Electronic Supplementary Information for

Iodoargentates from cluster to 1D chain, and 2D layer induced by solvated lanthanide complex cations: Syntheses, crystal structures, and photoluminescent properties

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Table S1. Selected Bond Lengths (Å) and angles (°) for **1**

Ag(1)–I(1)	2.828(3)	Ag(1)–I(2)	2.788(3)
Ag(1)–I(3)	2.659(4)	Ag(2)–I(1)	2.959(3)
Ag(2)–I(2)	2.897(3)	Ag(2)–I(4)	2.853(3)
Ag(2)–I(5)	2.805(3)	Ag(3)–I(1)	3.052(4)
Ag(3)–I(4)	2.920(3)	Ag(3)–I(6)	2.802(3)
Ag(3)–I(7)	2.807(3)	Ag(4)–I(4)	3.113(3)
Ag(4)–I(5)	2.868(3)	Ag(4)–I(6)	2.809(3)
Ag(4)–I(8)	2.788(4)	Ag(5)–I(4)	2.949(3)
Ag(5)–I(8)	2.786(4)	Ag(5)–I(9)	2.955(3)
Ag(5)–I(10)	2.785(4)	Ag(6)–I(9)	2.967(3)
Ag(6)–I(10)	2.829(3)	Ag(6)–I(11)	2.781(3)
Ag(6)–I(12)	2.927(3)	Ag(7)–I(7)	2.784(3)
Ag(7)–I(9)	3.000(3)	Ag(7)–I(11)	2.797(3)
Ag(7)–I(13)	3.041(4)	Ag(8)–I(9)	2.867(3)
Ag(8)–I(12)	2.986(3)	Ag(8)–I(13)	2.865(3)
Ag(8)–I(14)	2.804(3)	Ag(9)–I(12)	3.106(3)
Ag(9)–I(14)	2.791(3)	Ag(9)–I(15)	2.975(3)
Ag(9)–I(16)	2.759(3)	Ag(10)–I(12)	2.893(3)
Ag(10)–I(13)	2.842(3)	Ag(10)–I(15)	3.020(3)
Ag(10)–I(17)	2.787(3)	Ag(11)–I(15)	2.907(3)
Ag(11)–I(15)#1	2.966(3)	Ag(11)–I(16)	2.811(3)
Ag(11)–I(17)#1	2.789(3)	La(1)–O(1)	2.390(17)
La(1)–O(2)	2.427(16)	La(1)–O(3)	2.332(17)
La(1)–O(4)	2.402(17)	La(1)–O(5)	2.435(14)
La(1)–O(6)	2.391(15)	La(1)–O(7)	2.328(16)

La(1)–O(8)	2.440(15)	La(2)–O(9)	2.446(18)
La(2)–O(10)	2.413(15)	La(2)–O(11)	2.439(16)
La(2)–O(12)	2.436(15)	La(2)–O(13)	2.403(17)
La(2)–O(14)	2.495(16)	La(2)–O(15)	2.358(14)
La(2)–O(16)	2.469(14)		
I(1)–Ag(1)–I(2)	108.96(11)	I(1)–Ag(1)–I(3)	123.98(13)
I(2)–Ag(1)–I(3)	125.43(13)	I(1)–Ag(2)–I(2)	102.61(9)
I(1)–Ag(2)–I(4)	109.21(10)	I(1)–Ag(2)–I(5)	109.85(10)
I(2)–Ag(2)–I(4)	104.78(10)	I(2)–Ag(2)–I(5)	113.89(11)
I(4)–Ag(2)–I(5)	115.61(10)	I(1)–Ag(3)–I(4)	105.01(10)
I(1)–Ag(3)–I(6)	103.53(11)	I(1)–Ag(3)–I(7)	105.91(11)
I(4)–Ag(3)–I(6)	112.49(11)	I(4)–Ag(3)–I(7)	106.02(11)
I(6)–Ag(3)–I(7)	122.39(12)	I(4)–Ag(4)–I(5)	106.31(9)
I(4)–Ag(4)–I(6)	106.82(9)	I(4)–Ag(4)–I(8)	100.65(11)
I(5)–Ag(4)–I(6)	113.96(11)	I(5)–Ag(4)–I(8)	110.64(11)
I(6)–Ag(4)–I(8)	116.93(11)	I(4)–Ag(5)–I(8)	104.87(11)
I(4)–Ag(5)–I(9)	93.54(9)	I(4)–Ag(5)–I(10)	117.20(12)
I(8)–Ag(5)–I(9)	109.56(12)	I(8)–Ag(5)–I(10)	121.90(12)
I(9)–Ag(5)–I(10)	105.99(11)	I(9)–Ag(6)–I(10)	104.56(10)
I(9)–Ag(6)–I(11)	111.76(9)	I(9)–Ag(6)–I(12)	100.74(9)
I(10)–Ag(6)–I(11)	113.89(11)	I(10)–Ag(6)–I(12)	109.78(10)
I(11)–Ag(6)–I(12)	114.86(10)	I(7)–Ag(7)–I(9)	108.25(11)
I(7)–Ag(7)–I(11)	124.81(12)	I(7)–Ag(7)–I(13)	103.24(11)
I(9)–Ag(7)–I(11)	110.34(11)	I(9)–Ag(7)–I(13)	100.07(9)
I(11)–Ag(7)–I(13)	107.06(11)	I(9)–Ag(8)–I(12)	101.70(9)
I(9)–Ag(8)–I(13)	107.74(9)	I(9)–Ag(8)–I(14)	107.50(9)
I(12)–Ag(8)–I(13)	103.54(9)	I(12)–Ag(8)–I(14)	112.04(9)
I(13)–Ag(8)–I(14)	122.37(11)	I(12)–Ag(9)–I(14)	108.94(10)
I(12)–Ag(9)–I(15)	111.19(9)	I(12)–Ag(9)–I(16)	102.00(10)
I(14)–Ag(9)–I(15)	103.78(10)	I(14)–Ag(9)–I(16)	120.30(11)
I(15)–Ag(9)–I(16)	110.70(10)	I(12)–Ag(10)–I(13)	106.54(9)
I(12)–Ag(10)–I(15)	116.11(9)	I(12)–Ag(10)–I(17)	109.37(9)
I(13)–Ag(10)–I(15)	101.01(9)	I(13)–Ag(10)–I(17)	126.33(10)
I(15)–Ag(10)–I(17)	97.49(9)	I(15)–Ag(11)–I(15)#1	105.71(9)
I(15)–Ag(11)–I(16)	111.19(9)	I(15)#1–Ag(11)–I(16)	114.50(10)
I(15)–Ag(11)–I (17)#1	114.28(10)	I(15)#1–Ag(11)–I(17)#1	98.71(9)
I(16)–Ag(11)–I (17)#1	111.82(10)	Ag(1)–I(1)–Ag(2)	59.75(9)
Ag(1)–I(1)–Ag(3)	125.42(10)	Ag(2)–I(1)–Ag(3)	65.92(8)
Ag(1)–I(2)–Ag(2)	60.95(9)	Ag(2)–I(4)–Ag(3)	69.01(9)
Ag(2)–I(4)–Ag(4)	61.65(8)	Ag(2)–I(4)–Ag(5)	127.80(10)

Ag(3)–I(4)–Ag(4)	64.41(8)	Ag(3)–I(4)–Ag(5)	105.08(10)
Ag(4)–I(4)–Ag(5)	69.21(8)	Ag(2)–I(5)–Ag(4)	65.40(8)
Ag(3)–I(6)–Ag(4)	70.03(9)	Ag(3)–I(7)–Ag(7)	91.14(11)
Ag(4)–I(8)–Ag(5)	76.37(10)	Ag(5)–I(9)–Ag(6)	66.71(9)
Ag(5)–I(9)–Ag(7)	100.51(9)	Ag(5)–I(9)–Ag(8)	137.91(9)
Ag(6)–I(9)–Ag(7)	63.85(8)	Ag(6)–I(9)–Ag(8)	74.01(9)
Ag(7)–I(9)–Ag(8)	74.11(9)	Ag(5)–I(10)–Ag(6)	70.89(9)
Ag(6)–I(11)–Ag(7)	68.90(9)	Ag(6)–I(12)–Ag(8)	72.87(8)
Ag(6)–I(12)–Ag(9)	131.30(8)	Ag(6)–I(12)–Ag(10)	106.38(9)
Ag(8)–I(12)–Ag(9)	59.95(7)	Ag(8)–I(12)–Ag(10)	64.93(8)
Ag(9)–I(12)–Ag(10)	65.06(8)	Ag(7)–I(13)–Ag(8)	73.52(8)
Ag(7)–I(13)–Ag(10)	110.74(9)	Ag(8)–I(13)–Ag(10)	67.16(8)
Ag(8)–I(14)–Ag(9)	65.96(8)	Ag(9)–I(15)–Ag(10)	65.22(8)
Ag(9)–I(15)–Ag(11)	66.91(8)	Ag(9)–I(15)–Ag(11)#1	113.01(9)
Ag(10)–I(15)–Ag(11)	107.30(8)	Ag(10)–I(15)–Ag (11)#1	78.03(8)
Ag(11)–I(15)–Ag(11)#1	74.29(9)	Ag(9)–I(16)–Ag(11)	71.20(9)
Ag(10)–I(17)–Ag(11)#1	85.04(9)	O(1)–La(1)–O(2)	152.5(10)
O(1)–La(1)–O(3)	69.6(12)	O(1)–La(1)–O(4)	89.5(12)
O(1)–La(1)–O(5)	109.1(11)	O(1)–La(1)–O(6)	137.0(10)
O(1)–La(1)–O(7)	70.1(11)	O(1)–La(1)–O(8)	72.6(11)
O(2)–La(1)–O(3)	85.2(10)	O(2)–La(1)–O(4)	71.9(9)
O(2)–La(1)–O(5)	74.0(8)	O(2)–La(1)–O(6)	69.4(8)
O(2)–La(1)–O(7)	133.9(9)	O(2)–La(1)–O(8)	116.6(8)
O(3)–La(1)–O(4)	72.7(10)	O(3)–La(1)–O(5)	76.2(9)
O(3)–La(1)–O(6)	153.1(10)	O(3)–La(1)–O(7)	116.0(10)
O(3)–La(1)–O(8)	125.3(9)	O(4)–La(1)–O(5)	135.1(8)
O(4)–La(1)–O(6)	106.3(10)	O(4)–La(1)–O(7)	151.1(9)
O(4)–La(1)–O(8)	68.9(8)	O(5)–La(1)–O(6)	87.8(9)
O(5)–La(1)–O(7)	72.7(8)	O(5)–La(1)–O(8)	155.1(7)
O(6)–La(1)–O(7)	78.4(9)	O(6)–La(1)–O(8)	76.3(8)
O(7)–La(1)–O(8)	85.2(8)	O(9)–La(2)–O(10)	139.6(7)
O(9)–La(2)–O(11)	75.2(7)	O(9)–La(2)–O(12)	72.5(6)
O(9)–La(2)–O(13)	111.7(10)	O(9)–La(2)–O(14)	147.5(6)
O(9)–La(2)–O(15)	77.9(8)	O(9)–La(2)–O(16)	78.8(7)
O(10)–La(2)–O(11)	141.7(8)	O(10)–La(2)–O(12)	72.7(7)
O(10)–La(2)–O(13)	78.6(11)	O(10)–La(2)–O(14)	71.1(7)
O(10)–La(2)–O(15)	74.9(9)	O(10)–La(2)–O(16)	120.7(9)
O(11)–La(2)–O(12)	120.0(8)	O(11)–La(2)–O(13)	71.3(10)
O(11)–La(2)–O(14)	80.6(7)	O(11)–La(2)–O(15)	140.8(8)
O(11)–La(2)–O(16)	72.7(9)	O(12)–La(2)–O(13)	75.8(8)

O(12)–La(2)–O(14)	139.5(6)	O(12)–La(2)–O(15)	77.1(8)
O(12)–La(2)–O(16)	143.1(7)	O(13)–La(2)–O(14)	79.8(9)
O(13)–La(2)–O(15)	146.5(9)	O(13)–La(2)–O(16)	137.8(8)
O(14)–La(2)–O(15)	109.8(8)	O(14)–La(2)–O(16)	73.5(6)
O(15)–La(2)–O(16)	74.6(8)		

Symmetry transformations used to generate equivalent atoms: #1 –x+1, –y+1, –z

Table S2. Selected Bond Lengths (Å) and angles (°) for **2**

Ag(1)–I(1)	2.962(2)	Ag(1)–I(1)#1	2.893(2)
Ag(1)–I(2)	2.811(3)	Ag(1)–Ag(2)#1	3.186(3)
Ag(1)–I(3)	2.804(2)	Ag(2)–I(1)	2.966(3)
Ag(2)–I(2)#1	2.769(2)	Ag(2)–I(4)	3.076(3)
Ag(2)–I(5)	2.794(2)	Ag(3)–I(1)	2.999(2)
Ag(3)–I(3)	2.788(2)	Ag(3)–I(4)	2.890(3)
Ag(3)–I(6)	2.841(2)	Ag(4)–I(4)	2.976(2)
Ag(4)–I(5)	2.808(3)	Ag(4)–I(6)	2.865(2)
Ag(4)–I(7)	2.867(2)	Ag(5)–I(4)	2.924(2)
Ag(5)–I(7)	2.968(2)	Ag(5)–I(8)	2.781(2)
Ag(5)–I(9)	2.823(3)	Ag(6)–I(6)	3.003(3)
Ag(6)–I(7)	2.975(2)	Ag(6)–I(8)	2.800(3)
Ag(6)–I(10)	2.798(3)	Ag(7)–I(7)	2.943(3)
Ag(7)–I(9)	2.782(3)	Ag(7)–I(11)	2.938(3)
Ag(7)–I(12)	2.786(3)	Ag(8)–I(10)	2.811(2)
Ag(8)–I(11)	2.919(3)	Ag(8)–I(13)	2.809(2)
Ag(8)–I(15)	2.976(3)	Ag(9)–I(11)	3.083(2)
Ag(9)–I(12)	2.789(3)	Ag(9)–I(13)	2.803(3)
Ag(9)–I(14)	2.866(2)	Ag(10)–I(11)	2.854(2)
Ag(10)–I(14)	2.798(3)	Ag(10)–I(15)	2.976(3)
Ag(10)–I(16)	2.876(2)	Ag(11)–I(15)	2.815(3)
Ag(11)–I(16)	2.783(3)	Ag(11)–I(17)	2.672(3)
Ce(1)–O(1)	2.453(13)	Ce(1)–O(2)	2.441(13)
Ce(1)–O(3)	2.435(14)	Ce(1)–O(4)	2.501(11)
Ce(1)–O(5)	2.454(11)	Ce(1)–O(6)	2.463(11)
Ce(1)–O(7)	2.476(13)	Ce(1)–O(8)	2.460(14)
Ce(2)–O(9)	2.446(14)	Ce(2)–O(10)	2.502(12)
Ce(2)–O(11)	2.468(11)	Ce(2)–O(12)	2.488(13)

Ce(2)–O(13A)	2.500(16)	Ce(2)–O(13B)	2.443(16)
Ce(2)–O(14A)	2.429(17)	Ce(2)–O(14B)	2.446(17)
Ce(2)–O(15)	2.468(15)	Ce(2)–O(16)	2.325(14)
I(1)#1–Ag(1)–I(1)	106.70(7)	I(1)–Ag(1)–I(2)	114.41(8)
I(1)#1–Ag(1)–I(2)	112.69(7)	I(1)–Ag(1)–I(3)	97.22(7)
I(1)#1–Ag(1)–I(3)	114.26(8)	I(2)–Ag(1)–I(3)	110.65(8)
I(1) –Ag(2)–I(2)#1	111.73(8)	I(1)–Ag(2)–I(4)	112.12(7)
I(1)–Ag(2)–I(5)	102.29(8)	I(2)#1–Ag(2)–I(4)	101.58(8)
I(2)#1–Ag(2)–I(5)	119.27(9)	I(4)–Ag(2)–I(5)	110.16(8)
I(1)–Ag(3)–I(3)	96.74(7)	I(1)–Ag(3)–I(4)	116.70(7)
I(1)–Ag(3)–I(6)	102.61(7)	I(3)–Ag(3)–I(4)	108.95(8)
I(3)–Ag(3)–I(6)	125.72(8)	I(4)–Ag(3)–I(6)	106.39(7)
I(4)–Ag(4)–I(5)	112.72(8)	I(4)–Ag(4)–I(6)	103.53(7)
I(4)–Ag(4)–I(7)	101.76(8)	I(5)–Ag(4)–I(6)	121.88(9)
I(5)–Ag(4)–I(7)	107.56(7)	I(6)–Ag(4)–I(7)	107.52(7)
I(4)–Ag(5)–I(7)	100.61(7)	I(4)–Ag(5)–I(8)	114.73(8)
I(4)–Ag(5)–I(9)	109.99(8)	I(7)–Ag(5)–I(8)	111.46(8)
I(7)–Ag(5)–I(9)	104.72(8)	I(8)–Ag(5)–I(9)	114.07(9)
I(6)–Ag(6)–I(7)	101.27(7)	I(6)–Ag(6)–I(8)	108.44(8)
I(6)–Ag(6)–I(10)	103.48(9)	I(7)–Ag(6)–I(8)	110.71(9)
I(7)–Ag(6)–I(10)	107.88(8)	I(8)–Ag(6)–I(10)	122.74(9)
I(7)–Ag(7)–I(9)	106.47(8)	I(7)–Ag(7)–I(11)	93.53(7)
I(7)–Ag(7)–I(12)	109.21(10)	I(9)–Ag(7)–I(11)	116.75(10)
I(9)–Ag(7)–I(12)	121.72(10)	I(11)–Ag(7)–I(12)	105.38(9)
I(10)–Ag(8)–I(11)	104.02(8)	I(10)–Ag(8)–I(13)	119.48(8)
I(10)–Ag(8)–I(15)	107.01(9)	I(11)–Ag(8)–I(13)	113.33(9)
I(11)–Ag(8)–I(15)	106.37(8)	I(13)–Ag(8)–I(15)	105.85(8)
I(11)–Ag(9)–I(12)	101.61(8)	I(11)–Ag(9)–I(13)	108.72(8)
I(11)–Ag(9)–I(14)	106.64(7)	I(12)–Ag(9)–I(13)	117.13(9)
I(12)–Ag(9)–I(14)	106.90(9)	I(13)–Ag(9)–I(14)	114.63(9)
I(11)–Ag(10)–I(14)	115.18(8)	I(11)–Ag(10)–I(15)	108.06(8)
I(11)–Ag(10)–I(16)	105.95(8)	I(14)–Ag(10)–I(15)	109.91(8)
I(14)–Ag(10)–I(16)	114.37(8)	I(15)–Ag(10)–I(16)	102.45(7)
I(15)–Ag(11)–I(15)	123.52(10)	I(15)–Ag(11)–I(16)	109.18(8)
I(16)–Ag(11)–I(17)	126.27(10)	Ag(1)#1–I(1)–Ag(1)	73.30(7)
Ag(1)–I(1)–Ag(2)	112.27(7)	Ag(1)#1–I(1)–Ag(2)	65.89(6)
Ag(1)–I(1)–Ag(3)	79.31(6)	Ag(1)#1–I(1)–Ag(3)	106.21(7)
Ag(2)–I(1)–Ag(3)	64.34(6)	Ag(1)–I(2)–Ag(2)#1	69.64(7)
Ag(1)–I(3)–Ag(3)	85.73(7)	Ag(2)–I(4)–Ag(3)	64.23(6)
Ag(2)–I(4)–Ag(4)	59.76(6)	Ag(2)–I(4)–Ag(5)	131.21(7)

Ag(3)–I(4)–Ag(4)	64.29(6)	Ag(3)–I(4)–Ag(5)	107.50(7)
Ag(4)–I(4)–Ag(5)	73.21(6)	Ag(2)–I(5)–Ag(4)	65.17(6)
Ag(3)–I(6)–Ag(4)	66.35(6)	Ag(3)–I(6)–Ag(6)	110.71(8)
Ag(4)–I(6)–Ag(6)	72.96(6)	Ag(4)–I(7)–Ag(5)	74.14(7)
Ag(4)–I(7)–Ag(6)	73.36(7)	Ag(4)–I(7)–Ag(7)	137.61(8)
Ag(5)–I(7)–Ag(6)	63.69(6)	Ag(5)–I(7)–Ag(7)	66.16(7)
Ag(6)–I(7)–Ag(7)	100.55(8)	Ag(5)–I(8)–Ag(6)	68.37(7)
Ag(5)–I(9)–Ag(7)	70.28(7)	Ag(6)–I(10)–Ag(8)	92.87(8)
Ag(7)–I(11)–Ag(8)	105.96(8)	Ag(7)–I(11)–Ag(9)	68.63(7)
Ag(7)–I(11)–Ag(10)	126.40(8)	Ag(8)–I(11)–Ag(9)	62.74(6)
Ag(8)–I(11)–Ag(10)	68.17(7)	Ag(9)–I(11)–Ag(10)	61.70(6)
Ag(7)–I(12)–Ag(9)	75.05(8)	Ag(8)–I(13)–Ag(9)	67.74(7)
Ag(9)–I(14)–Ag(10)	65.17(6)	Ag(8)–I(15)–Ag(10)	65.85(6)
Ag(8)–I(15)–Ag(11)	125.96(8)	Ag(10)–I(15)–Ag(11)	60.33(7)
Ag(10)–I(16)–Ag(11)	61.96(7)	O(1)–Ce(1)–O(2)	74.8(7)
O(1)–Ce(1)–O(3)	114.2(8)	O(1)–Ce(1)–O(4)	147.1(5)
O(1)–Ce(1)–O(5)	137.7(6)	O(1)–Ce(1)–O(6)	74.7(6)
O(1)–Ce(1)–O(7)	76.6(7)	O(1)–Ce(1)–O(8)	77.6(6)
O(2)–Ce(1)–O(3)	73.5(8)	O(2)–Ce(1)–O(4)	80.0(6)
O(2)–Ce(1)–O(5)	146.1(7)	O(2)–Ce(1)–O(6)	122.8(7)
O(2)–Ce(1)–O(7)	139.6(7)	O(2)–Ce(1)–O(8)	72.3(8)
O(3)–Ce(1)–O(4)	77.5(7)	O(3)–Ce(1)–O(5)	81.5(8)
O(3)–Ce(1)–O(6)	76.7(7)	O(3)–Ce(1)–O(7)	145.5(7)
O(3)–Ce(1)–O(8)	138.9(7)	O(4)–Ce(1)–O(5)	72.4(6)
O(4)–Ce(1)–O(6)	137.8(6)	O(4)–Ce(1)–O(7)	111.9(6)
O(4)–Ce(1)–O(8)	74.8(6)	O(5)–Ce(1)–O(6)	71.2(6)
O(5)–Ce(1)–O(7)	70.9(6)	O(5)–Ce(1)–O(8)	117.2(8)
O(6)–Ce(1)–O(7)	75.0(7)	O(6)–Ce(1)–O(8)	142.3(7)
O(7)–Ce(1)–O(8)	74.1(7)	O(9)–Ce(2)–O(10)	71.8(6)
O(9)–Ce(2)–O(11)	96.7(7)	O(9)–Ce(2)–O(12)	134.7(6)
O(9)–Ce(2)–O(13A)	151.5(10)	O(9)–Ce(2)–O(13B)	152.5(8)
O(9)–Ce(2)–O(14A)	98.2(12)	O(9)–Ce(2)–O(14B)	118.9(10)
O(9)–Ce(2)–O(15)	73.7(8)	O(9)–Ce(2)–O(16)	70.5(8)
O(10)–Ce(2)–O(11)	76.1(6)	O(10)–Ce(2)–O(12)	153.5(6)
O(10)–Ce(2)–O(13A)	80.3(9)	O(10)–Ce(2)–O(13B)	83.2(9)
O(10)–Ce(2)–O(14A)	75.2(13)	O(10)–Ce(2)–O(14B)	85.1(12)
O(10)–Ce(2)–O(15)	127.7(7)	O(10)–Ce(2)–O(16)	119.0(7)
O(11)–Ce(2)–O(12)	98.1(6)	O(11)–Ce(2)–O(13A)	70.2(8)
O(11)–Ce(2)–O(13B)	88.1(8)	O(11)–Ce(2)–O(14A)	141.5(13)
O(11)–Ce(2)–O(14B)	131.8(13)	O(11)–Ce(2)–O(15)	70.2(7)

O(11)–Ce(2)–O(16)	153.4(6)	O(12)–Ce(2)–O(13A)	73.5(9)
O(12)–Ce(2)–O(13B)	70.6(9)	O(12)–Ce(2)–O(14A)	96.3(13)
O(12)–Ce(2)–O(14B)	79.9(11)	O(12)–Ce(2)–O(15)	71.6(8)
O(12)–Ce(2)–O(16)	77.5(7)	O(13A)–Ce(2)–O(13B)	18.0(9)
O(13A)–Ce(2)–O(14A)	80.1(13)	O(13A)–Ce(2)–O(14B)	63.1(13)
O(13A)–Ce(2)–O(15)	121.6(9)	O(13A)–Ce(2)–O(16)	131.1(9)
O(13B)–Ce(2)–O(14A)	63.4(13)	O(13B)–Ce(2)–O(14B)	45.4(13)
O(13B)–Ce(2)–O(15)	132.7(9)	O(13B)–Ce(2)–O(16)	114.2(10)
O(14A)–Ce(2)–O(14B)	20.8(13)	O(14A)–Ce(2)–O(15)	148.3(14)
O(14A)–Ce(2)–O(16)	64.9(13)	O(14B)–Ce(2)–O(15)	146.8(13)
O(14B)–Ce(2)–O(16)	73.7(13)	O(15)–Ce(2)–O(16)	83.7(8)

Symmetry transformations used to generate equivalent atoms: #1 –x+1, –y+1, –z

Table S3. Selected Bond Lengths (Å) and angles (°) for **3**

Ag(1)–I(1)	2.902(2)	Ag(1)–I(2)	2.785(2)
Ag(1)–I(3)	2.920(2)	Ag(1)–I(4)	2.833(2)
Ag(2)–I(1)	2.942(2)	Ag(2)–I(2)	2.792(2)
Ag(2)–I(5)	2.867(2)	Ag(2)–I(6)	2.772(2)
Ag(3)–I(1)	2.909(2)	Ag(3)–I(5)	2.810(2)
Ag(3)–I(7)	2.938(3)	Ag(3)–I(8)	2.748(2)
Ag(4)–I(1)	2.868(2)	Ag(4)–I(3)	2.963(2)
Ag(4)–I(7)	2.876(2)	Ag(4)–I(9)	2.747(2)
Ag(5)–I(3)	2.869(2)	Ag(5)–I(3)#1	2.980(2)
Ag(5)–I(5)	2.817(2)	Ag(5)–I(7)	2.870(2)
Ag(6)–I(4)#2	2.975(2)	Ag(6)–I(6)	2.742(2)
Ag(6)–I(8)	2.932(2)	Ag(6)–I(10)	2.922(2)
Ag(7)–I(4)#2	2.850(2)	Ag(7)–I(8)	3.170(3)
Ag(7)–I(9)#2	2.714(2)	Ag(7)–I(10)	2.843(2)
Eu(1)–O(1)	2.345(13)	Eu(1)–O(2)	2.446(13)
Eu(1)–O(3)	2.432(11)	Eu(1)–O(4)	2.359(12)
Eu(1)–O(5)	2.334(12)	Eu(1)–O(6)	2.331(12)
Eu(1)–O(7)	2.412(12)	Eu(1)–O(8)	2.422(12)
I(1)–Ag(1)–I(2)	113.46(7)	I(1)–Ag(1)–I(3)	107.41(6)
I(1)–Ag(1)–I(4)	94.41(6)	I(2)–Ag(1)–I(3)	107.72(7)
I(2)–Ag(1)–I(4)	113.76(7)	I(3)–Ag(1)–I(4)	119.47(7)
I(1)–Ag(2)–I(2)	112.04(6)	I(1)–Ag(2)–I(4)	101.03(6)
I(1)–Ag(2)–I(6)	101.72(7)	I(2)–Ag(2)–I(5)	109.93(7)
I(2)–Ag(2)–I(6)	117.72(7)	I(5)–Ag(2)–I(6)	112.86(7)

I(1)–Ag(3)–I(5)	103.24(7)	I(1)–Ag(3)–I(7)	102.81(7)
I(1)–Ag(3)–I(8)	107.42(8)	I(5)–Ag(3)–I(7)	103.01(8)
I(5)–Ag(3)–I(8)	122.99(8)	I(7)–Ag(3)–I(8)	115.08(8)
I(1)–Ag(4)–I(3)	107.17(7)	I(1)–Ag(4)–I(7)	105.44(7)
I(1)–Ag(4)–I(9)	107.71(7)	I(3)–Ag(4)–I(7)	109.04(7)
I(3)–Ag(4)–I(9)	107.73(7)	I(7)–Ag(4)–I(9)	119.17(7)
I(3)#1–Ag(5)–I(3)	100.75(7)	I(3)–Ag(5)–I(5)	122.11(8)
I(3)#1–Ag(5)–I(5)	110.51(7)	I(3)–Ag(5)–I(7)	111.90(7)
I(3)#1–Ag(5)–I(7)	106.12(7)	I(5)–Ag(5)–I(7)	104.58(7)
I(4)#2 –Ag(6)–I(6)	114.79(7)	I(4)#2–Ag(6)–I(8)	96.88(6)
I(4)#2–Ag(6)–I(10)	99.87(6)	I(6)–Ag(6)–I(8)	131.79(7)
I(6)–Ag(6)–I(10)	113.24(8)	I(8)–Ag(6)–I(10)	94.60(6)
I(4)#2–Ag(7)–I(8)	94.31(7)	I(4)#2–Ag(7)–I(9)#2	125.97(8)
I(4)#2–Ag(7)–I(10)	104.88(7)	I(8)–Ag(7)–I(9)#2	105.33(8)
I(8)–Ag(7)–I(10)	91.18(7)	I(9)#2–Ag(7)–I(10)	123.99(8)
Ag(1)–I(1)–Ag(2)	63.86(5)	Ag(1)–I(1)–Ag(3)	110.34(6)
Ag(1)–I(1)–Ag(4)	71.07(6)	Ag(2)–I(1)–Ag(3)	72.43(6)
Ag(2)–I(1)–Ag(4)	107.74(6)	Ag(3)–I(1)–Ag(4)	74.42(6)
Ag(1)–I(2)–Ag(2)	67.31(6)	Ag(1)–I(3)–Ag(4)	69.51(6)
Ag(1)–I(3)–Ag(5)	92.86(6)	Ag(1)–I(3)–Ag(5)#1	154.46(7)
Ag(4)–I(3)–Ag(5)	63.11(6)	Ag(4)–I(3)–Ag(5)#1	125.38(7)
Ag(5)#1–I(3)–Ag(5)	79.25(7)	Ag(1)–I(4)–Ag(6)#3	141.13(8)
Ag(1)–I(4)–Ag(7)#3	90.43(7)	Ag(6)#3–I(4)–Ag(7)#3	60.92(5)
Ag(2)–I(5)–Ag(3)	75.04(6)	Ag(2)–I(5)–Ag(5)	98.02(6)
Ag(3)–I(5)–Ag(5)	71.93(7)	Ag(2)–I(6)–Ag(6)	94.95(7)
Ag(3)–I(7)–Ag(4)	73.88(6)	Ag(3)–I(7)–Ag(5)	69.35(6)
Ag(4)–I(7)–Ag(5)	64.20(6)	Ag(3)–I(8)–Ag(6)	84.34(7)
Ag(3)–I(8)–Ag(7)	127.09(7)	Ag(6)–I(8)–Ag(7)	57.77(5)
Ag(4)–I(9)–Ag(7)#3	95.25(7)	Ag(6)–I(10)–Ag(7)	61.65(6)
O(1)–Eu(1)–O(2)	75.7(5)	O(1)–Eu(1)–O(3)	77.9(5)
O(1)–Eu(1)–O(4)	76.9(5)	O(1)–Eu(1)–O(5)	148.9(4)
O(1)–Eu(1)–O(6)	69.8(5)	O(1)–Eu(1)–O(7)	120.3(5)
O(1)–Eu(1)–O(8)	133.9(5)	O(2)–Eu(1)–O(3)	72.5(5)
O(2)–Eu(1)–O(4)	141.6(5)	O(2)–Eu(1)–O(5)	88.3(4)
O(2)–Eu(1)–O(6)	107.1(5)	O(2)–Eu(1)–O(7)	69.3(4)
O(2)–Eu(1)–O(8)	145.0(4)	O(3)–Eu(1)–O(4)	75.9(4)
O(3)–Eu(1)–O(5)	71.9(4)	O(3)–Eu(1)–O(6)	146.4(4)
O(3)–Eu(1)–O(7)	130.3(4)	O(3)–Eu(1)–O(8)	124.8(5)
O(4)–Eu(1)–O(5)	102.0(5)	O(4)–Eu(1)–O(6)	87.8(4)
O(4)–Eu(1)–O(7)	149.0(5)	O(4)–Eu(1)–O(8)	72.3(5)

O(5)–Eu(1)–O(6)	141.2(4)	O(5)–Eu(1)–O(7)	76.5(4)
O(5)–Eu(1)–O(8)	72.1(4)	O(6)–Eu(1)–O(7)	76.3(4)
O(6)–Eu(1)–O(8)	75.5(4)	O(7)–Eu(1)–O(8)	77.9(4)

Symmetry transformations used to generate equivalent atoms: #1 –x+1, –y+1, –z

Table S4. Selected Bond Lengths (Å) and angles (°) for **4**

Ag(1)–I(1)	2.912(3)	Ag(1)–I(2)	2.931(3)
Ag(1)–I(3)	2.805(3)	Ag(1)–I(4)	2.827(3)
Ag(2)–I(1)	2.869(3)	Ag(2)–I(2)	2.998(3)
Ag(2)–I(5)	2.876(3)	Ag(2)–I(6)	2.754(3)
Ag(3)–I(1)	2.981(3)	Ag(3)–I(3)	2.792(3)
Ag(3)–I(7)	2.873(3)	Ag(3)–I(10)#1	2.763(3)
Ag(4)–I(1)	2.887(3)	Ag(4)–I(5)	2.985(4)
Ag(4)–I(7)	2.837(3)	Ag(4)–I(9)#1	2.742(3)
Ag(5)–I(2)	2.858(3)	Ag(5)–I(2)#2	2.992(3)
Ag(5)–I(5)	2.888(3)	Ag(5)–I(7)	2.821(3)
Ag(6)–I(4)	2.842(3)	Ag(6)–I(6)	2.712(3)
Ag(6)–I(8)	2.826(3)	Ag(7)–I(4)	2.995(3)
Ag(7)–I(8)	2.914(3)	Ag(7)–I(9)	2.927(3)
Ag(7)–I(10)	2.745(3)	Tb(1)–O(1)	2.353(15)
Tb(1)–O(2)	2.301(15)	Tb(1)–O(3)	2.366(18)
Tb(1)–O(4)	2.323(16)	Tb(1)–O(5)	2.403(16)
Tb(1)–O(6)	2.364(17)	Tb(1)–O(7)	2.313(16)
Tb(1)–O(8)	2.382(15)		
I(1)–Ag(1)–I(2)	108.31(9)	I(1)–Ag(1)–I(3)	112.46(9)
I(1)–Ag(1)–I(4)	94.76(9)	I(2)–Ag(1)–I(3)	107.71(9)
I(2)–Ag(1)–I(4)	120.03(10)	I(3)–Ag(1)–I(4)	112.97(10)
I(1)–Ag(2)–I(2)	107.63(9)	I(1)–Ag(2)–I(5)	105.98(9)
I(1)–Ag(2)–I(6)	108.51(10)	I(2)–Ag(2)–I(5)	108.04(9)
I(2)–Ag(2)–I(6)	108.07(10)	I(5)–Ag(2)–I(6)	118.18(10)
I(1)–Ag(3)–I(3)	110.77(9)	I(1)–Ag(3)–I(7)	100.75(8)
I(1)–Ag(3)–I(10)#1	102.47(9)	I(3)–Ag(3)–I(7)	110.17(10)
I(3)–Ag(3)–I(10)#1	118.47(10)	I(7)–Ag(3)–I(10)#1	112.46(9)
I(1)–Ag(4)–I(5)	102.73(10)	I(1)–Ag(4)–I(7)	103.96(10)
I(1)–Ag(4)–I(9)#1	109.00(10)	I(5)–Ag(4)–I(7)	101.85(10)
I(5)–Ag(4)–I(9)#1	114.56(11)	I(7)–Ag(4)–I(9)#1	122.59(11)
I(2)#2–Ag(5)–I(2)	101.22(9)	I(2)–Ag(5)–I(5)	111.65(10)
I(2)#2–Ag(5)–I(5)	106.75(10)	I(2)–Ag(5)–I(7)	121.14(11)

I(2)#2–Ag(5)–I(7)	110.70(10)	I(5)–Ag(5)–I(7)	104.71(10)
I(4)–Ag(6)–I(6)	126.74(12)	I(4)–Ag(6)–I(8)	105.79(10)
I(6)–Ag(6)–I(8)	124.03(11)	I(4)–Ag(7)–I(8)	99.80(9)
I(4)–Ag(7)–I(9)	97.91(9)	I(4)–Ag(7)–I(10)	112.33(10)
I(8)–Ag(7)–I(9)	96.17(9)	I(8)–Ag(7)–I(10)	114.53(10)
I(9)–Ag(7)–I(10)	130.92(11)	Ag(1)–I(1)–Ag(2)	70.34(8)
Ag(1)–I(1)–Ag(3)	64.50(7)	Ag(1)–I(1)–Ag(4)	110.08(9)
Ag(2)–I(1)–Ag(3)	107.68(8)	Ag(2)–I(1)–Ag(4)	74.69(9)
Ag(3)–I(1)–Ag(4)	71.91(8)	Ag(1)–I(2)–Ag(2)	68.33(8)
Ag(1)–I(2)–Ag(5)	93.64(9)	Ag(1)–I(2)–Ag(5)#2	155.45(10)
Ag(2)–I(2)–Ag(5)	63.70(8)	Ag(2)–I(2)–Ag(5)#2	125.94(9)
Ag(5) –I(2)–Ag(5)#2	78.78(9)	Ag(1)–I(3)–Ag(3)	68.37(8)
Ag(1)–I(4)–Ag(6)	89.25(10)	Ag(1)–I(4)–Ag(7)	141.16(10)
Ag(6)–I(4)–Ag(7)	60.79(8)	Ag(2)–I(5)–Ag(4)	73.10(8)
Ag(2)–I(5)–Ag(5)	64.88(8)	Ag(4)–I(5)–Ag(5)	69.77(8)
Ag(2)–I(6)–Ag(6)	93.69(10)	Ag(3)–I(7)–Ag(4)	74.25(9)
Ag(3)–I(7)–Ag(5)	99.59(9)	Ag(4)–I(7)–Ag(5)	72.86(9)
Ag(6)–I(8)–Ag(7)	61.97(8)	Ag(4)#3–I(9)–Ag(7)	85.39(9)
Ag(3)#3–I(10)–Ag(7)	96.78(9)	O(1)–Tb(1)–O(2)	74.8(7)
O(1)–Tb(1)–O(3)	76.7(6)	O(1)–Tb(1)–O(4)	147.8(5)
O(1)–Tb(1)–O(5)	130.3(6)	O(1)–Tb(1)–O(6)	69.8(5)
O(1)–Tb(1)–O(7)	76.8(7)	O(1)–Tb(1)–O(8)	124.6(6)
O(2)–Tb(1)–O(2)	90.9(7)	O(2)–Tb(1)–O(3)	74.4(8)
O(2)–Tb(1)–O(4)	98.9(7)	O(2)–Tb(1)–O(5)	72.4(6)
O(2)–Tb(1)–O(7)	140.5(7)	O(2)–Tb(1)–O(8)	148.8(7)
O(3)–Tb(1)–O(4)	71.2(5)	O(3)–Tb(1)–O(5)	126.8(7)
O(3)–Tb(1)–O(6)	146.0(6)	O(3)–Tb(1)–O(7)	72.8(8)
O(3)–Tb(1)–O(8)	130.2(6)	O(4)–Tb(1)–O(5)	74.2(5)
O(4)–Tb(1)–O(6)	142.4(5)	O(4)–Tb(1)–O(7)	90.8(7)
O(4)–Tb(1)–O(8)	76.7(6)	O(5)–Tb(1)–O(6)	74.4(6)
O(5)–Tb(1)–O(7)	146.5(6)	O(5)–Tb(1)–O(8)	76.7(6)
O(6)–Tb(1)–O(7)	104.4(7)	O(6)–Tb(1)–O(8)	76.5(6)
O(7)–Tb(1)–O(8)	70.7(7)		

Symmetry transformations used to generate equivalent atoms: #1 –x+1, –y+1, –z.

Table S5. Selected Bond Lengths (Å) and angles (°) for **5**

Ag(1)–I(1)	2.9139(19)	Ag(1)–I(2)	2.810(2)
Ag(1)–I(3)	2.932(2)	Ag(1)–I(10)#1	2.8261(19)
Ag(2)–I(1)	2.986(2)	Ag(2)–I(2)	2.793(2)
Ag(2)–I(4)	2.870(2)	Ag(2)–I(5)	2.7658(19)
Ag(3)–I(1)	2.887(2)	Ag(3)–I(4)	2.838(2)
Ag(3)–I(6)	2.982(3)	Ag(3)–I(7)	2.743(2)
Ag(4)–I(1)	2.872(2)	Ag(4)–I(3)	2.993(2)
Ag(4)–I(6)	2.873(2)	Ag(4)–I(8)	2.757(2)
Ag(5)–I(3)	2.861(2)	Ag(5)–I(3)#2	2.991(2)
Ag(5)–I(4)	2.826(2)	Ag(5)–I(6)	2.890(2)
Ag(6)–I(5)	2.743(2)	Ag(6)–I(7)	2.933(2)
Ag(6)–I(9)	2.913(2)	Ag(6)–I(10)	2.998(2)
Ag(7)–I(8)#3	2.715(2)	Ag(7)–I(9)	2.825(2)
Ag(7)–I(10)	2.847(2)	Dy(1)–O(1)	2.398(10)
Dy(1)–O(2)	2.305(12)	Dy(1)–O(3)	2.352(11)
Dy(1)–O(4)	2.403(10)	Dy(1)–O(5)	2.315(10)
Dy(1)–O(6)	2.385(15)	Dy(1)–O(7)	2.374(12)
Dy(1)–O(8)	2.338(11)		
I(1)–Ag(1)–I(2)	112.52(6)	I(1)–Ag(1)–I(3)	108.17(6)
I(1)–Ag(1)–I(10)#1	94.59(6)	I(2)–Ag(1)–I(3)	107.79(6)
I(2)–Ag(1)–I(10)#1	113.28(7)	I(3)–Ag(1)–I(10)#1	119.85(7)
I(1)–Ag(2)–I(2)	110.87(6)	I(1)–Ag(2)–I(4)	100.79(6)
I(1)–Ag(2)–I(5)	102.21(6)	I(2)–Ag(2)–I(4)	110.27(7)
I(2)–Ag(2)–I(5)	118.46(7)	I(4)–Ag(2)–I(5)	112.48(6)
I(1)–Ag(3)–I(4)	104.03(7)	I(1)–Ag(3)–I(6)	102.84(7)
I(1)–Ag(3)–I(7)	108.98(7)	I(4)–Ag(3)–I(6)	102.13(7)
I(4)–Ag(3)–I(7)	122.31(8)	I(6)–Ag(3)–I(7)	114.45(8)
I(1)–Ag(4)–I(3)	107.64(7)	I(1)–Ag(4)–I(6)	106.03(6)
I(1)–Ag(4)–I(8)	108.47(7)	I(3)–Ag(4)–I(6)	108.24(7)
I(3)–Ag(4)–I(8)	107.97(7)	I(6)–Ag(4)–I(8)	118.07(7)
I(3)–Ag(5)–I(3)#2	101.15(6)	I(3)–Ag(5)–I(4)	121.17(7)
I(3)#2–Ag(5)–I(4)	110.68(7)	I(3)#2–Ag(5)–I(6)	106.92(7)
I(3)–Ag(5)–I(6)	111.50(7)	I(4)–Ag(5)–I(6)	104.78(7)
I(5)–Ag(6)–I(7)	130.87(7)	I(5)–Ag(6)–I(9)	114.59(7)
I(5)–Ag(6)–I(10)	112.56(7)	I(7)–Ag(6)–I(9)	95.97(6)
I(7)–Ag(6)–I(10)	97.85(7)	I(9)–Ag(6)–I(10)	99.78(6)
I(8)#3–Ag(7)–I(9)	124.10(8)	I(8)#3–Ag(7)–I(10)	126.35(8)
I(9)–Ag(7)–I(10)	105.73(7)	Ag(1)–I(1)–Ag(2)	64.41(5)

Ag(1)–I(1)–Ag(3)	109.99(6)	Ag(1)–I(1)–Ag(4)	70.40(6)
Ag(2)–I(1)–Ag(3)	71.90(6)	Ag(2)–I(1)–Ag(4)	107.57(6)
Ag(3)–I(1)–Ag(4)	74.51(6)	Ag(1)–I(2)–Ag(2)	68.30(5)
Ag(1)–I(3)–Ag(4)	68.51(5)	Ag(1)–I(3)–Ag(5)	93.63(6)
Ag(1)–I(3)–Ag(5)#2	155.20(7)	Ag(4)–I(3)–Ag(5)	63.67(6)
Ag(4)–I(3)–Ag(5)#2	126.02(6)	Ag(5)–I(3)–Ag(5)#2	78.85(6)
Ag(2)–I(4)–Ag(3)	74.35(6)	Ag(2)–I(4)–Ag(5)	99.50(6)
Ag(3)–I(4)–Ag(5)	72.62(6)	Ag(2)–I(5)–Ag(6)	96.72(6)
Ag(3)–I(6)–Ag(4)	73.05(6)	Ag(3)–I(6)–Ag(5)	69.65(6)
Ag(4)–I(6)–Ag(5)	64.85(6)	Ag(3)–I(7)–Ag(6)	85.39(7)
Ag(4)–I(8)–Ag(7)#1	94.10(7)	Ag(6)–I(9)–Ag(7)	61.95(6)
Ag(1)#3–I(10)–Ag(6)	141.48(7)	Ag(1)#3–I(10)–Ag(7)	89.86(7)
Ag(6)–I(10)–Ag(7)	60.65(6)	O(1)–Dy(1)–O(2)	73.0(5)
O(1)–Dy(1)–O(3)	74.1(4)	O(1)–Dy(1)–O(4)	76.2(4)
O(1)–Dy(1)–O(5)	73.9(4)	O(1)–Dy(1)–O(6)	146.4(5)
O(1)–Dy(1)–O(7)	126.3(5)	O(1)–Dy(1)–O(8)	131.2(4)
O(2)–Dy(1)–O(3)	91.4(6)	O(2)–Dy(1)–O(4)	148.9(5)
O(2)–Dy(1)–O(5)	98.8(5)	O(2)–Dy(1)–O(6)	139.8(6)
O(2)–Dy(1)–O(7)	73.3(6)	O(2)–Dy(1)–O(8)	75.3(5)
O(3)–Dy(1)–O(4)	76.1(4)	O(3)–Dy(1)–O(5)	141.7(4)
O(3)–Dy(1)–O(6)	105.5(5)	O(3)–Dy(1)–O(7)	146.4(4)
O(3)–Dy(1)–O(8)	70.5(4)	O(4)–Dy(1)–O(5)	76.3(4)
O(4)–Dy(1)–O(6)	71.3(5)	O(4)–Dy(1)–O(7)	130.7(4)
O(4)–Dy(1)–O(8)	124.5(4)	O(5)–Dy(1)–O(6)	90.2(5)
O(5)–Dy(1)–O(7)	71.4(4)	O(5)–Dy(1)–O(8)	147.8(4)
O(6)–Dy(1)–O(7)	72.6(6)	O(6)–Dy(1)–O(8)	76.5(6)
O(7)–Dy(1)–O(8)	76.6(4)		

Symmetry transformations used to generate equivalent atoms: #1 –x+1, –y+1, –z

Table S6. Selected Bond Lengths (Å) and angles (°) for **6**

Ag(1)–I(1)	3.001(4)	Ag(1)–I(2)	2.722(3)
Ag(1)–I(3)	2.860(4)	Ag(1)–Ag(5)#1	2.844(4)
Ag(1)–I(8)#1	2.948(4)	Ag(1)–I(2)	2.892(3)
Ag(2)–I(4)	2.800(4)	Ag(2)–Ag(4)#1	3.379(4)
Ag(2)–I(7)#1	2.847(4)	Ag(2)–I(8)#1	2.905(3)
Ag(3)–I(2)	2.816(4)	Ag(3)–I(4)	2.784(4)
Ag(3)–I(5)	2.803(4)	Ag(3)···I(1)	3.509(4)
Ag(4)–I(6)	2.882(3)	Ag(4)–I(5)	2.862(3)
Ag(4)–I(8)	2.923(3)	Ag(4)–I(7)	2.920(3)
Ag(5)···I(8)	3.353(4)	Ag(4)–Ag(2)#2	3.379(4)
Ag(5)–I(1)#2	2.961(4)	Ag(5)–I(3)#2	2.843(4)
Ag(5)–I(6)	2.722(4)	Ag(5)–Ag(1)#2	2.844(4)
Yb(1)–O(1)	2.339(15)	Yb(1)–O(2)	2.328(16)
Yb(1)–O(3)	2.188(16)	Yb(1)–O(4)	2.267(15)
Yb(1)–O(5)	2.292(15)	Yb(1)–O(6)	2.153(16)
Yb(1)–O(7)	2.276(13)		
I(1)–Ag(1)–I(2)	111.35(12)	I(1)–Ag(1)–I(3)	100.48(10)
I(1)–Ag(1)–I(8)#1	101.39(10)	I(2)–Ag(1)–I(3)	122.29(13)
I(2)–Ag(1)–I(8)#1	114.76(12)	I(3)–Ag(1)–I(8)#1	103.79(11)
Ag(5)#1–Ag(1)–I(1)	60.81(10)	Ag(5)#1–Ag(1)–I(2)	171.81(16)
Ag(5)#1–Ag(1)–I(3)	59.80(10)	Ag(5)#1–Ag(1)–I(8)#1	70.72(11)
I(1)–Ag(2)–I(4)	111.43(11)	I(1)–Ag(2)–I(7)#1	112.49(11)
I(1)–Ag(2)–I(8)#1	105.16(10)	I(4)–Ag(2)–I(7)#1	113.46(11)
I(4)–Ag(2)–I(8)#1	109.60(11)	I(7)#1–Ag(2)–I(8)#1	104.05(11)
Ag(4)#1–Ag(2)–I(1)	100.48(10)	Ag(4)#1–Ag(2)–I(4)	147.68(12)
Ag(4)#1–Ag(2)–I(7)#1	55.14(8)	Ag(4)#1–Ag(2)–I(8)#1	54.82(8)
I(2)–Ag(3)–I(4)	119.08(12)	I(2)–Ag(3)–I(5)	117.20(13)
I(4)–Ag(3)–I(5)	118.42(13)	I(5)–Ag(4)–I(6)	102.48(11)
I(5)–Ag(4)–I(7)	117.55(11)	I(5)–Ag(4)–I(8)	105.29(10)
I(6)–Ag(4)–I(7)	112.94(11)	I(6)–Ag(4)–I(8)	117.20(10)
I(7)–Ag(4)–I(8)	101.81(10)	Ag(2)#2–Ag(4)–I(5)	145.21(11)
Ag(2)#2–Ag(4)–I(6)	111.91(11)	Ag(2)#2–Ag(4)–I(7)	53.15(8)
Ag(2)#2–Ag(4)–I(8)	54.32(8)	I(1)#2–Ag(5)–I(3)#2	101.83(11)
I(1)#2–Ag(5)–I(6)	122.96(14)	I(3)#2–Ag(5)–I(6)	126.52(14)
Ag(1)#2–Ag(5)–I(1)#2	62.22(10)	Ag(1)#2–Ag(5)–I(3)#2	60.38(10)
Ag(1)#2–Ag(5)–I(6)	164.93(17)	Ag(1)–I(1)–Ag(2)	70.20(9)

Ag(1)–I(1)–Ag(5)#1	56.97(9)	Ag(2)–I(1)–Ag(5)#1	76.47(10)
Ag(1)–I(2)–Ag(3)	78.38(13)	Ag(1)–I(3)–Ag(5)#1	59.83(9)
Ag(2)–I(4)–Ag(3)	78.47(13)	Ag(3)–I(5)–Ag(4)	112.00(13)
Ag(4)–I(6)–Ag(5)	67.69(10)	Ag(2)#2–I(7)–Ag(4)	71.72(9)
Ag(2)#2–I(8)–Ag(4)	70.86(9)	Ag(1)#2–I(8)–Ag(2)#2	70.77(10)
Ag(1)#2–I(8)–Ag(4)	109.65(10)	O(1)–Yb(1)–O(2)	69.9(5)
O(1)–Yb(1)–O(3)	85.6(8)	O(1)–Yb(1)–O(4)	141.6(6)
O(1)–Yb(1)–O(5)	71.6(5)	O(1)–Yb(1)–O(6)	97.8(8)
O(1)–Yb(1)–O(7)	141.6(6)	O(2)–Yb(1)–O(3)	93.3(8)
O(2)–Yb(1)–O(4)	73.0(6)	O(2)–Yb(1)–O(5)	138.1(6)
O(2)–Yb(1)–O(6)	84.5(8)	O(2)–Yb(1)–O(7)	147.1(6)
O(3)–Yb(1)–O(4)	87.0(7)	O(3)–Yb(1)–O(5)	99.6(7)
O(3)–Yb(1)–O(6)	175.0(8)	O(3)–Yb(1)–O(7)	82.9(7)
O(4)–Yb(1)–O(5)	146.8(6)	O(4)–Yb(1)–O(6)	88.0(8)
O(4)–Yb(1)–O(7)	74.2(6)	O(5)–Yb(1)–O(6)	85.0(8)
O(5)–Yb(1)–O(7)	74.4(6)	O(6)–Yb(1)–O(7)	96.5(7)

Symmetry transformations used to generate equivalent atoms: #1 –x+1, –y+1, –z.

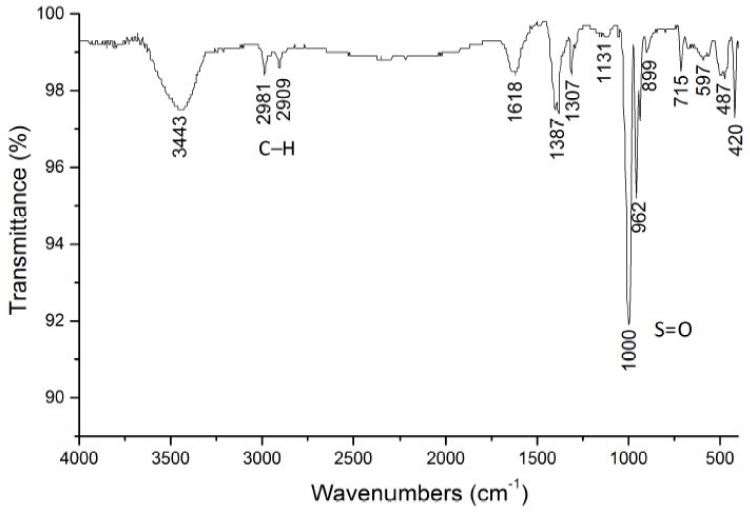


Fig. S1. IR spectrum of compound **1**.

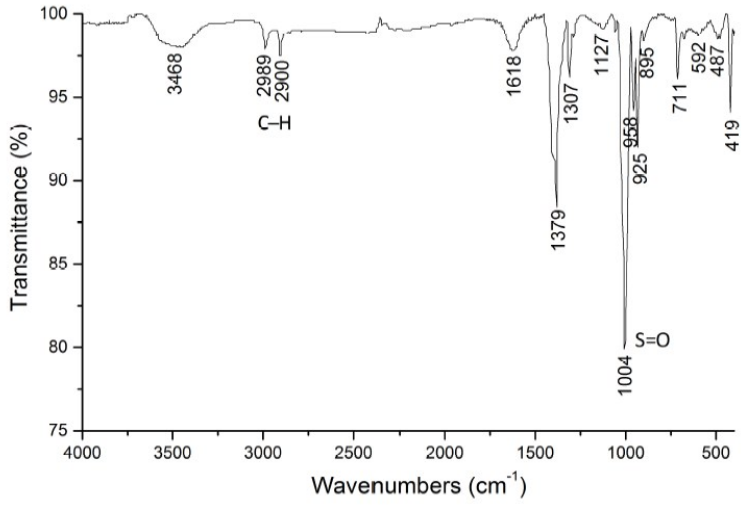


Fig. S2. IR spectrum of compound **2**.

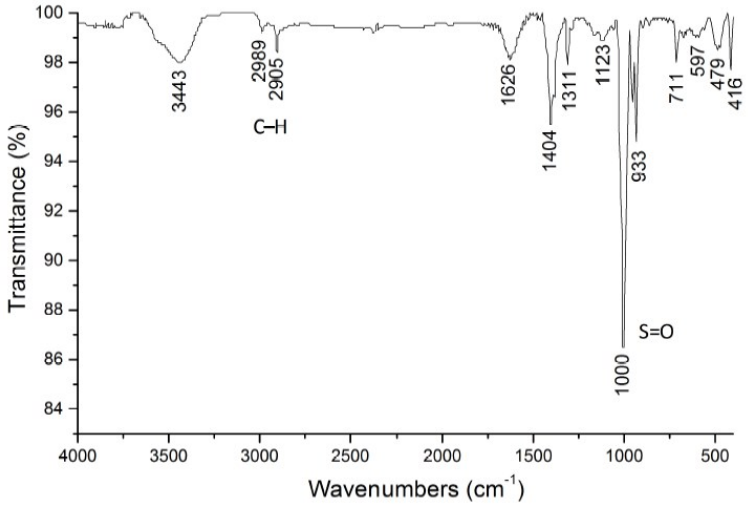


Fig. S3. IR spectrum of compound **3**.

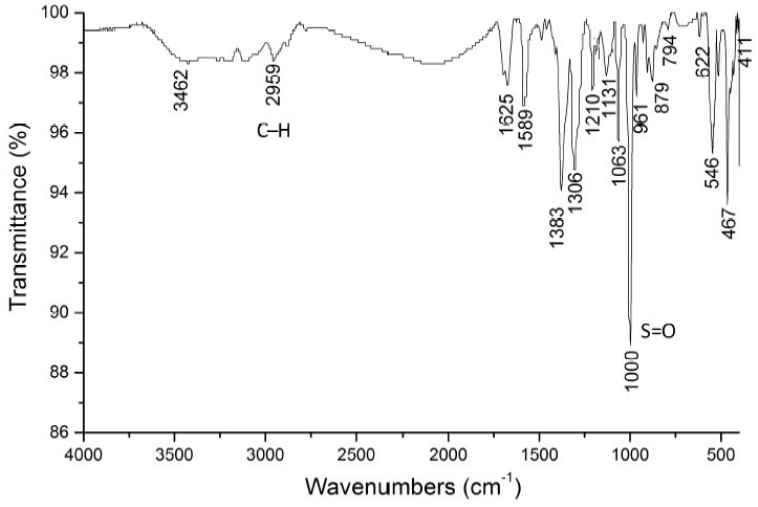


Fig. S4. IR spectrum of compound **4.**

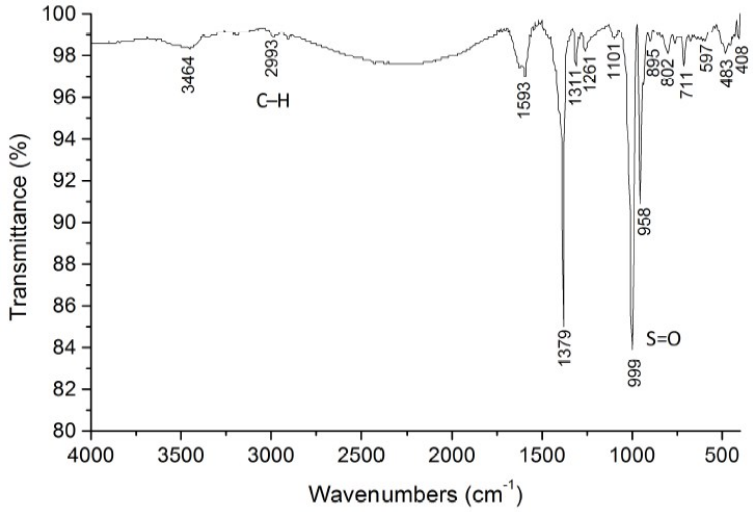


Fig. S5. IR spectrum of compound **5.**

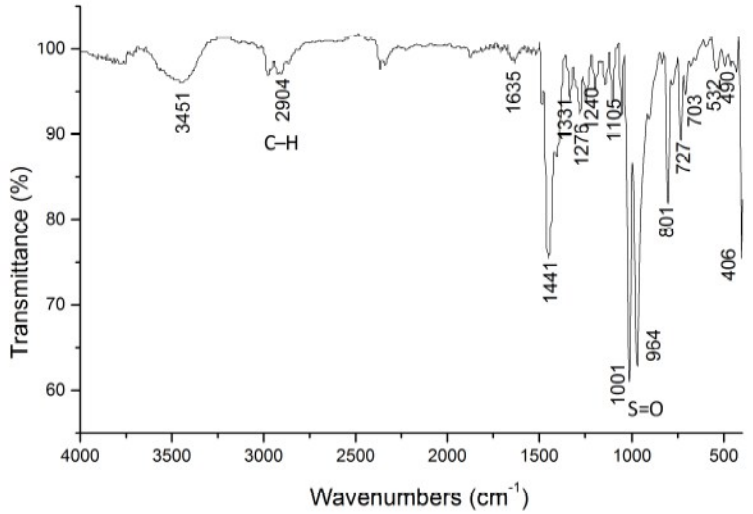
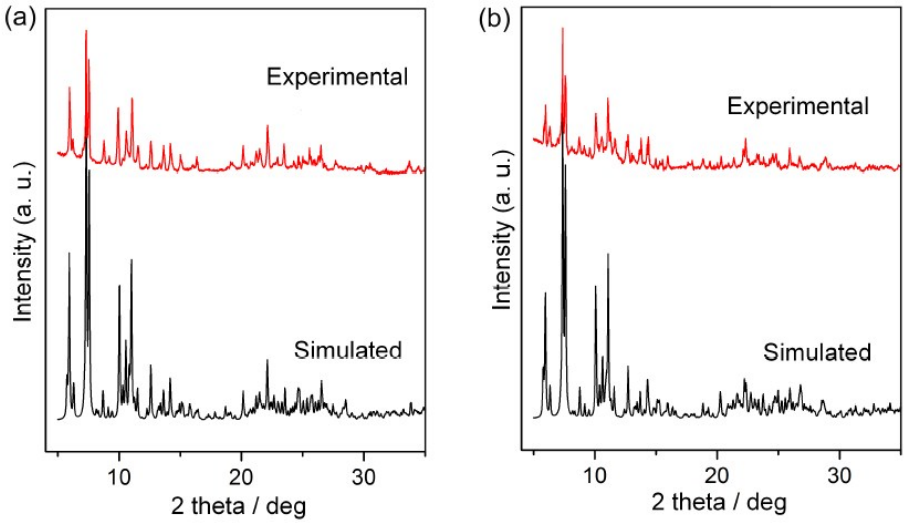


Fig. S6. IR spectrum of compound **6.**



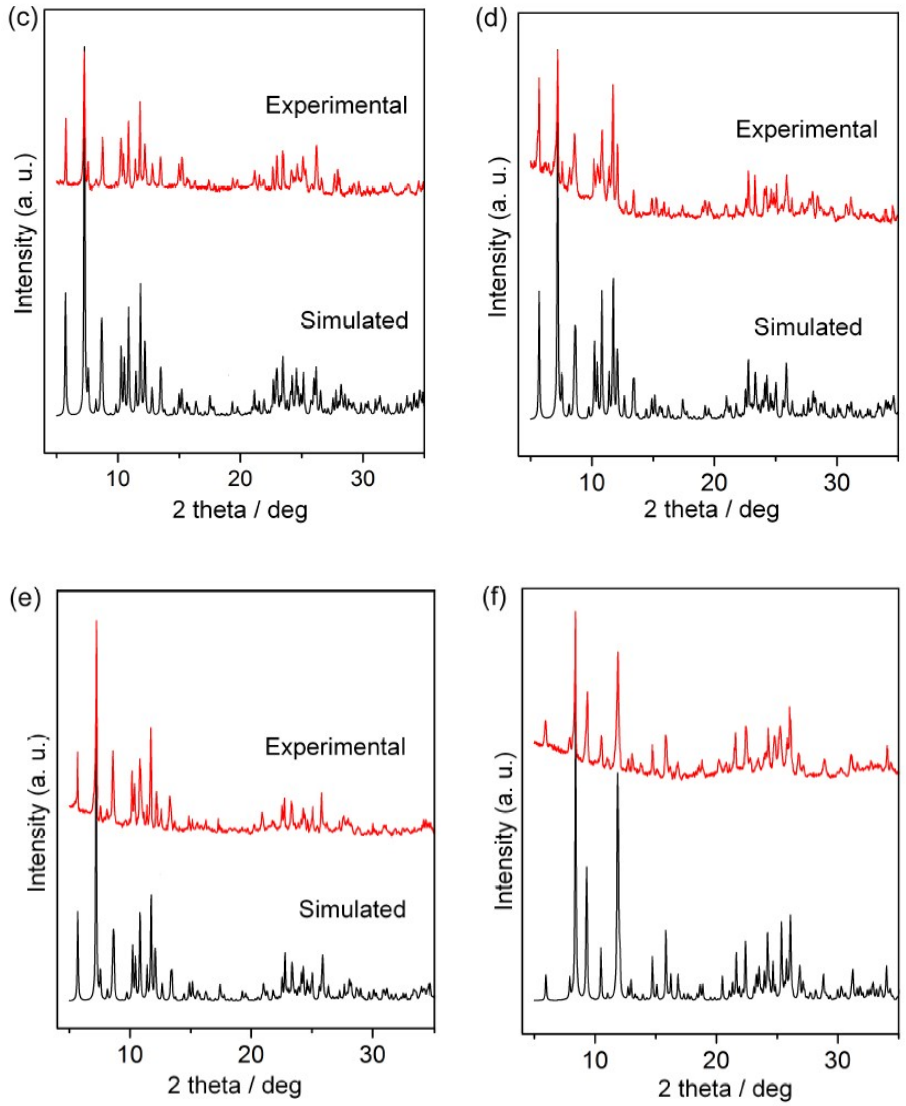


Fig. S7 Experimental and simulated powder XRD patterns of compounds **1**(a), **2**(b), **3**(c), **4**(d), **5**(e), and **6**(f).

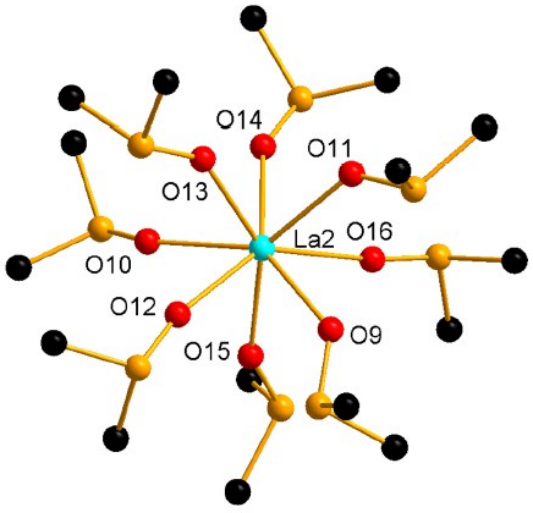


Fig. S8 Crystal structure of the $[La(2)(DMSO)_8]^{3+}$ compound in **1** with the labelling scheme.

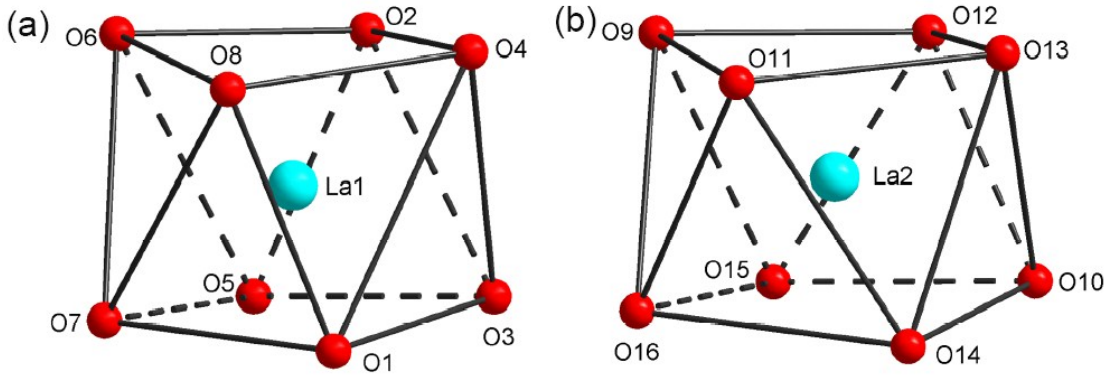


Fig. S9 The distorted square antiprisms LaO_8 of $[La(1)(DMSO)_8]^{3+}$(a) and $[La(2)(DMSO)_8]^{3+}$(b) in **1**.

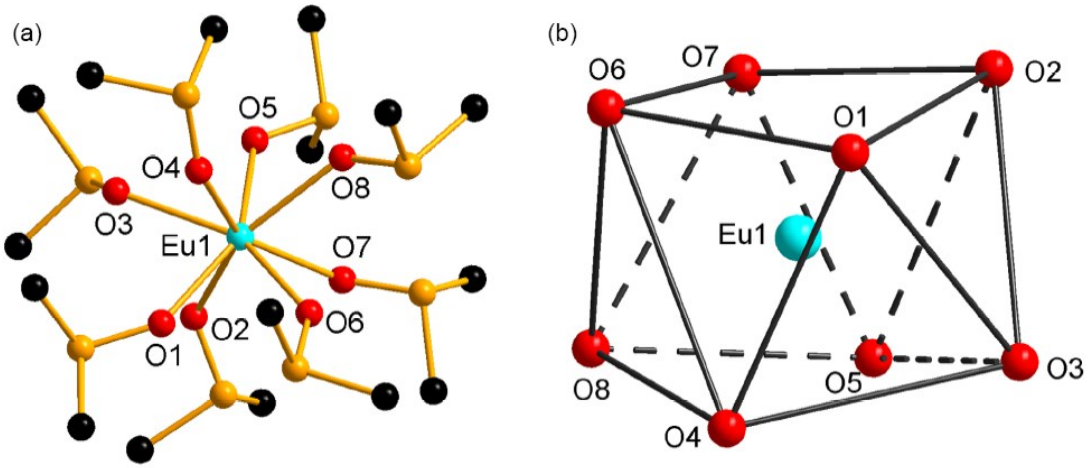


Fig. S10 (a) Crystal structure of the $[Eu(DMSO)_8]^{3+}$ compound in **3** with the labelling scheme. (b) The distorted square antiprism EuO_8 of $[Eu(DMSO)_8]^{3+}$ in **3**.

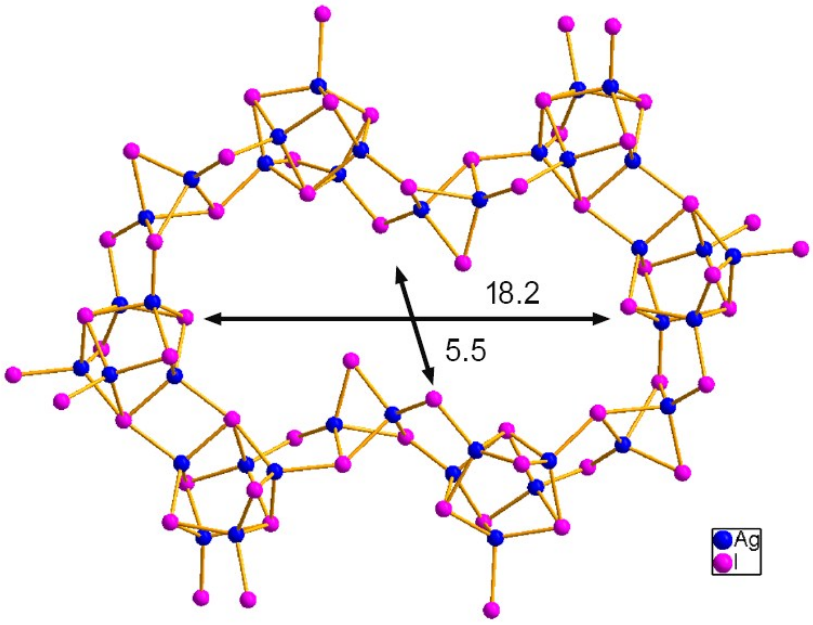


Fig. S11 A diagram of the $Ag_{16}I_{16}$ circle in the $[Ag_7I_{10}^{3-}]_n$ layer of **3**. Measures are given in angstroms.

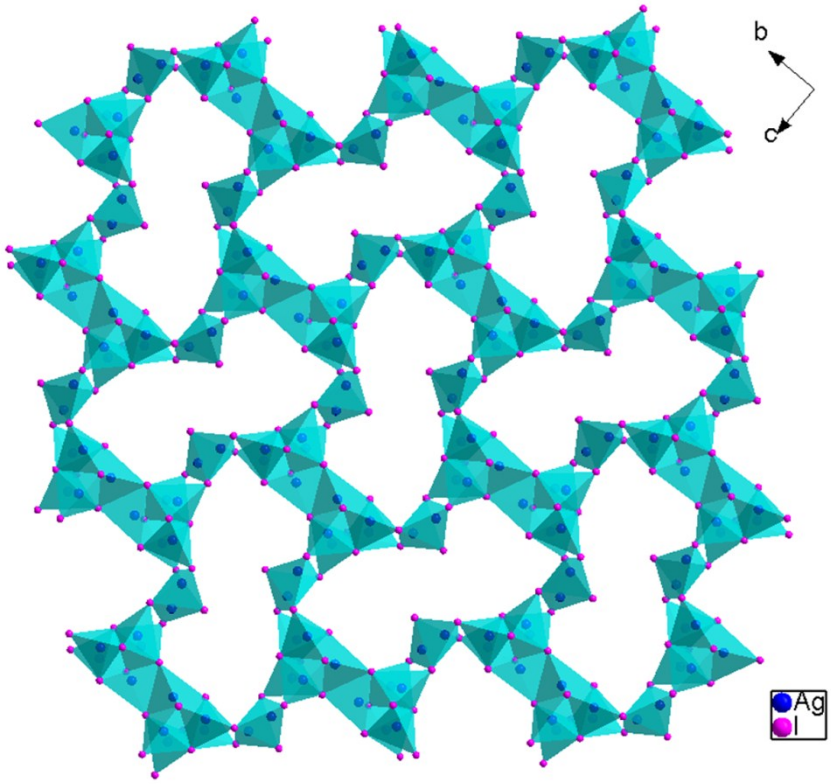


Fig. S12 A diagram of the $[Ag_7I_{10}^{3-}]_n$ layer in **3** viewed along the *a* axis. Cyan tetrahedron: AgI_4.

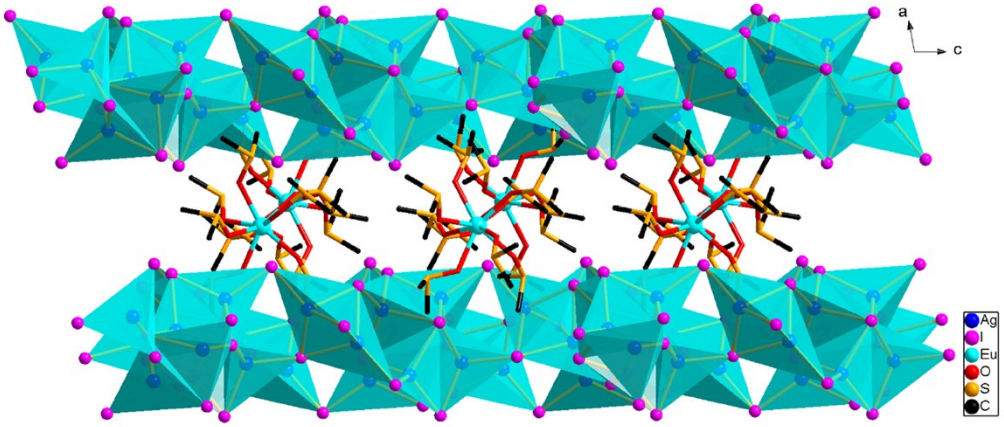


Fig. S13 Packing diagram of **3** viewed along the *b* axis. Cyan tetrahedron: AgI_4.

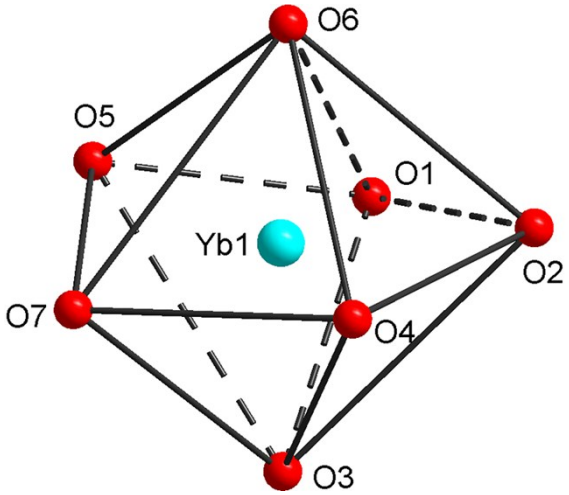


Fig. S14 The distorted pentagonal bipyramid YbO_7 of $[Yb(DMSO)_7]^{3+}$ in **6**.

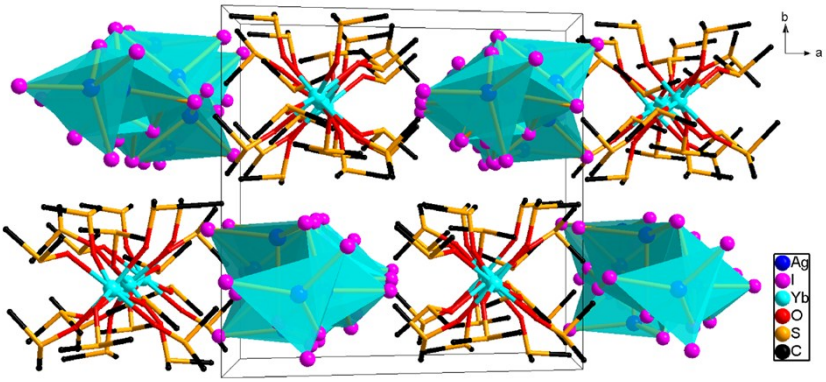


Fig. S15 Packing diagram of **6** viewed along the *c* axis. Cyan tetrahedron: AgI_4.

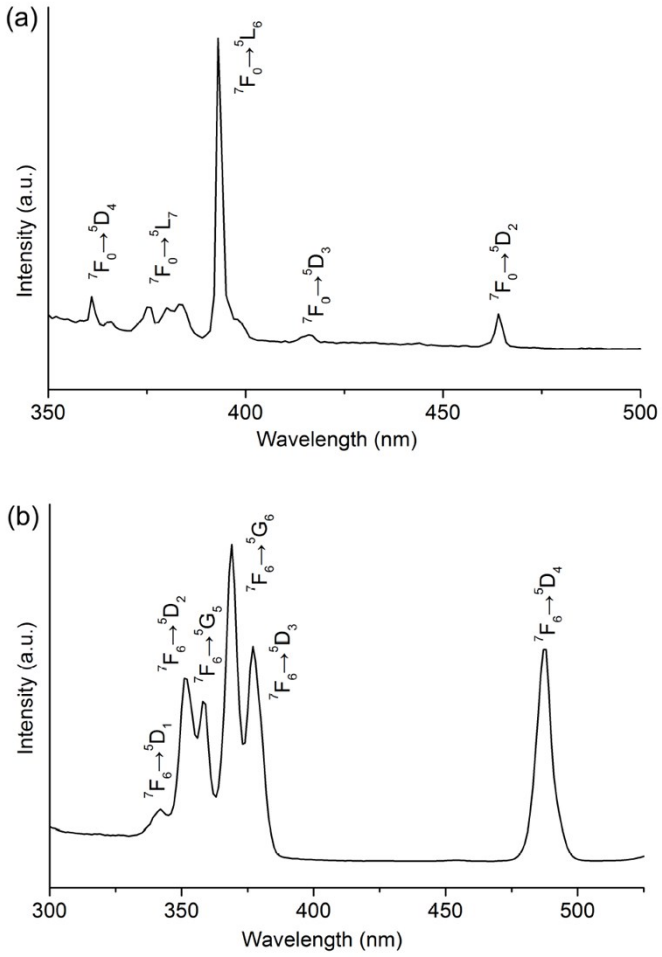


Fig. S16 Solid-state excitation spectra of **3**(a) (λ_{em} = 614 nm) and **4** (b) (λ_{em} = 542 nm).

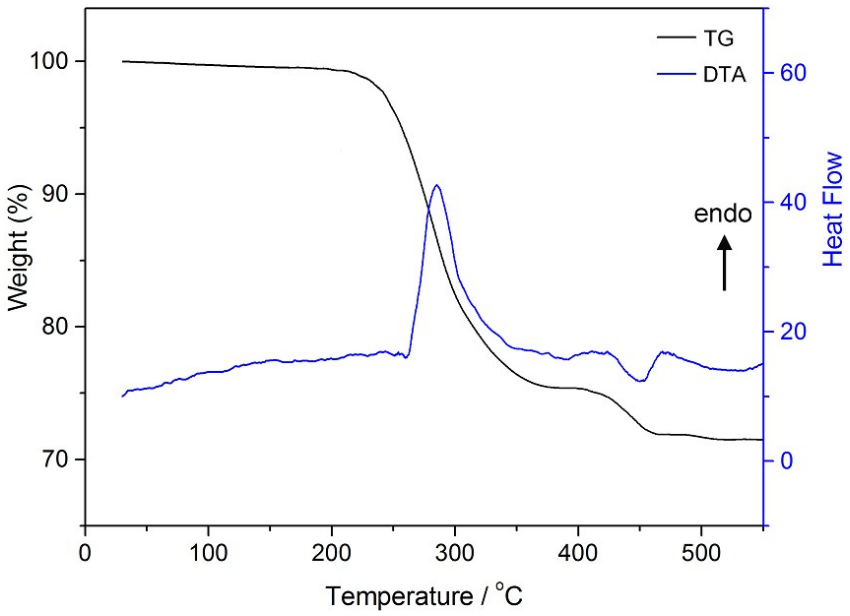


Fig. S17 TG-DTA curves of compound **1**.

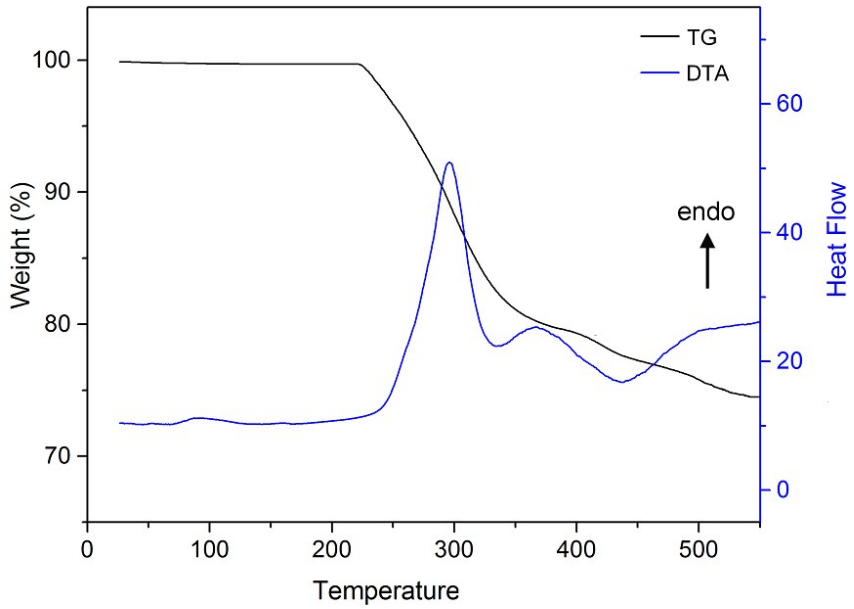


Fig. S18 TG-DTA curves of compound **3**.

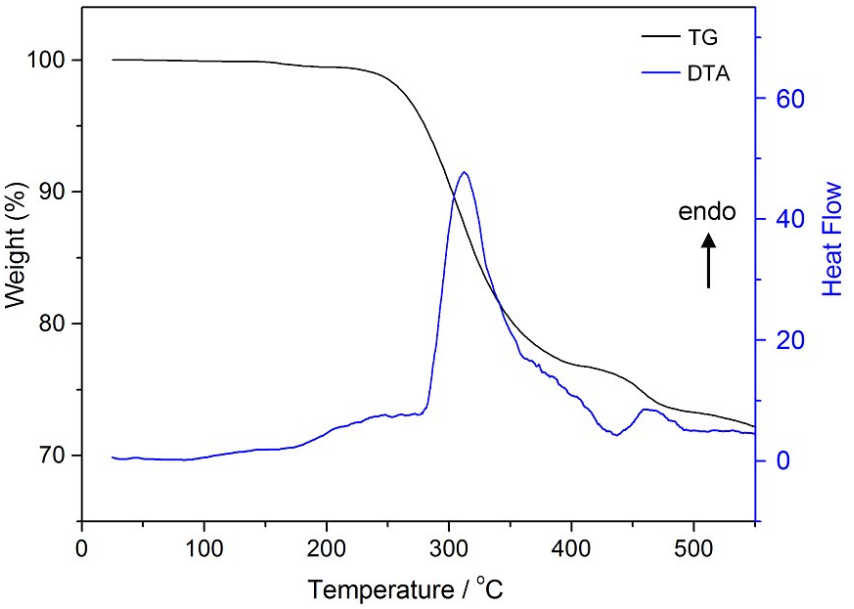


Fig. S19 TG-DTA curves of compound **6**.

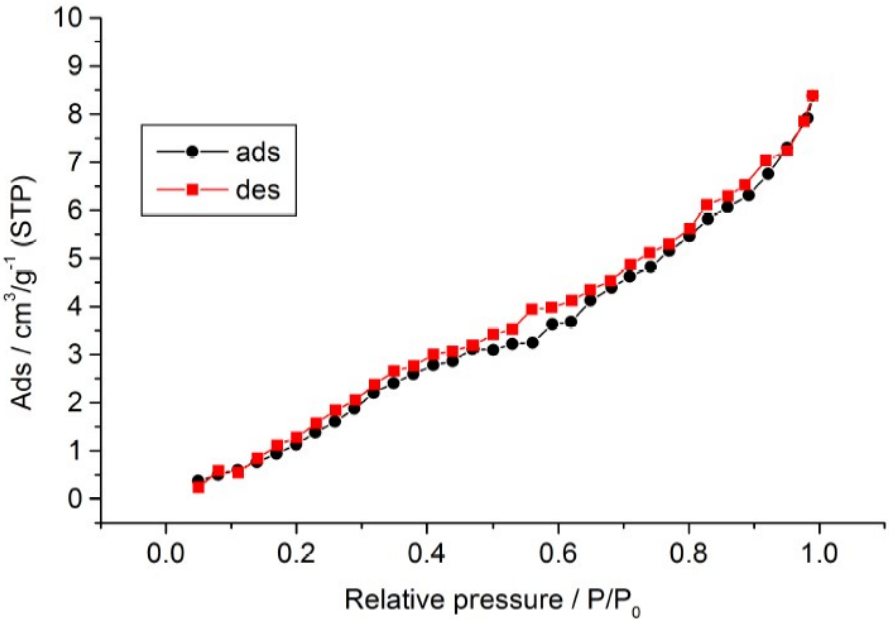


Fig. S20 N_2 adsorption-desorption isotherms for the decomposition residue of **3** at 400 ^oC.