Mild Hydrothermal Crystal Growth, Structure, and Magnetic Properties of Ternary U(IV) Containing Fluorides; $LiUF_5$, KU_2F_9, $K_7U_6F_{31}$, $RbUF_5$, RbU_2F_9, and RbU_3F_{13}

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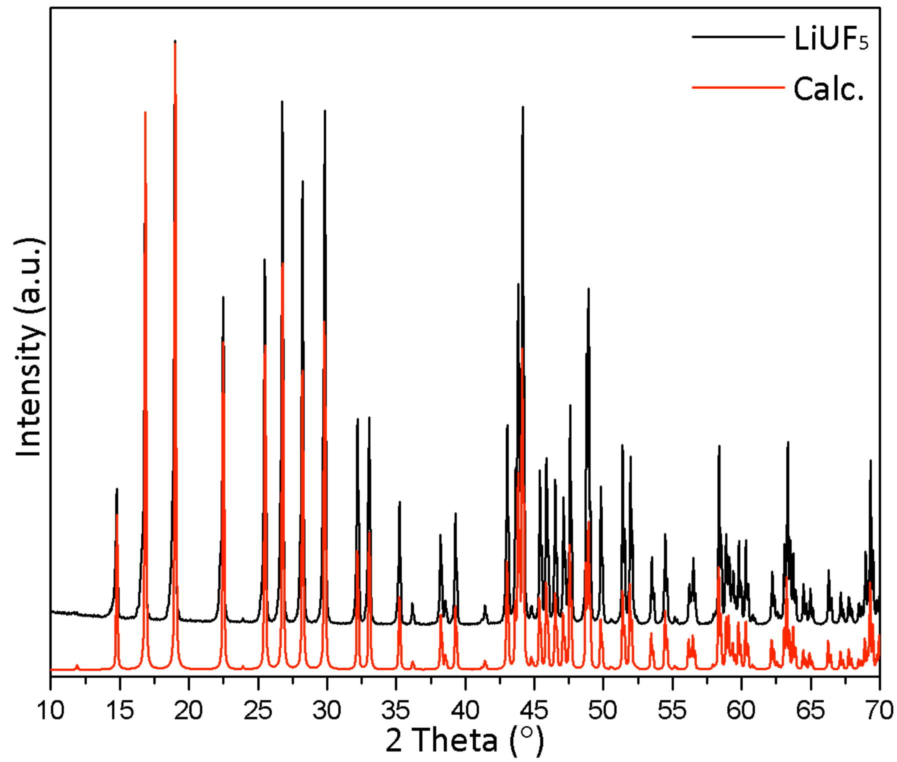
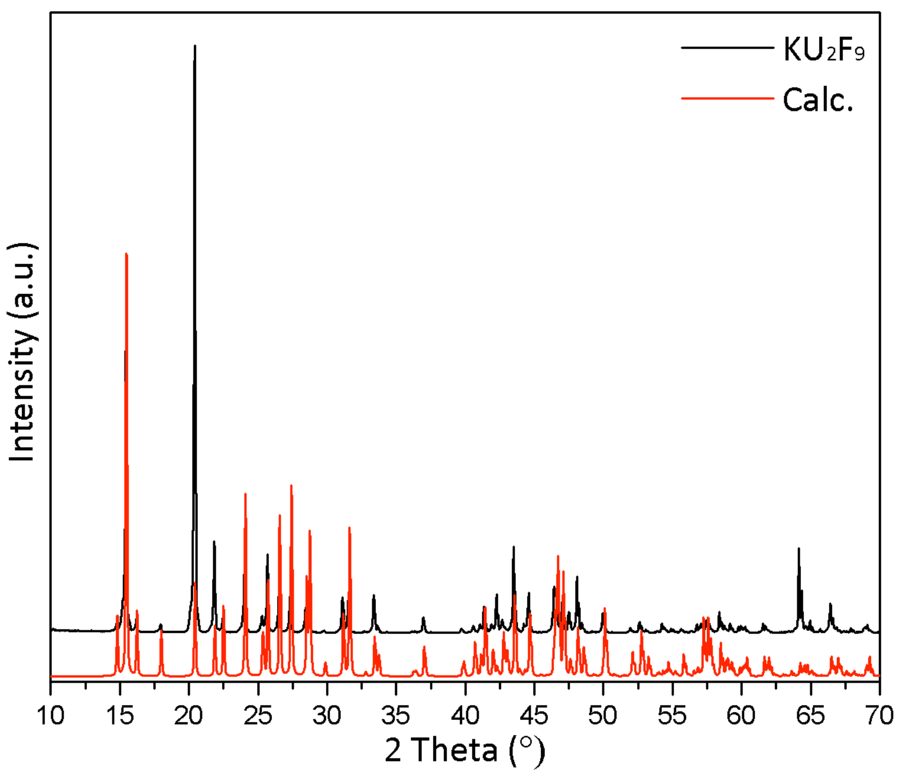
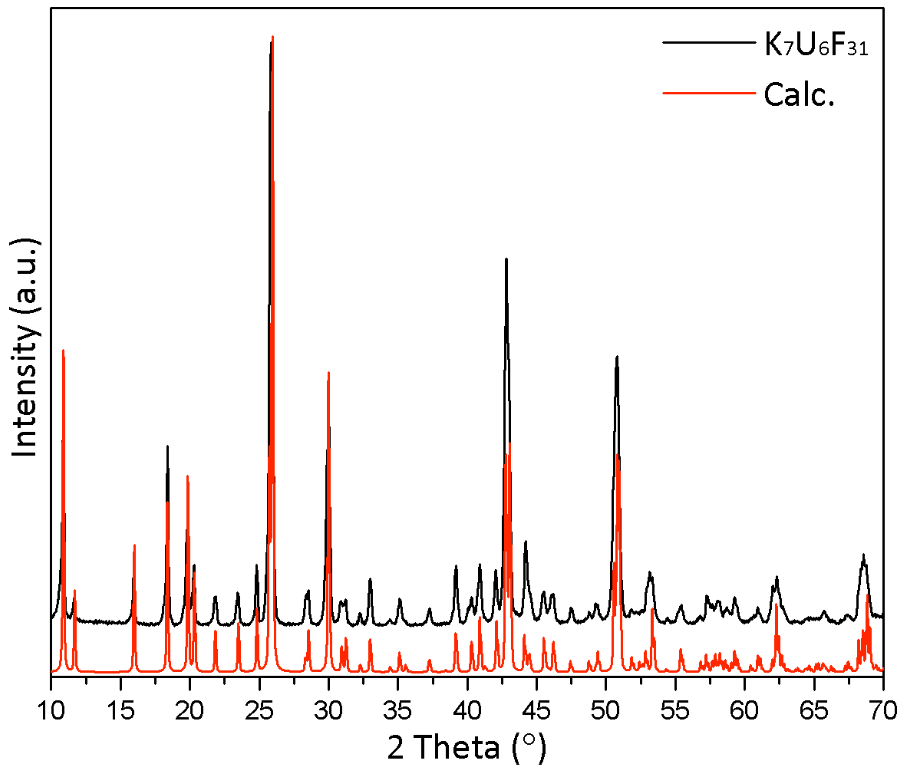
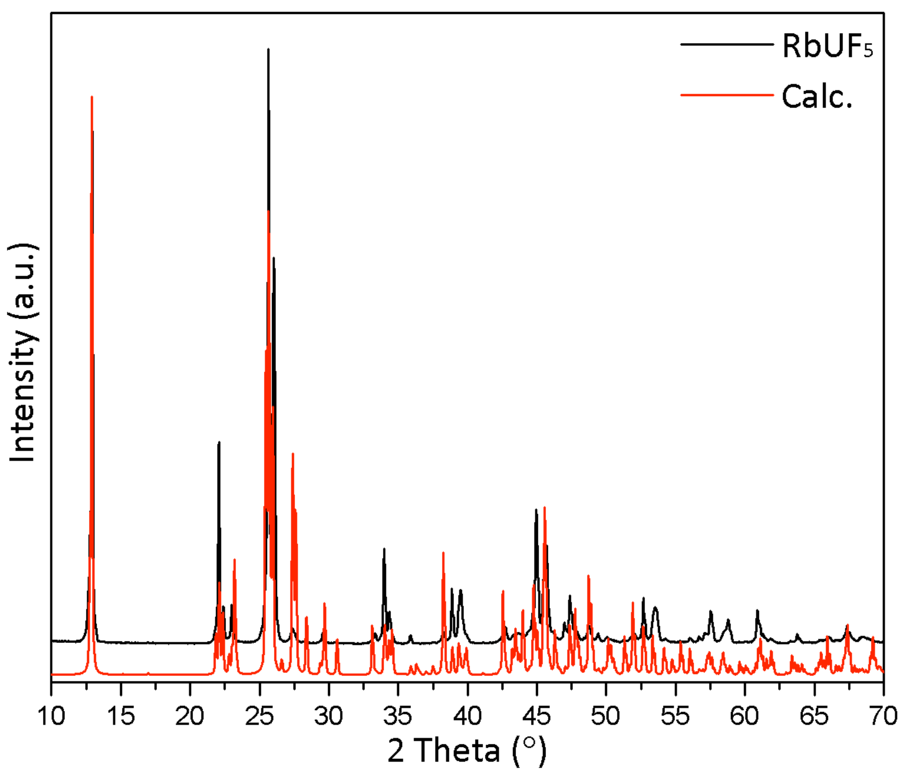
Figure S1. The experimental and calculated powder X-ray diffraction data for $LiUF_5$, KU_2F_9, $K_7U_6F_{31}$, $RbUF_5$, and RbU_3F_{13}.







$K_7U_6F_{31}$
Calc.
Intensity (a.u.)
10 15 20 25 30 35 40 45 50 55 60 65 70
2 Theta (°)



$RbUF_5$
Calc.
Intensity (a.u.)
10 15 20 25 30 35 40 45 50 55 60 65 70
2 Theta (°)

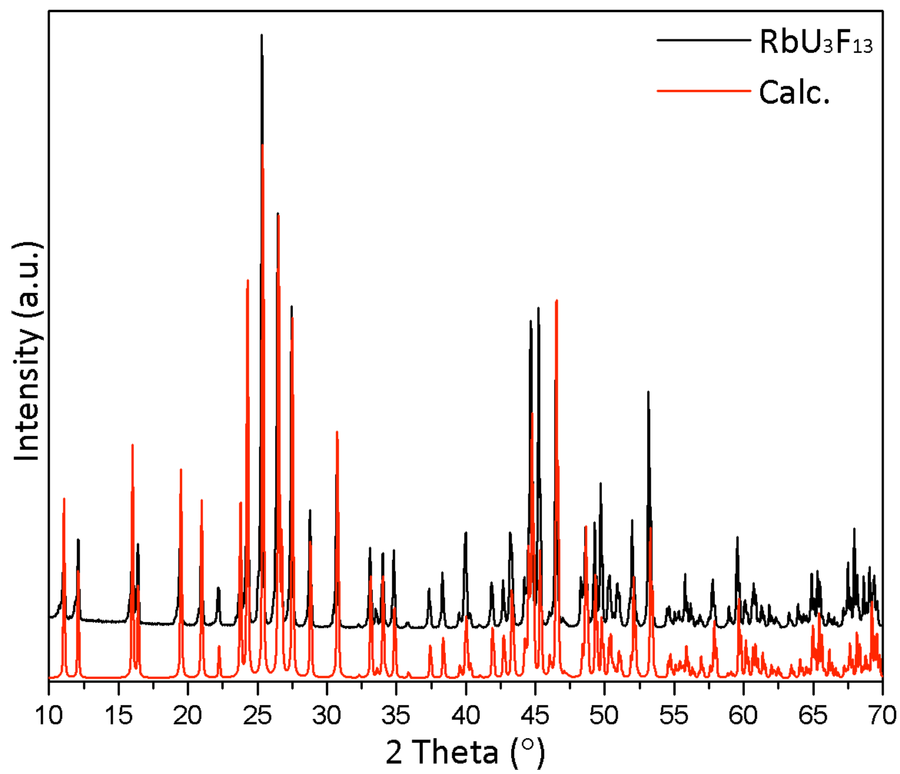

RbU3F13
Calc.
Intensity (a.u.)
2 Theta (°)
10
15
20
25
30
35
40
45
50
55
60
65
70

Figure S2. Temperature dependence of the molar inverse susceptibility data for $LiUF_5$, KU_2F_9, $K_7U_6F_{31}$, $RbUF_5$, and RbU_3F_{13}, measured in an applied field of 1000 Oe.

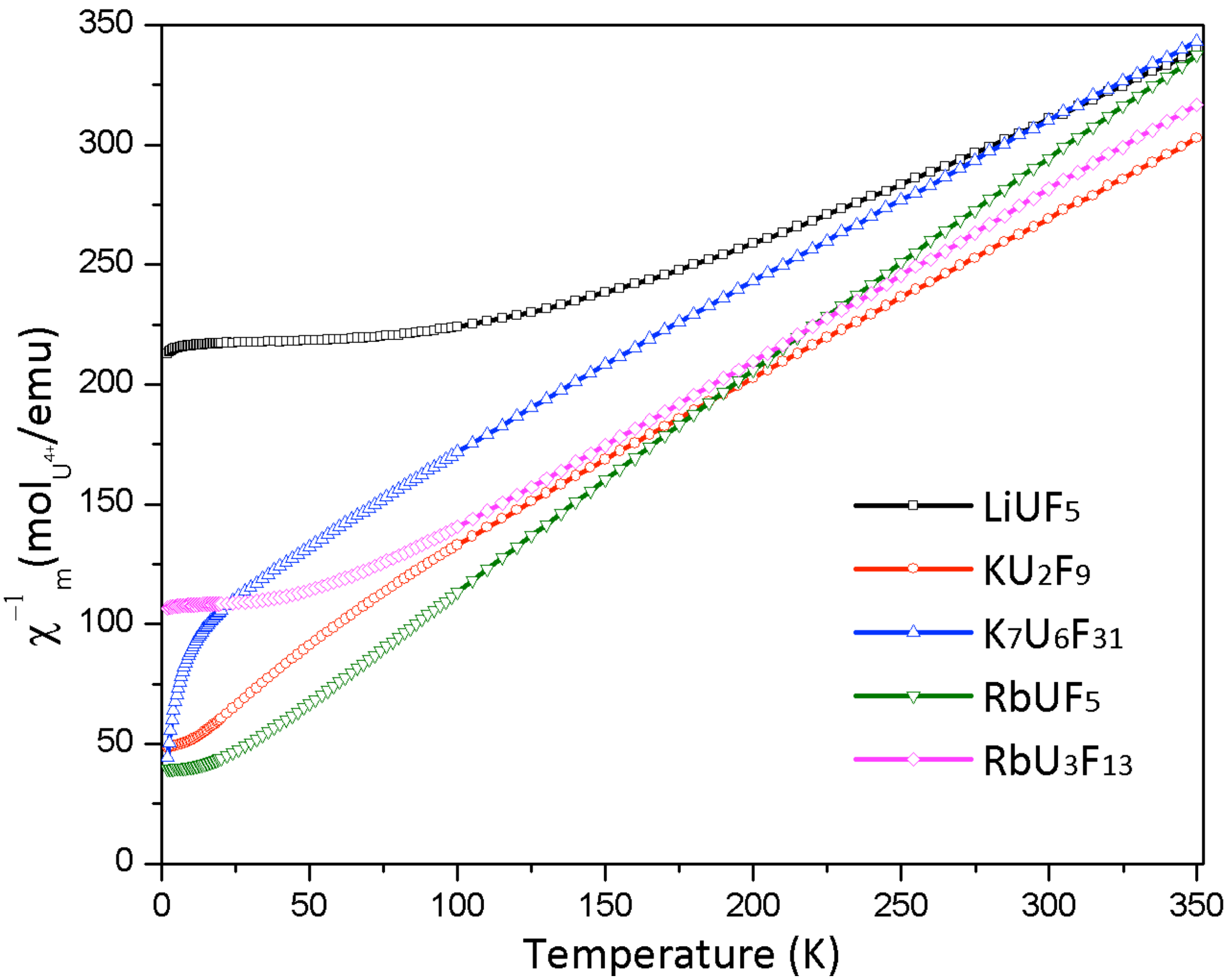


Figure S3. Field dependence of the magnetization for $LiUF_5$, KU_2F_9, $K_7U_6F_{31}$, $RbUF_5$, and RbU_3F_{13}.

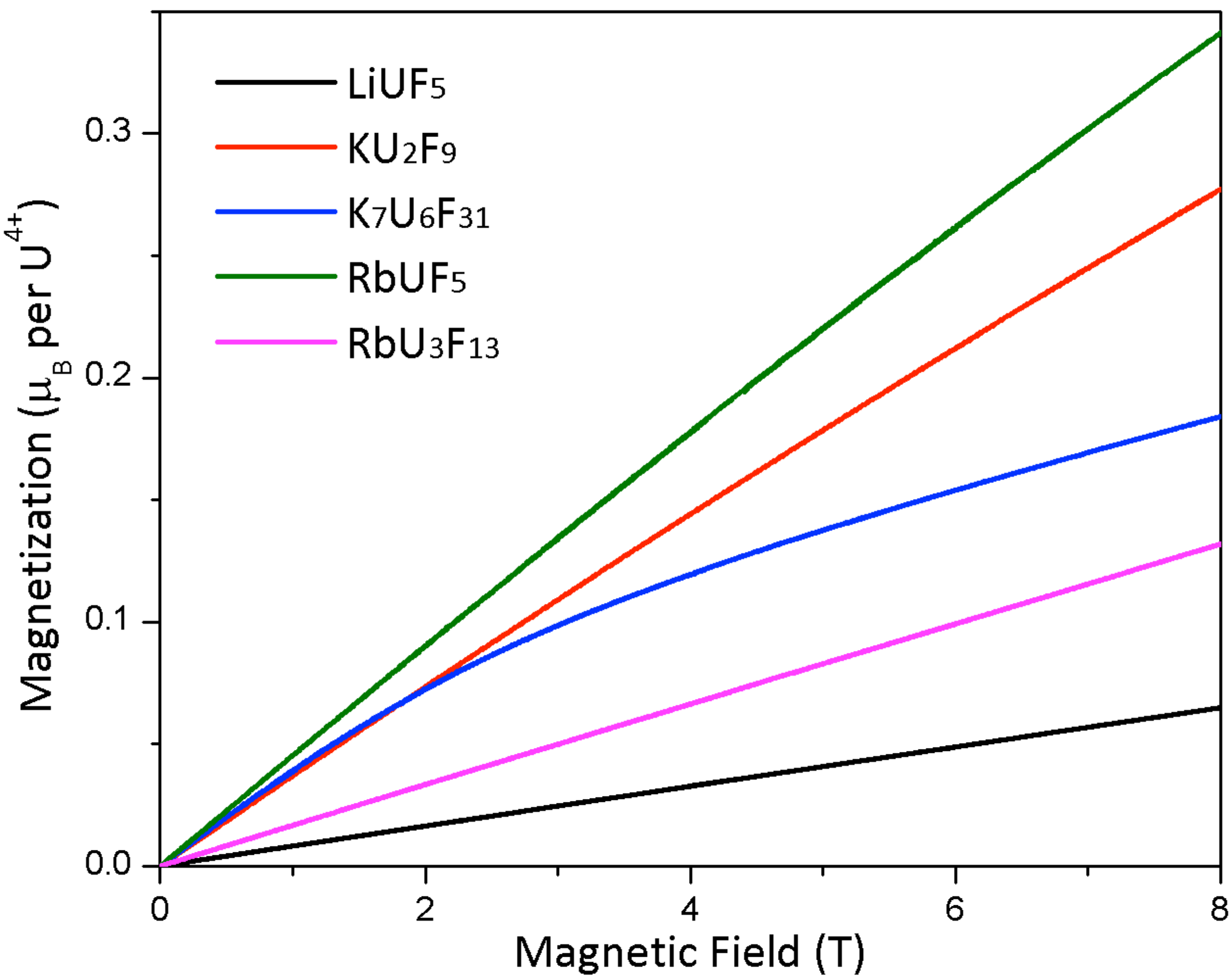


Figure S4. $\chi_m T$ vs T data for $LiUF_5$, KU_2F_9, $K_7U_6F_{31}$, $RbUF_5$, and RbU_3F_{13}, measured in an applied field of 1000 Oe.

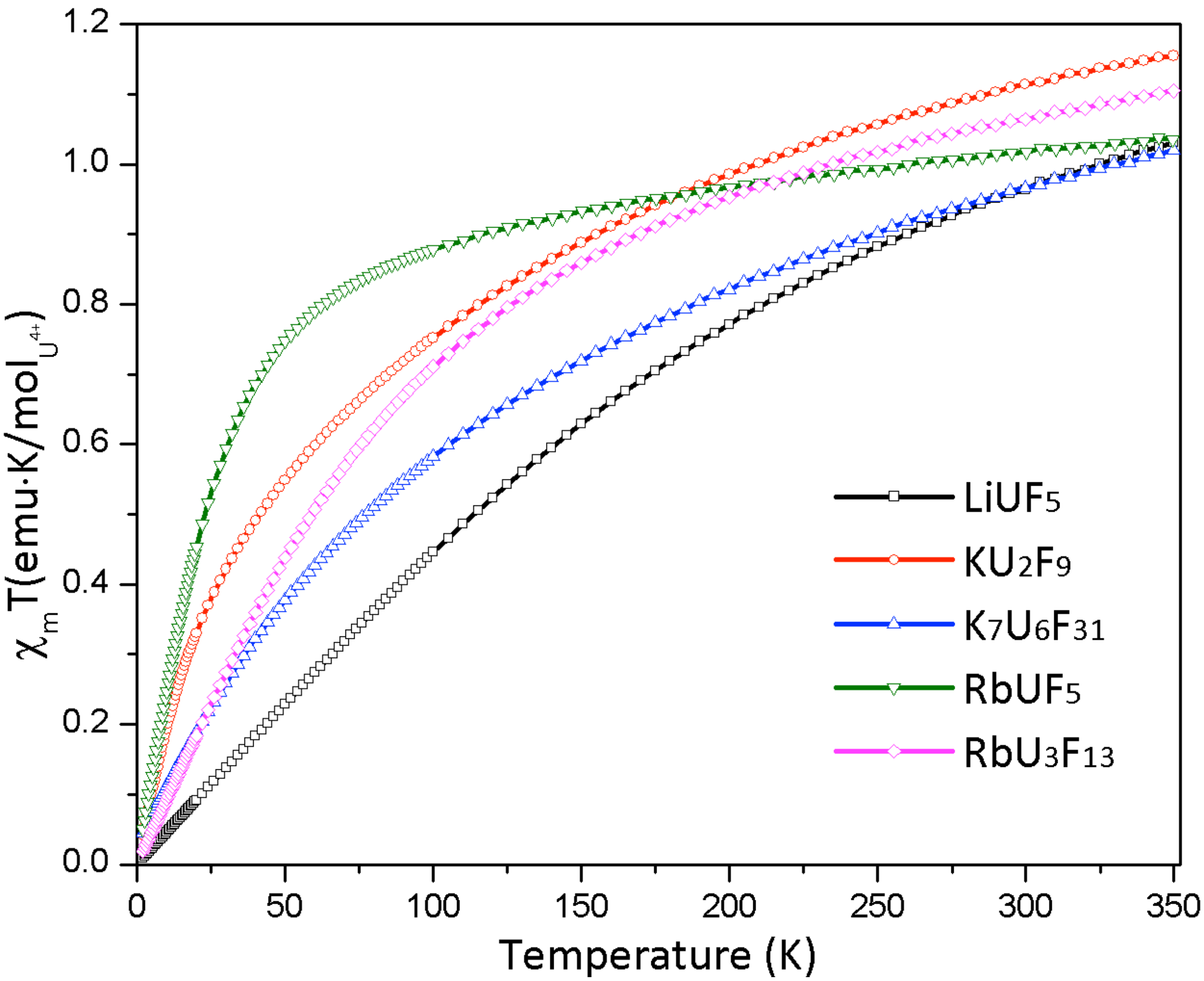


Table S1. The brief information of the known U(IV) fluorides that were structurally characterized.

	Structure			Product	Year
	Space group	Dimension	Connectivity between UF_x polyhedra		
$LiUF_5$	$I4_1/a$	3-D	corner- and edge-shared UF_9	single crystal	1966
Li_4UF_8	*Pnma*	0-D	isolated UF_8	single crystal	1967
β2-Na_2UF_6	*P*321	1-D	face-shared UF_9	powder	1948
δ-Na_2UF_6	*P*3	2-D	edge-shared UF_9	single crystal	1979
γ-Na_2UF_6	*Immm*	1-D	edge-shared UF_8	powder	1948
Na_3UF_7	*I*4/*mmm*	0-D	isolated UF_8	single crystal	1948
KU_2F_9	*Pnma*	3-D	corner- and edge-shared UF_9	single crystal	1969
β1-K_2UF_6	$P\bar{6}2m$	1-D	face-shared UF_9	single crystal	1969
β2-K_2UF_6	*P*321	1-D	face-shared UF_9	powder	1948
Lt-K_3UF_7	$I4_1/a$	0-D	isolated UF_7	powder	1954
Ht-K_3UF_7	$Fm\bar{3}m$	0-D	unusual isolated UFx	powder	1954
$K_7U_6F_{31}$	N/A			powder	1996
$RbUF_5$	N/A			powder	1996
Rb_2UF_6	*Cmcm*	1-D	edge-shared UF_8	single crystal	1971
CsU_2F_9	*C*2/*c*	2-D	corner- and edge-shared UF_9	single crystal	1973
CsU_6F_{25}	$P6_3/mmc$	3-D	corner- and edge-shared UF_9	single crystal	1971
$TlUF_5$	$P2_1/c$	2-D	corner-, edge-, and face-shared UF_9	single crystal	1980
U_2AuF_{11}	*I*4/*mcm*	3-D	corner-shared UF_9	single crystal	2004
$(NH_4)_4UF_8$	*C*2/*c*	0-D	isolated UF_8	single crystal	1970
$(NH_4)_7U_6F_{31}$	$R\bar{3}$	3-D	corner- and edge-shared UF_8	single crystal	2001
$(NH_4)U_3F_{13}$	$Pm2_1b$	3-D	corner- and edge-shared UF_9	single crystal	2001
β -$(NH_4)UF_5$	$P2_1/c$	2-D	corner- and edge-shared UF_9	single crystal	1974

Table S2. Atomic coordinates (×10^4) and equivalent isotropic displacement parameters (Å^2×10^3) for $LiUF_5$, KU_2F_9, $K_7U_6F_{31}$, $RbUF_5$, RbU_2F_9 and RbU_3F_{13}. *U(eq)* is defined as one third of the trace of the orthogonalized U_{ij} tensor.

	x	y	z	U(eq)
		$LiUF_5$		
U(1)	619(1)	562(1)	2480(1)	5(1)
F(1)	3018(2)	2128(2)	1259(6)	7(1)
F(2)	4272(2)	422(2)	41(6)	10(1)
F(3)	1075(2)	1832(2)	750(5)	6(1)
F(4)	2036(2)	929(2)	3614(6)	7(1)
F(5)	484(2)	1696(2)	4799(5)	7(1)
Li(1)	4164(8)	1853(8)	220(18)	14(2)
		KU_2F_9		
U1	3257.7(2)	4496.7(1)	1532.0(2)	9.24(6)
K1	4659(2)	2500	6407(2)	15.3(2)
F1	4963(3)	5990(2)	761(4)	13.2(4)
F2	2910(3)	4040(2)	4712(4)	12.4(4)
F3	2835(3)	6070(2)	3553(3)	13.6(5)
F4	656(3)	4199(3)	1973(4)	13.8(4)
F5	3258(4)	2500	1622(5)	11.3(7)
		$K_7U_6F_{31}$		
U1	4693.2(2)	6144.2(2)	4895.9(3)	16.8(1)
K1	4176(1)	4381(1)	1625(2)	23.6(4)
K2	3333	6667	1667	29.8(9)
F1	4261(3)	4473(3)	4257(4)	18.7(9)
F2	4611(4)	6126(3)	2797(5)	25(1)
F3	4597(5)	7577(4)	4447(6)	37(1)
F4	6249(3)	7219(4)	4274(5)	22.8(9)
F5	3796(4)	5068(4)	6622(5)	29(1)
F6 (occ. = 1/6)	3310(140)	6460(80)	6010(30)	77(18)

		$RbUF_5$		
U1	546.0(3)	2468.9(2)	5412.5(3)	12.7(6)
U2	4846.2(3)	2456.7(1)	4110.8(3)	13.45(7)
Rb1	2697.3(9)	5197.2(5)	7702.9(9)	25.8(2)
Rb2	2188.1(9)	5191.7(5)	2927.7(9)	27.2(2)
F1	3234(5)	3184(3)	6475(5)	20.8(8)
F2	180(6)	4007(3)	4946(6)	31(1)
F3	-2301(5)	2651(4)	4767(5)	30.8(1)
F4	-283(5)	1026(3)	5818(5)	25.8(9)
F5	-308(5)	1958(3)	2734(5)	25.7(9)
F6	2728(5)	1493(3)	4870(5)	19.8(8)
F7	2132(5)	3114(3)	3143(5)	20.5(8)
F8	5194(5)	4009(3)	4399(5)	26.6(9)
F9	5657(5)	975(3)	3888(5)	25.6(9)
F10	5797(5)	2094(3)	6820(5)	24.3(9)
		RbU_2F_9		
U1	3250.6(2)	4484.5(2)	1496.5(2)	5.50(8)
Rb1	4671.3(9)	2500	6345(1)	8.9(1)
F1	4935(4)	5967(3)	719(5)	9.6(6)
F2	2871(4)	4067(3)	4650(5)	8.5(5)
F3	2783(4)	6046(3)	3506(4)	9.0(6)
F4	646(4)	4219(3)	1941(5)	10.2(6)
F5	3237(5)	2500	1596(6)	7.5(8)

		RbU_3F_{13}		
U1	2528.1(4)	1044.1(3)	1273.0(7)	5.55(9)
U2	0	3908.1(5)	4637.0(7)	5.3(1)
Rb1	5000	6057.9(2)	2653.9(2)	12.4(3)
F1	1723(8)	1948(7)	5966(6)	9(1)
F2	1958(9)	3898(7)	52(8)	10(1)
F3	2581(6)	3224(8)	3176(8)	10(1)
F4	3018(7)	-486(8)	3665(6)	8(1)
F5	5000	-608(13)	1146(10)	11(1)
F6	5000	2725(11)	896(10)	9(1)
F7	0	979(11)	0(11)	10(2)
F8	0	1380(11)	2833(9)	6(1)
F9	0	5307(11)	2275(11)	10(2)