2.117	2.1228	15	3 3 2
		2.1024	5	2 2 6
21	2.074	2.0791	13	3 1 6
		2.0728	5	1 4 1
		2.0642	1	0 4 2
10	2.031	2.0470	4	0 0 8
		2.0351	1	4 0 5
6	1.9964	2.0190	4	5 1 0
		2.0124	1	1 2 7
24	1.9605	1.9733	6	2 4 0
		1.9602	10	5 1 2
		1.9550	2	1 1 8
		1.9515	4	1 4 3
12	1.9264	1.9365	3	3 3 4
		1.9348	2	1 3 6
		1.9183	4	2 4 2
12	1.8968	1.9045	5	2 0 8
		1.8918	4	0 4 4
		1.8561	1	5 2 1
9	1.8472	1.8456	7	0 2 8
		1.8368	1	4 2 5
6	1.8121	1.8107	5	5 1 4
		1.8095	1	4 3 3
6	1.7708	1.7801	1	1 3 7
		1.7776	4	2 4 4
		1.7616	2	1 4 5
7	1.7342	1.7391	3	2 2 8
		1.7316	2	6 0 0
		1.7258	3	3 1 8
8	1.7097	1.7119	6	3 3 6
		1.6942	1	6 0 2
		1.6902	1	2 4 5
		1.6880	1	6 1 1
7	1.6785	1.6807	1	0 4 6
		1.6779	3	5 3 0
9	1.6448	1.6551	1	4 3 5
		1.6494	1	1 5 2
		1.6437	5	5 3 2
		1.6376	1	0 0 10
6	1.6156	1.6231	4	5 1 6
		1.6134	1	2 5 1
		1.6045	2	6 2 0
6	1.5930	1.6038	1	5 3 3
		1.5991	1	2 4 6
		1.5948	2	6 0 4
		1.5931	1	2 2 9
		1.5893	2	1 1 10
		1.5746	1	6 2 2
4	1.5559	1.5618	1	2 0 10
		1.5584	1	1 4 7
		1.5542	1	2 5 3
		1.5525	2	5 3 4
		1.5308	1	3 5 0
		1.5288	2	0 2 10
7	1.4990	1.5047	3	3 5 2
		1.4980	2	3 3 8
		1.4939	3	6 2 4
4	1.4717	1.4832	1	4 3 7
		1.4770	2	0 4 8
		1.4666	1	2 2 10
		1.4622	1	6 0 6
4	1.4532	1.4586	4	3 1 10
		1.4530	1	2 5 5
		1.4522	1	1 1 11
		1.4374	3	5 1 8
		1.4338	1	3 5 4
7	1.4273	1.4294	2	5 3 6
		1.4221	1	0 6 0
		1.4209	3	4 5 1
2	1.4062	1.4069	1	4 2 9
		1.4038	1	1 6 1
		1.4011	1	0 6 2
2	1.3738	1.3799	2	4 5 3
		1.3722	1	1 4 9
		1.3643	2	1 6 3

Table S8. Calculated powder X-ray data (d in Å) for finchite. Only lines with $I \geq 2$ are listed.

h	k	l	d_{meas}(Å)	I/I$_{max}$	h	k	l	d$_{meas}$(Å)	I/I$_{max}$
0	**0**	**2**	**8.13**	**75.34**	1	1	6	2.50	6.51
0	2	0	5.18	15.25	3	2	1	2.46	2.84
1	1	2	5.11	7.70	0	2	6	2.40	6.84
0	2	2	4.37	10.55	2	2	5	2.31	2.56
2	**0**	**0**	**4.25**	**63.89**	2	0	6	2.28	17.40
1	1	3	4.18	3.14	2	4	0	2.21	5.53
0	**0**	**4**	**4.06**	**100.00**	3	3	0	2.19	10.70
2	1	1	3.82	2.87	1	1	7	2.19	4.94
2	0	2	3.77	31.00	4	0	0	2.12	35.89
1	0	4	3.67	2.29	0	2	7	2.12	3.18
1	1	4	3.46	3.23	**3**	**3**	**2**	**2.11**	**47.74**
2	2	0	3.29	34.66	2	2	6	2.09	15.34
2	2	1	3.22	2.27	1	3	6	2.07	43.63
1	**3**	**0**	**3.20**	**44.95**	4	1	1	2.06	15.85
0	2	4	3.20	19.74	4	0	2	2.06	8.15
2	1	3	3.18	2.23	**0**	**0**	**8**	**2.03**	**54.63**
2	2	2	3.05	24.08	0	4	5	2.03	4.37
1	2	4	2.99	2.63	1	5	0	2.01	33.65
1	**3**	**2**	**2.98**	**68.01**	2	1	7	2.00	3.60
2	**0**	**4**	**2.94**	**47.38**	4	2	0	1.97	41.58
3	1	0	2.73	16.18	1	5	2	1.95	37.49
0	0	6	2.71	31.97	4	1	3	1.94	12.08
3	1	1	2.69	2.57	2	4	4	1.94	2.34
0	4	0	2.59	3.69	1	1	8	1.94	6.10
3	1	2	2.59	10.40	3	3	4	1.93	15.08
1	0	6	2.58	2.87	3	1	6	1.92	6.05
0	4	1	2.56	2.27	4	2	2	1.91	17.78
2	2	4	2.55	14.71	3	4	1	1.90	6.01
1	3	4	2.51	12.85	0	2	8	1.89	25.58
2	1	5	2.50	2.05	4	0	4	1.88	38.08

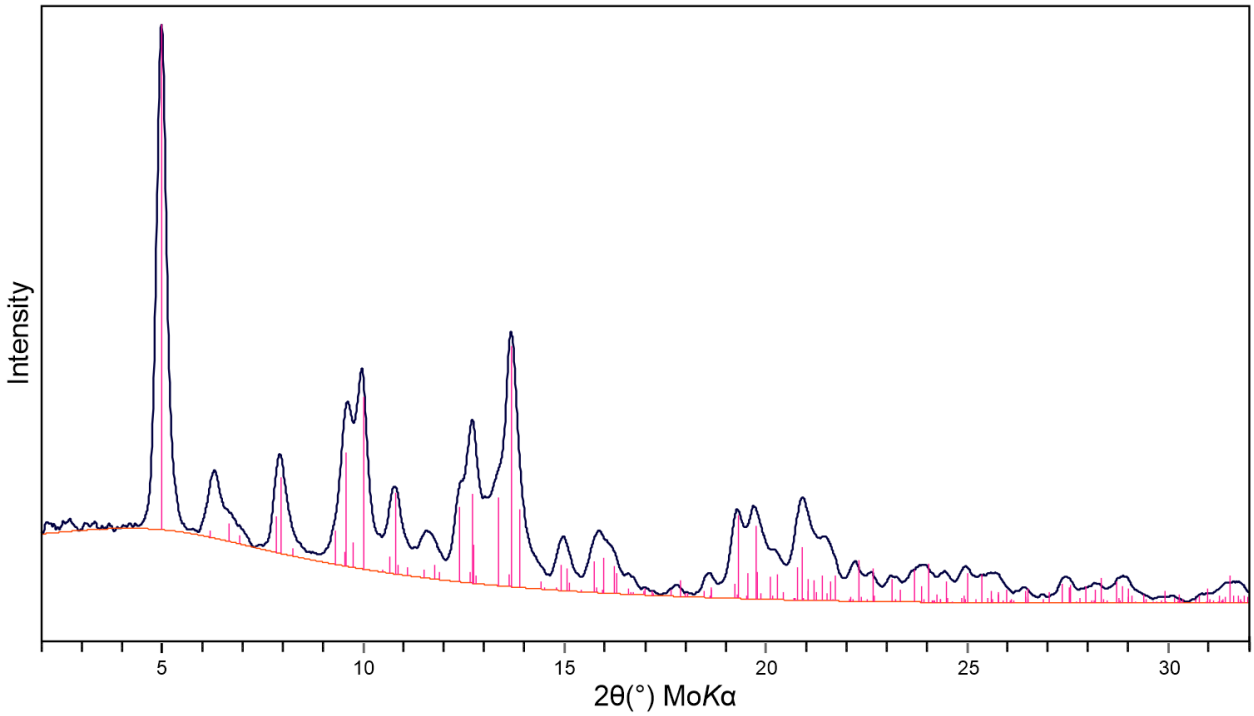

Figure S1. Simulated powder diffraction data for finchite from Sulfur Springs Draw compared with experimental diffraction data collected for Pandora finchite.