

Self-Assembly of a Family of Isopolytungstates Induced by the Synergistic Effect of the Nature of Lanthanoids and the pH Variation in the Reaction Process: Syntheses, Structures and Properties

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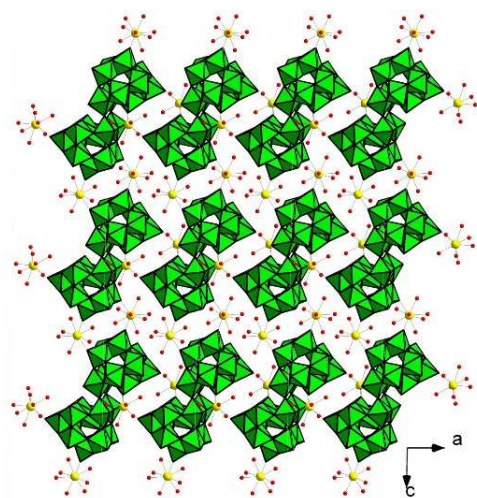


Figure S1. The two-dimensional sheet of 3.

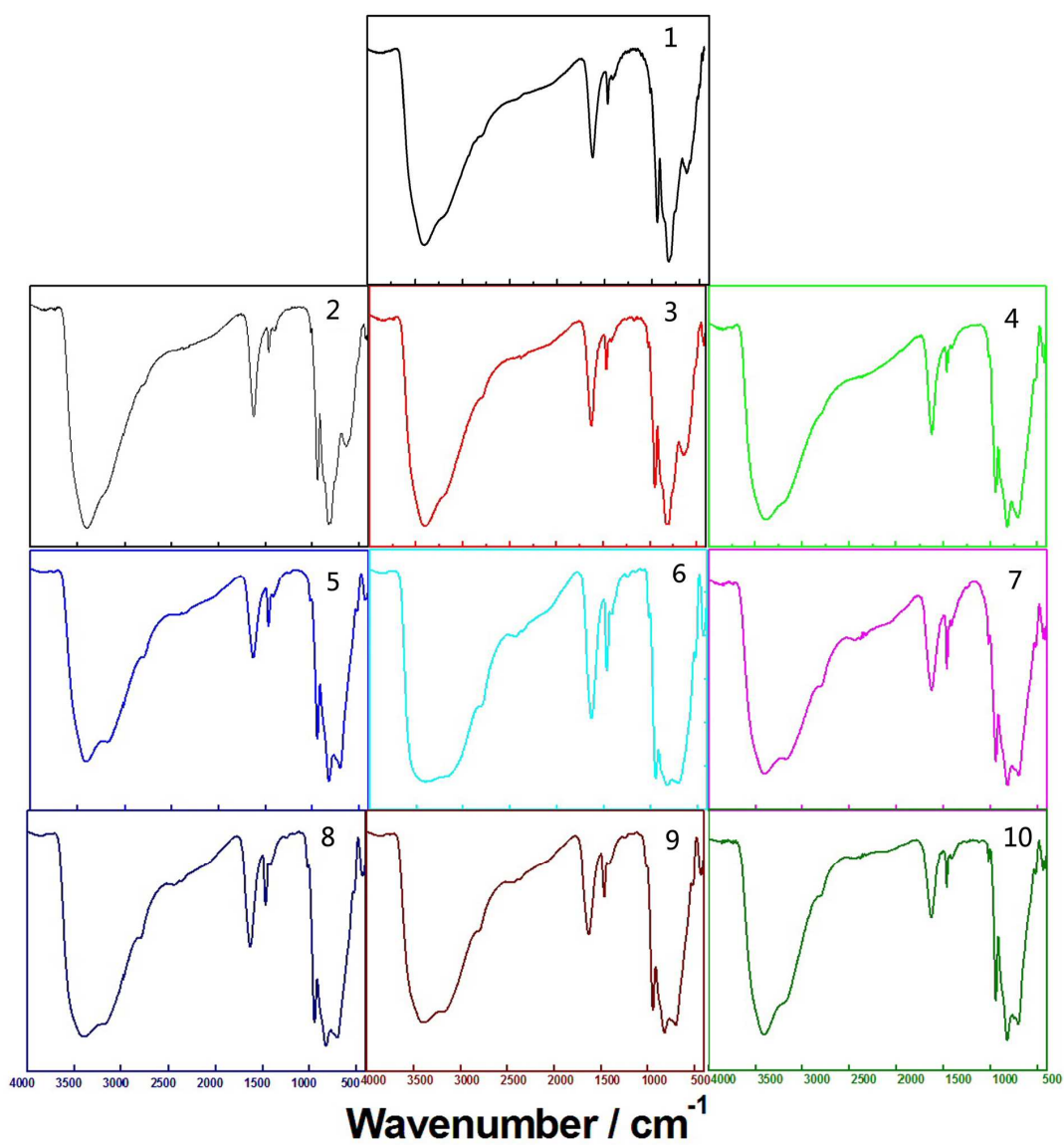


Figure S2. IR spectra of 1–10.

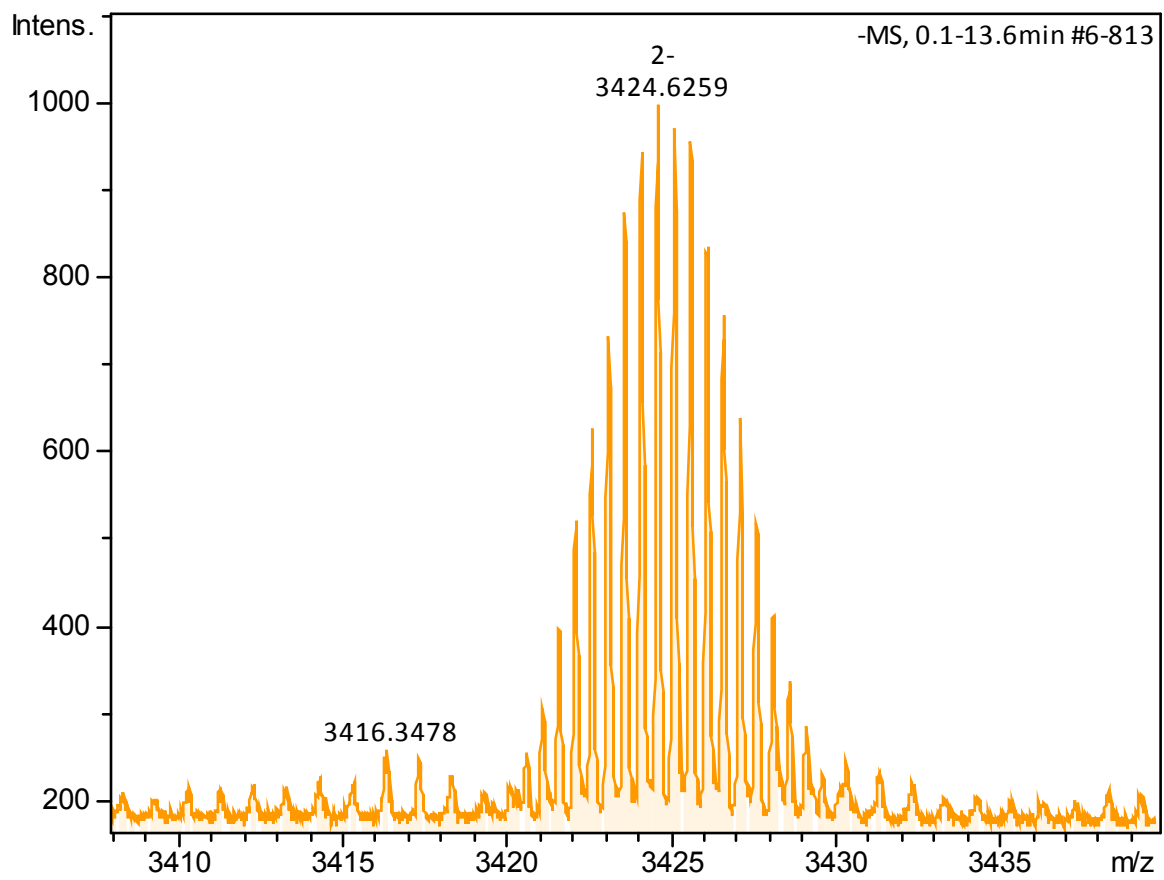


Figure S3. The ESI-MS spectrum of **3**.

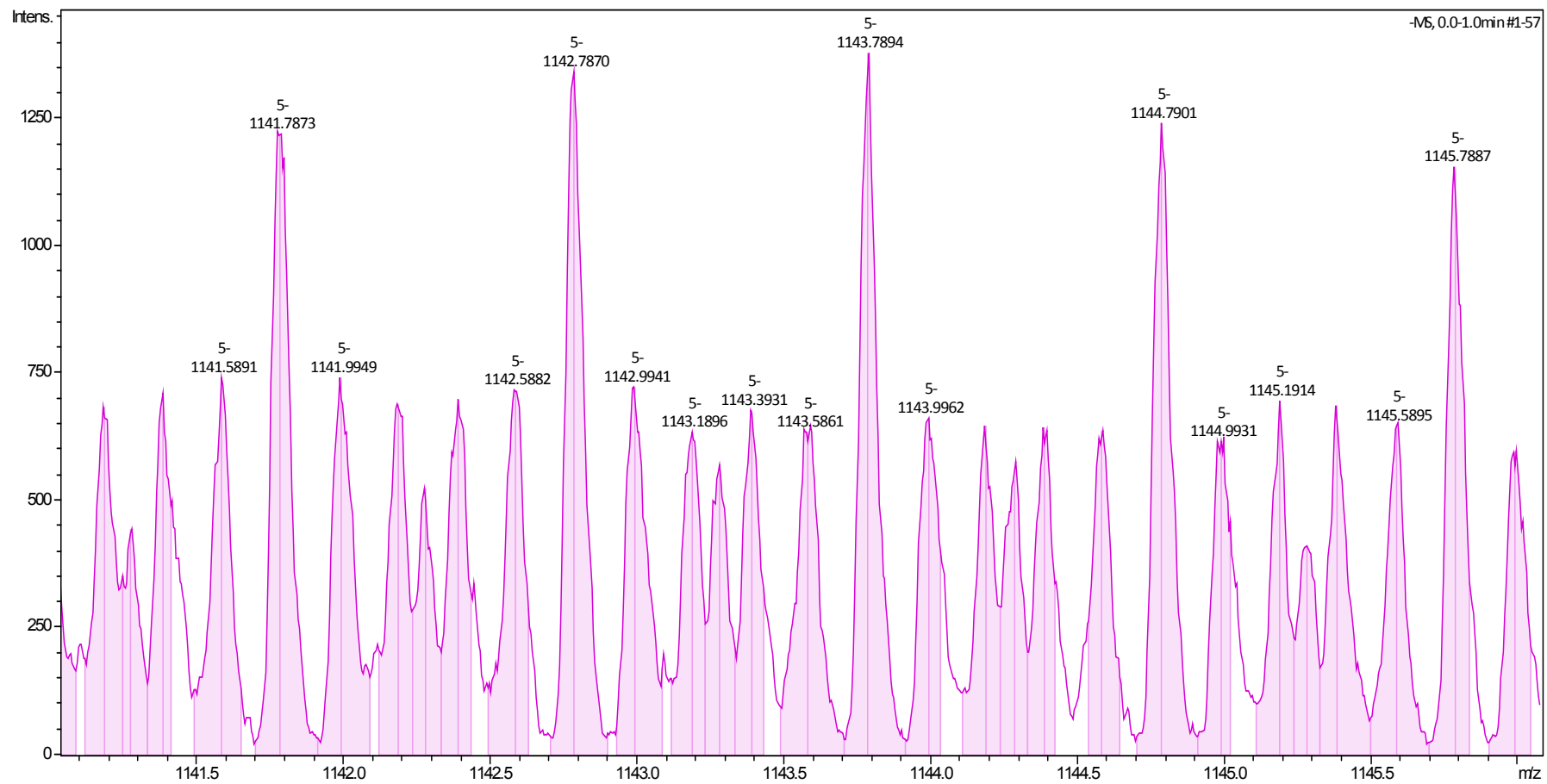


Figure S4. The ESI-MS spectrum of **4**.

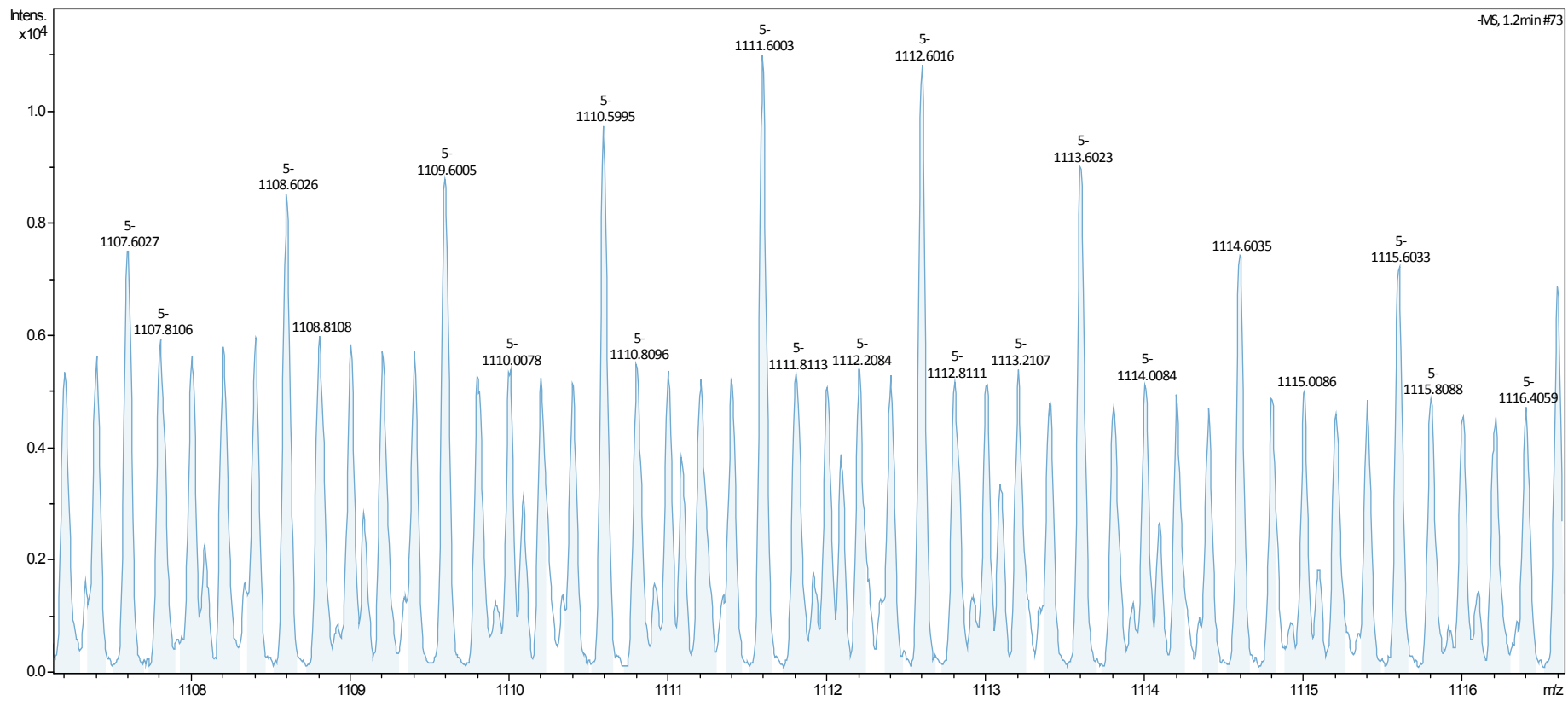


Figure S5. The ESI-MS spectrum of 9.

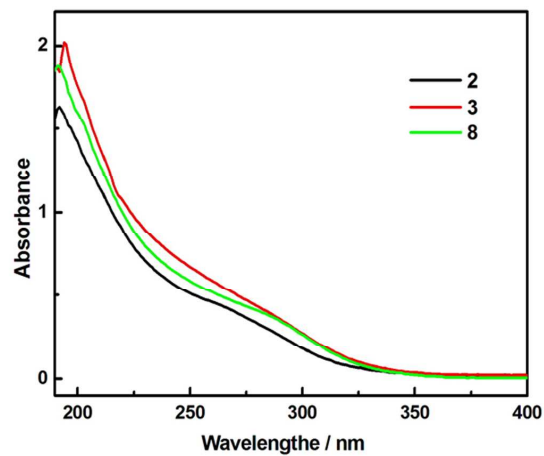


Figure S6. The UV spectra of 2, 3 and 8.

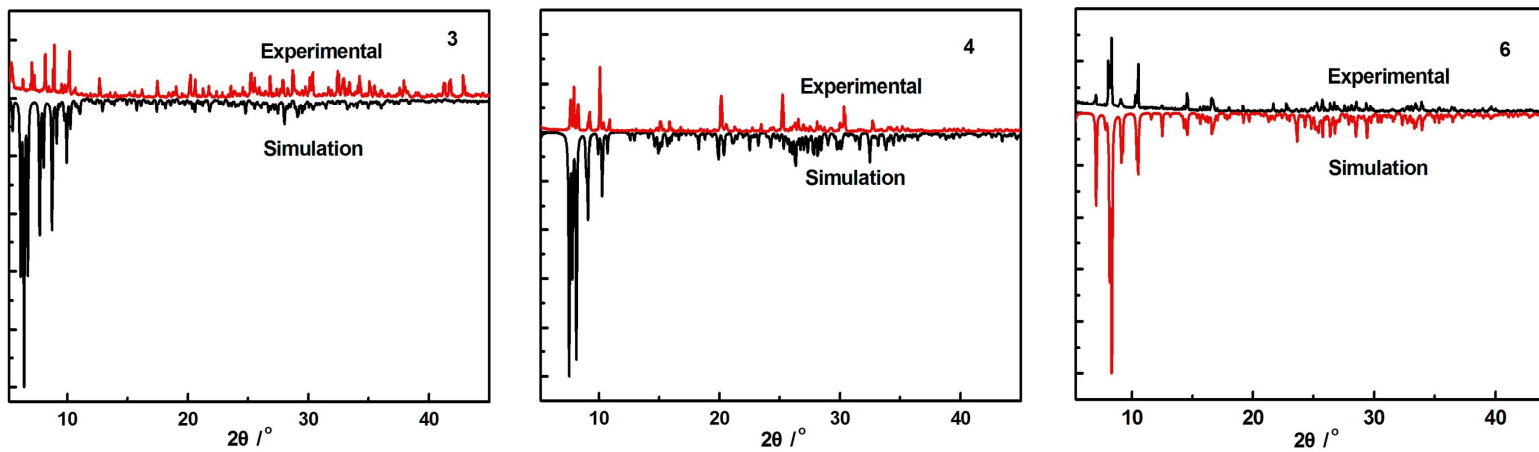


Figure S7. The PXRD patterns of 3, 4 and 6.

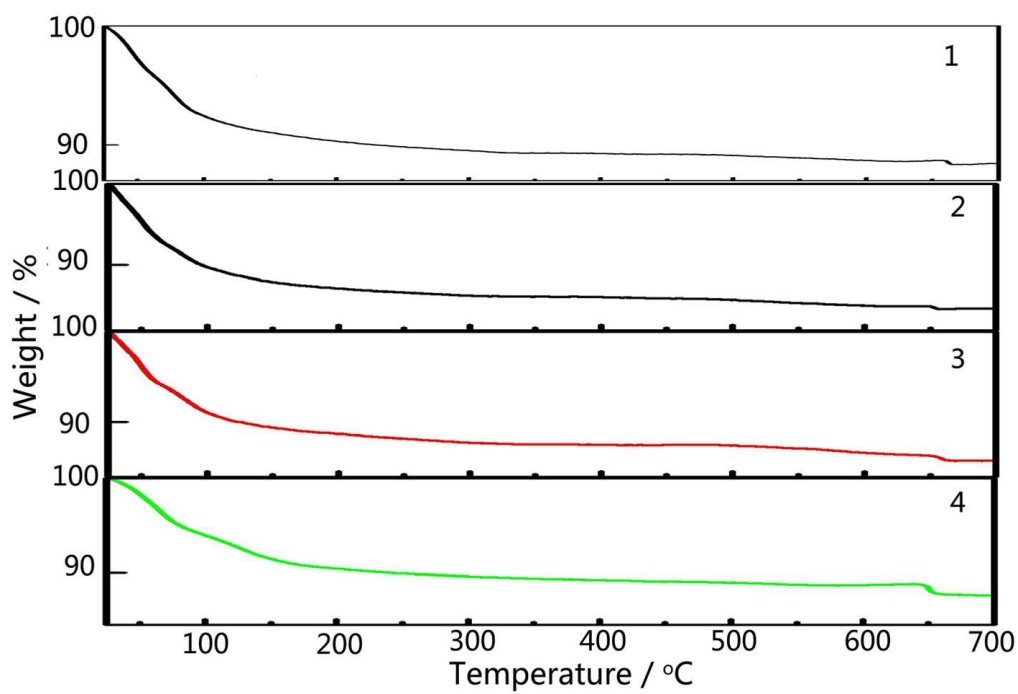


Figure S8. (a) The TG curves of 1-4.

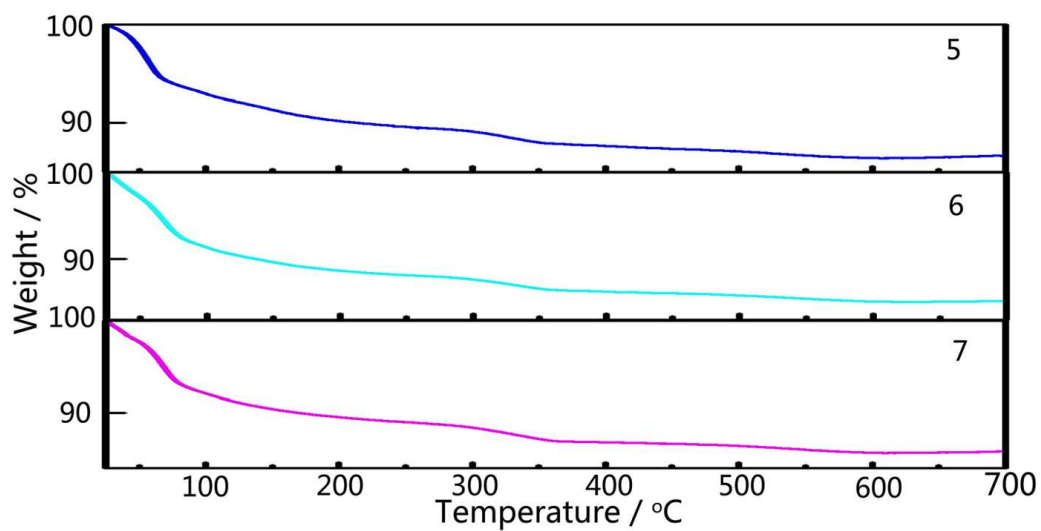


Figure S9. (b) The TG curves of 5-7.

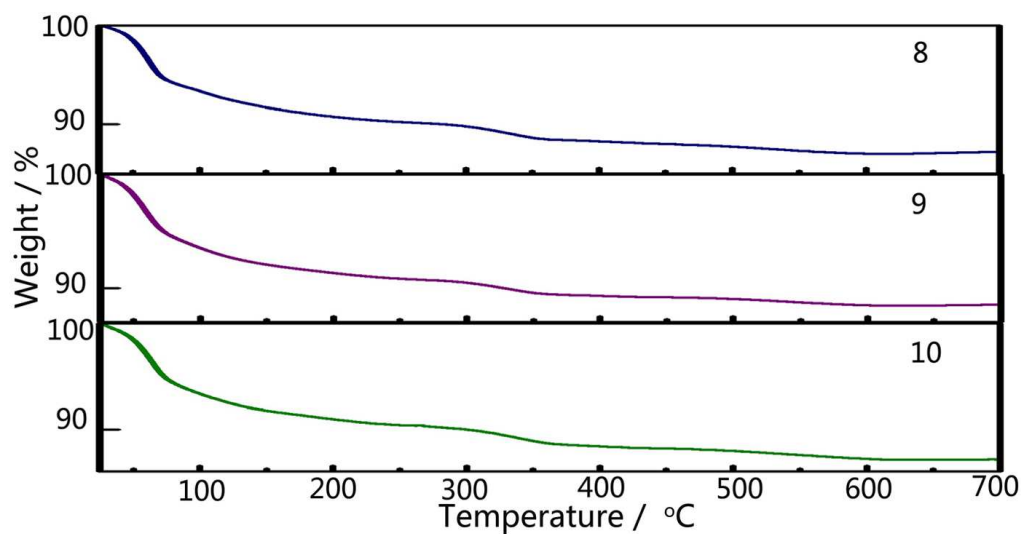


Figure S10. (c)The TG curves of 8-10.

Table S1. The pH variation in the process of reaction of 1–10 within one day.

Time	1	2	3	4	5	6	7	8	9	10
0 min	3.02	3.05	3.05	3.03	3.01	3.04	3.06	3.08	3.07	3.02
10 min	2.76	2.72	2.75	2.74	2.78	2.81	2.84	2.83	2.83	2.82
20 min	2.74	2.69	2.73	2.72	2.78	2.76	2.82	2.80	2.81	2.80
30 min	2.68	2.62	2.69	2.67	2.72	2.73	2.77	2.74	2.78	2.72
40 min	2.63	2.55	2.64	2.61	2.68	2.65	2.70	2.68	2.69	2.67
50 min	2.63	2.58	2.63	2.62	2.70	2.66	2.70	2.72	2.73	2.72
60 min	2.63	2.57	2.64	2.63	2.72	2.74	2.77	2.77	2.76	2.75
70 min	2.63	2.57	2.63	2.63	2.72	2.69	2.75	2.76	2.75	2.74
80 min	2.65	2.58	2.64	2.64	2.72	2.69	2.73	2.74	2.76	2.74
90 min	2.63	2.57	2.63	2.63	2.72	2.69	2.75	2.76	2.75	2.76
100 min	2.67	2.60	2.67	2.66	2.75	2.72	2.77	2.76	2.76	2.77
110 min	2.76	2.74	2.78	2.75	2.80	2.87	2.89	2.89	2.90	2.88
120 min	2.74	2.75	2.76	2.73	2.81	2.86	2.91	2.92	2.93	2.90
10 h	2.68	2.57	2.67	2.65	2.75	2.71	2.78	2.78	2.80	2.79
11 h	2.64	2.58	2.64	2.63	2.77	2.74	2.76	2.79	2.82	2.81

15 h	2.65	2.57	2.66	2.67	2.79	2.73	2.83	2.79	2.82	2.81
1 d	2.63	2.59	2.65	2.64	2.78	2.73	2.82	2.80	2.81	2.80

Table S2. Bond Valence Sum (BVS) Calculations of All W and Ln Atoms in **1**.

Atom	BVS	Atom	BVS	Atom	BVS
W1	5.732	W2	6.057	W3	6.185
W4	6.002	W5	5.931	W6	6.061
W7	6.295	W8	5.732	W9	6.057
W10	6.139	W11	5.814	W12	5.949
W13	6.082	W14	6.020	W15	6.202
W16	6.362	W17	5.668	W18	5.975
W19	6.039	W20	6.079	W21	6.077
W22	6.252	W23	6.245	W24	5.932
W25	6.252	W26	6.038	W27	6.230
W28	6.032				
Nd1	3.13	Nd2	2.965	Nd3	2.992
Nd4	3.096				
O1	1.902	O2	2.090	O3	1.891
O4	1.901	O5	1.852	O6	1.898
O7	1.842	O8	1.828	O9	1.953
O10	1.937	O11	1.847	O12	1.830
O13	1.833	O14	1.992	O15	1.881
O16	1.842	O17	1.869	O18	1.878
O19	1.915	O20	1.901	O21	1.877
O22	1.265	O23	1.868	O24	1.735
O25	2.038	O26	1.644	O27	1.675
O28	1.879	O29	1.997	O30	1.893
O31	2.106	O32	1.922	O33	1.822
O34	2.034	O35	1.975	O36	1.918
O37	1.975	O38	1.991	O39	2.048
O40	1.995	O41	2.048	O42	1.952
O43	1.832	O44	2.049	O45	1.778
O46	1.609	O47	1.988	O48	1.899
O49	1.961	O50	1.184	O51	2.047
O52	1.769	O53	1.740	O54	1.824
O55	2.033	O56	1.870	O57	1.777
O58	2.001	O59	1.694	O60	1.939
O61	1.613	O62	1.722	O63	1.790
O64	1.904	O65	1.892	O66	1.909
O67	1.870	O68	1.803	O69	2.023
O70	1.657	O71	1.840	O72	1.671
O73	1.745	O74	1.847	O75	1.898

O76	1.549	O77	1.988	O78	2.030
O79	1.995	O80	1.888	O81	1.717
O82	1.818	O83	1.712	O84	1.468
O85	1.708	O86	1.899	O87	1.949
O88	1.976	O89	1.740	O90	1.988
O91	1.952	O92	1.556	O93	1.817
O94	1.788				

Table S3. Bond Valence Sum (BVS) Calculations of All W and Ln Atoms in **3**.

Atom	BVS	Atom	BVS	Atom	BVS
W1	5.900	W2	5.919	W3	6.127
W4	5.931	W5	5.888	W6	5.887
W7	6.018	W8	6.064	W9	5.854
W10	6.076	W11	6.015		
Eu1	3.061	Eu2	3.094		
O1	1.884	O2	1.927	O3	1.205
O4	1.826	O5	1.990	O6	1.870
O7	1.729	O8	1.919	O9	1.920
O10	1.877	O11	1.913	O12	1.850
O13	1.846	O14	1.812	O15	1.958
O16	2.051	O17	1.821	O18	2.060
O19	1.824	O20	1.991	O21	1.807
O22	2.029	O23	1.703	O24	1.622
O25	1.898	O26	1.968	O27	2.025
O28	1.801	O29	1.851	O30	1.605
O31	1.640	O32	1.940	O33	1.835
O34	1.592	O35	1.813	O36	1.769
O37	1.640				

Table S4. Bond Valence Sum (BVS) Calculations of All W and Ln Atoms in **8**.

Atom	BVS	Atom	BVS	Atom	BVS
W1	6.167	W2	6.212	W3	6.336
W4	6.324	W5	6.260	W6	6.044
W7	6.247	W8	6.417	W9	6.139
W10	6.073	W11	6.034		
Yb1	2.990				
O1	1.995	O2	1.272	O3	1.792
O4	1.835	O5	1.783	O6	2.043
O7	2.036	O8	2.012	O9	2.114
O10	2.022	O11	1.948	O12	1.662
O13	1.659	O14	1.947	O15	2.114
O16	2.017	O17	1.969	O18	1.873
O19	2.089	O20	1.946	O21	1.840
O22	1.981	O23	1.907	O24	2.027

O25	1.934	O26	2.043	O27	2.136
O28	1.653	O29	1.893	O30	1.788
O31	1.694	O32	1.900	O33	1.703
O34	1.640	O35	1.750	O36	1.783
O37	1.685				