

Electronic Supplementary Information

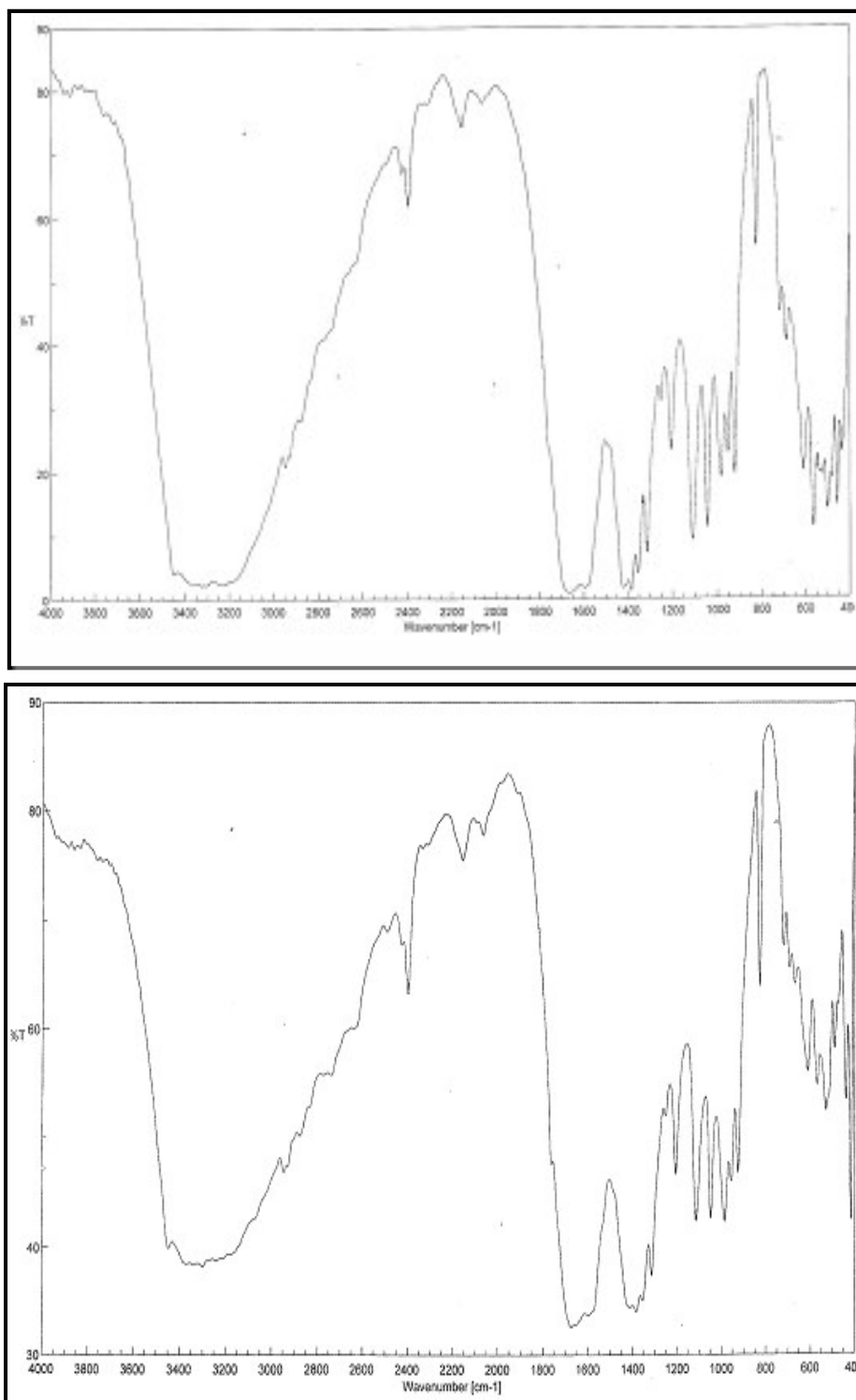


Figure ESI S1 Infrared spectra of (GunH)₃[La(tda)₃] & (GunH)₃[Ce(tda)₃] in type I

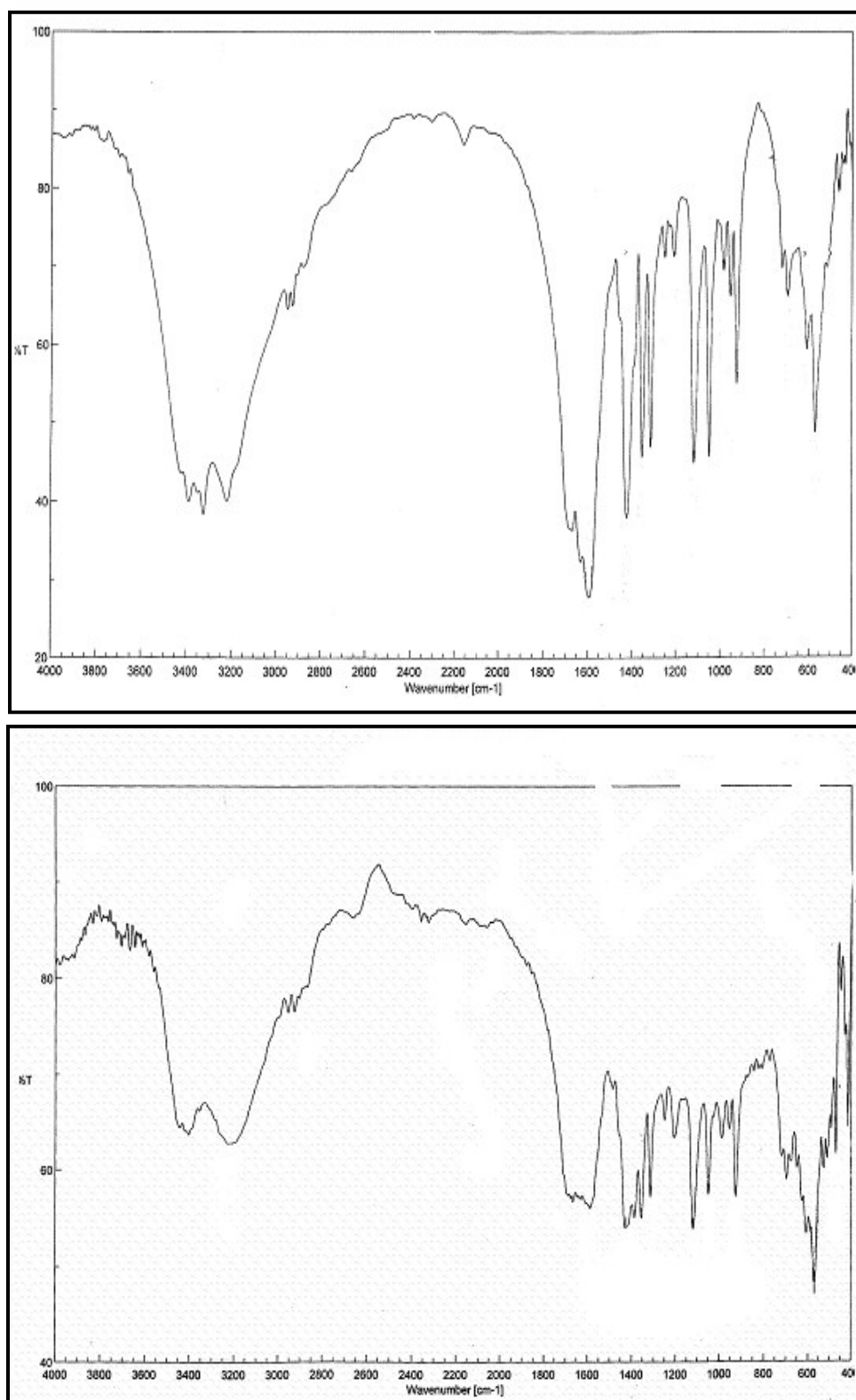


Figure ESI S2 Infrared spectra of (AgunH)₃[La(oda)₃].H₂O & (AgunH)₃[Ce(tda)₃].H₂O in type II

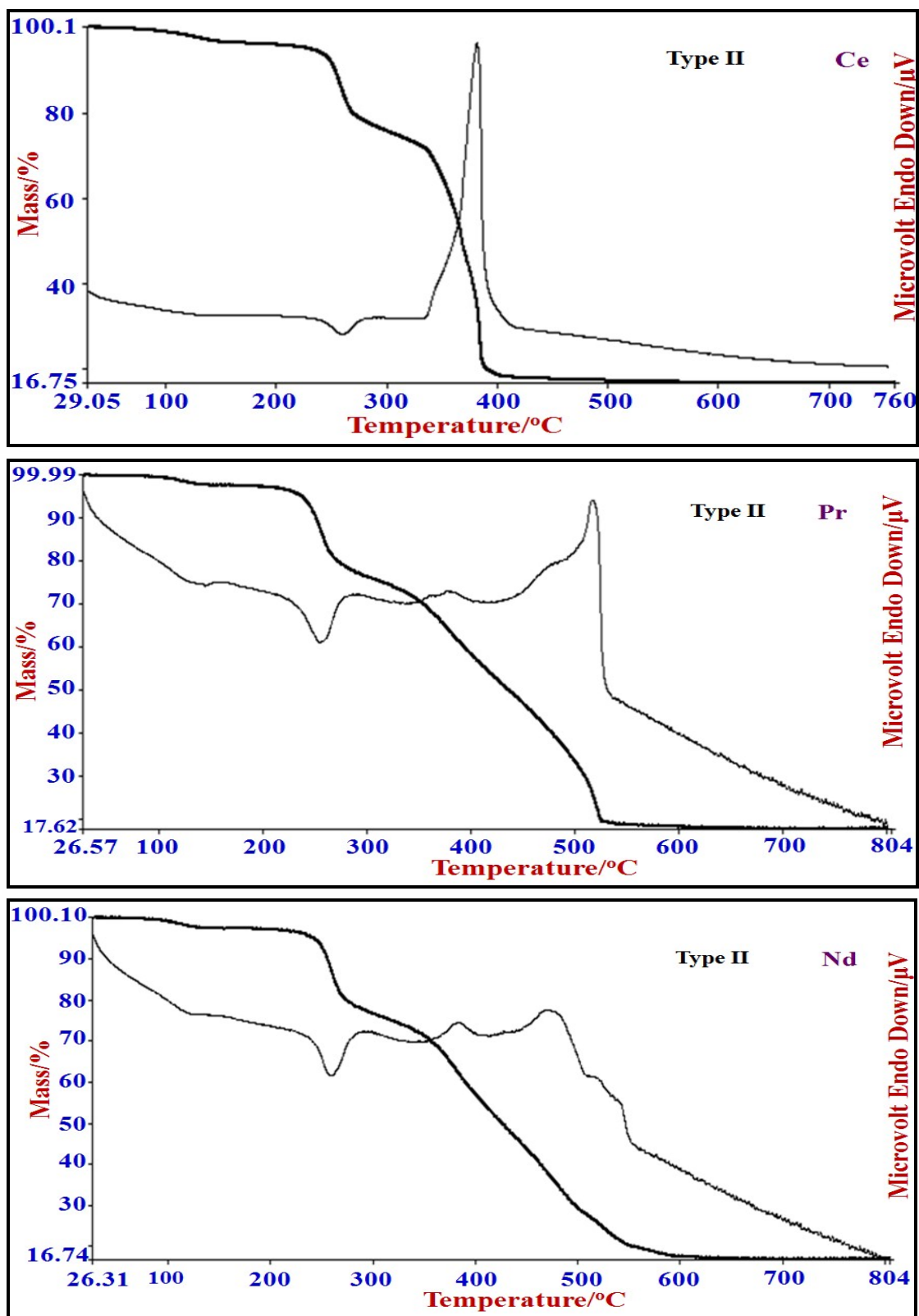


Figure ESI S3 Simultaneous TGA/DTA of $(\text{AgunH})_3[\text{Ce}(\text{oda})_3] \cdot \text{H}_2\text{O}$, $(\text{AgunH})_3[\text{Pr}(\text{oda})_3] \cdot \text{H}_2\text{O}$ and $(\text{AgunH})_3[\text{Nd}(\text{oda})_3] \cdot \text{H}_2\text{O}$ in type II

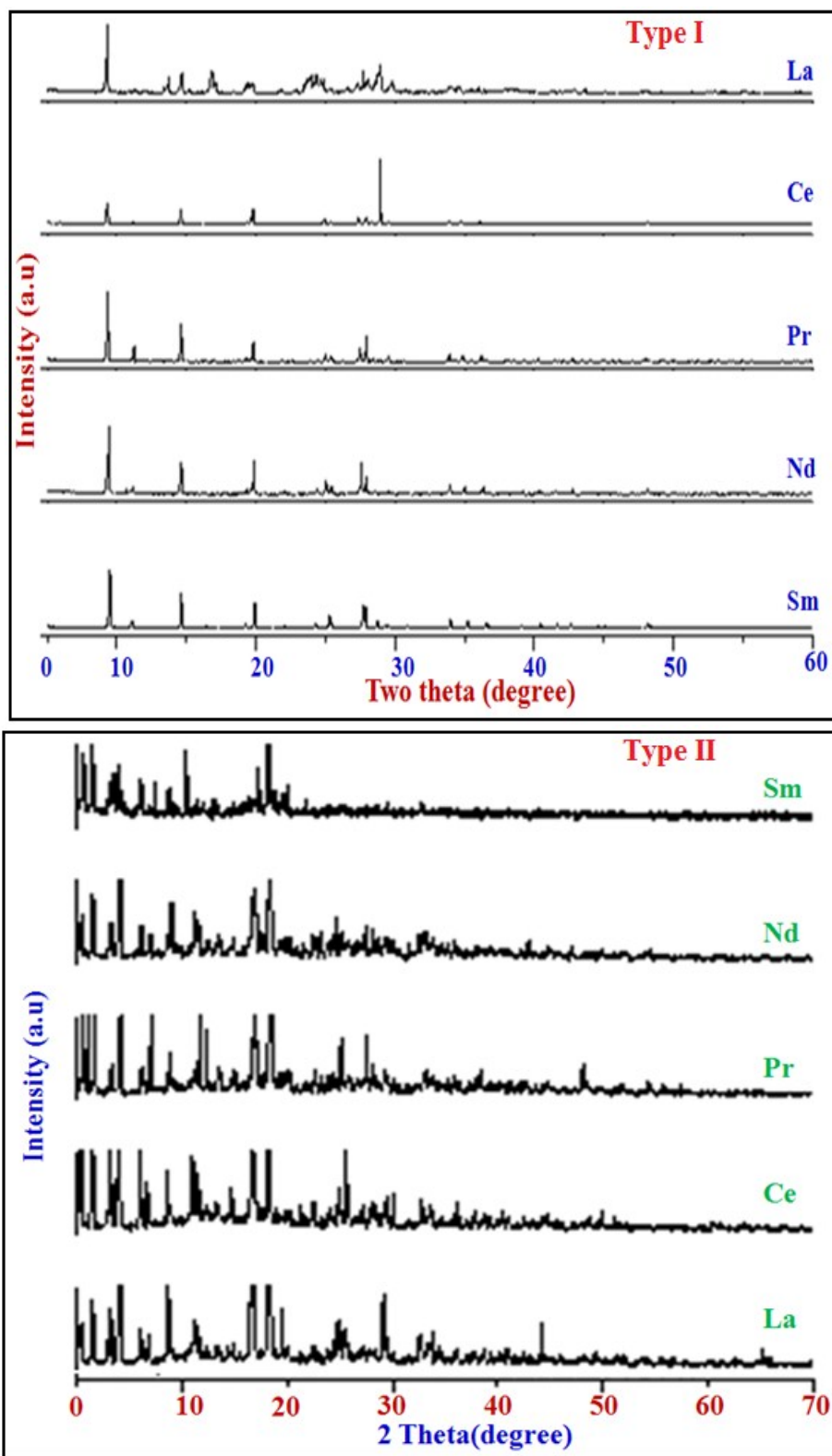


Figure ESI S4 Powder XRD patterns of type I and II complexes

Table ESI T1 Bond lengths (Å) for Pr, Nd in **I** and La in **II**

Atom	Atom	Pr	Nd	La		Length/Å	Atom	Atom	Length/Å
		Length/Å	Length/Å	Atom	Atom				
Ln	O ¹	2.387(3)	2.388(3)	La	O1C	2.513(2)	C30	N30	1.318(4)
Ln	O ²	2.387(3)	2.388(3)	La	O2C	2.489(2)	C30	N31	1.335(4)
Ln	O ³	2.387(3)	2.388(3)	La	O3C	2.5913(18)	C30	N32	1.329(4)
Ln	O	2.387(3)	2.388(3)	La	O2A	2.521(2)	N32	N33	1.410(4)
Ln	O ⁴	2.387(3)	2.388(3)	La	O1B	2.542(2)	C1A	O1A	1.268(3)
Ln	O ⁵	2.387(3)	2.388(3)	La	O3A	2.6077(18)	C1A	O4A	1.242(3)
S2	C3 ⁵	1.800(5)	1.803(5)	La	O3B	2.6191(19)	C4A	O2A	1.268(3)
S2	C3	1.800(5)	1.803(5)	La	O2B	2.4904(19)	C4A	O5A	1.247(3)
O	C4A	1.272(6)	1.269(6)	La	O1A	2.535(2)	C1B	O1B	1.282(3)
O	C4B	1.272(6)	1.269(6)	C10	N10	1.320(4)	C1B	O4B	1.234(4)
C3	C4A	1.504(6)	1.498(6)	C10	N11	1.329(4)	C4B	O2B	1.260(3)
C3	C4B	1.504(6)	1.498(6)	C10	N12	1.330(4)	C4B	O5B	1.240(3)
C4B	O2	1.267(10)	1.259(10)	N12	N13	1.409(3)	C1C	O1C	1.278(3)
N1	C0AA	1.319(9)	1.317(9)	C20	N20	1.331(4)	C1C	O4C	1.239(4)
C0AA	N1AA	1.322(5)	1.321(5)	C20	N21	1.315(4)	C4C	O2C	1.258(3)
C0AA	N1AA ⁶	1.322(5)	1.321(5)	C20	N22	1.335(4)	C4C	O5C	1.245(3)
O0	C4A	1.240(7)	1.235(7)	N22	N23	1.409(4)			

Table ESI T2 Selected bond angles (°) for Pr, Nd in **I** and La in **II**

Atom	Atom	Atom	Pr	Nd	La			Angle/°
			Angle/°	Atom	Atom	Atom	Atom	
O	Ln	O ¹	82.34(11)	82.07(11)	O2C	La	O1C	120.89(6)
O ²	Ln	O ³	135.33(5)	135.45(5)	O3C	La	O1C	60.62(6)
O ⁴	Ln	O ³	82.34(11)	82.07(11)	O3C	La	O2C	60.96(6)
O ⁵	Ln	O ¹	135.33(5)	135.45(5)	O2A	La	O1C	76.10(7)
O ³	Ln	O ¹	81.05(15)	81.41(15)	O2A	La	O2C	154.23(7)
O ²	Ln	O ¹	82.34(11)	82.07(11)	O2A	La	O3C	135.32(6)
O ⁴	Ln	O ¹	135.33(5)	135.45(5)	O1B	La	O1C	157.10(7)
O ⁵	Ln	O ³	82.34(11)	82.07(11)	O1B	La	O2C	78.94(7)
O ⁵	Ln	O ⁴	82.34(11)	82.07(11)	O1B	La	O3C	134.65(6)
O	Ln	O ²	82.34(11)	82.07(11)	O1B	La	O2A	89.88(7)
O	Ln	O ³	135.32(5)	135.45(5)	O3A	La	O1C	79.34(6)
O	Ln	O ⁴	81.05(15)	81.41(15)	O3A	La	O2C	136.62(6)
O	Ln	O ⁵	135.33(5)	135.45(5)	O3A	La	O3C	116.56(6)
O ⁴	Ln	O ²	135.32(5)	135.45(5)	O3A	La	O2A	61.05(6)
O ⁵	Ln	O ²	81.05(15)	82.07(11)	O3A	La	O1B	78.02(7)
C3	S2	C3 ⁴	98.8(3)	99.3(3)	O3B	La	O1C	129.99(6)
C4B	O	Pr1	135.2(5)	135.4(5)	O3B	La	O2C	80.58(6)
C4B	O	C4A	14.3(7)	14.3(7)	O3B	La	O3C	126.14(6)
C4A	O	Pr1	144.9(3)	144.9(3)	O3B	La	O2A	73.74(7)
C4B	C3	S2	111.6(4)	111.8(4)	O3B	La	O1B	60.01(6)
C4A	C3	S2	118.1(3)	12.1(6)	O3B	La	O3A	117.30(6)
C4A	C3	C4B	12.1(6)	118.3(3)	O2B	La	O1C	76.14(6)
O	C4B	C3	119.2(4)	119.1(4)	O2B	La	O2C	84.70(7)
O2	C4B	O	120.3(6)	120.5(6)	O2B	La	O3C	78.67(6)
O2	C4B	C3	119.9(6)	120.0(6)	O2B	La	O2A	80.92(7)
N1	C0AA	N1AA	120.0(3)	119.8(3)	O2B	La	O1B	119.99(6)
N1	C0AA	N1AA ⁶	120.0(3)	119.8(3)	O2B	La	O3A	138.67(6)
N1AA ⁶	C0AA	N1AA	119.9(6)	120.3(7)	O2B	La	O3B	60.49(6)
O	C4A	C3	119.2(4)	119.1(4)	O1A	La	O1C	94.12(7)
O0	C4A	O	123.5(5)	123.5(5)	O1A	La	O2C	78.75(7)
O0	C4A	C3	117.3(5)	117.3(5)	O1A	La	O3C	74.59(6)
					O1A	La	O2A	121.77(6)
					O1A	La	O1B	77.77(7)
					O1A	La	O3A	60.72(6)
					O1A	La	O3B	135.73(6)
					O1A	La	O2B	152.92(7)

Table ESI T3 Selected bond lengths (Å) for **La** in **II**

Atom	Atom	Length/Å	Atom	Atom	Length/Å
La	O1C	2.513(2)	O3B	C3B	1.427(3)
La	O2C	2.489(2)	O3B	C2B	1.424(3)
La	O3C	2.5913(18)	O5B	C4B	1.240(3)
La	O2A	2.521(2)	N20	C20	1.331(4)
La	O1B	2.542(2)	O2B	C4B	1.260(3)
La	O3A	2.6077(18)	N30	C30	1.318(4)
La	O3B	2.6191(19)	O1A	C1A	1.268(3)
La	O2B	2.4904(19)	N23	N22	1.409(4)
La	O1A	2.535(2)	O4B	C1B	1.234(4)
O1C	C1C	1.278(3)	C1A	C2A	1.523(4)
O2C	C4C	1.258(3)	N31	C30	1.335(4)
C4C	C3C	1.521(4)	N32	N33	1.410(4)
C4C	O5C	1.245(3)	N32	C30	1.329(4)
O3C	C3C	1.422(3)	C4B	C3B	1.521(4)
O3C	C2C	1.429(3)	N11	C10	1.329(4)
O4C	C1C	1.239(4)	N22	C20	1.335(4)
C1C	C2C	1.515(4)	N10	C10	1.320(4)
O5A	C4A	1.247(3)	N21	C20	1.315(4)
O4A	C1A	1.242(3)	C3A	C4A	1.519(4)
O2A	C4A	1.268(3)	N13	N12	1.409(3)
O1B	C1B	1.282(3)	C1B	C2B	1.518(4)
O3A	C3A	1.422(3)	N12	C10	1.330(4)
O3A	C2A	1.433(3)			

Table ESI T4 Selected bond angles (°) for **La** in **II**

Atom	Atom	Atom	Angle/°	Atom	Atom	Atom	Angle/°
O2C	La	O1C	120.89(6)	O4C	C1C	O1C	125.6(3)
O3C	La	O1C	60.62(6)	C2C	C1C	O1C	117.0(2)
O3C	La	O2C	60.96(6)	C2C	C1C	O4C	117.4(2)
O2A	La	O1C	76.10(7)	O3C	C3C	C4C	108.9(2)
O2A	La	O2C	154.23(7)	C1C	C2C	O3C	108.7(2)
O2A	La	O3C	135.32(6)	C4A	O2A	La	127.84(17)
O1B	La	O1C	157.10(7)	C1B	O1B	La	128.10(18)
O1B	La	O2C	78.94(7)	C3A	O3A	La	123.15(15)
O1B	La	O3C	134.65(6)	C2A	O3A	La	123.62(15)
O1B	La	O2A	89.88(7)	C2A	O3A	C3A	112.7(2)
O3A	La	O1C	79.34(6)	C3B	O3B	La	122.06(15)
O3A	La	O2C	136.62(6)	C2B	O3B	La	123.36(16)
O3A	La	O3C	116.56(6)	C2B	O3B	C3B	111.8(2)
O3A	La	O2A	61.05(6)	C4B	O2B	La	127.98(17)
O3A	La	O1B	78.02(7)	C1A	O1A	La	128.23(17)
O3B	La	O1C	129.99(6)	O1A	C1A	O4A	125.6(3)
O3B	La	O2C	80.58(6)	C2A	C1A	O4A	116.7(2)
O3B	La	O3C	126.14(6)	C2A	C1A	O1A	117.7(2)
O3B	La	O2A	73.74(7)	C30	N32	N33	117.3(2)
O3B	La	O1B	60.01(6)	O2B	C4B	O5B	125.3(3)
O3B	La	O3A	117.30(6)	C3B	C4B	O5B	116.5(2)
O2B	La	O1C	76.14(6)	C3B	C4B	O2B	118.1(2)
O2B	La	O2C	84.70(7)	C20	N22	N23	117.8(2)
O2B	La	O3C	78.67(6)	C4A	C3A	O3A	109.8(2)
O2B	La	O2A	80.92(7)	O4B	C1B	O1B	125.4(3)
O2B	La	O1B	119.99(6)	C2B	C1B	O1B	117.1(2)
O2B	La	O3A	138.67(6)	C2B	C1B	O4B	117.5(3)
O2B	La	O3B	60.49(6)	C10	N12	N13	118.3(2)
O1A	La	O1C	94.12(7)	C1A	C2A	O3A	109.4(2)
O1A	La	O2C	78.75(7)	N22	C20	N20	118.2(3)
O1A	La	O3C	74.59(6)	N21	C20	N20	121.2(3)
O1A	La	O2A	121.77(6)	N21	C20	N22	120.6(3)
O1A	La	O1B	77.77(7)	N10	C10	N11	121.5(3)
O1A	La	O3A	60.72(6)	N12	C10	N11	118.5(3)
O1A	La	O3B	135.73(6)	N12	C10	N10	120.0(3)
O1A	La	O2B	152.92(7)	O2A	C4A	O5A	125.7(3)
C1C	O1C	La	128.35(18)	C3A	C4A	O5A	116.3(2)

C4C	O2C	La	127.13(17)	C3A	C4A	O2A	118.0(2)
C3C	C4C	O2C	117.8(2)	N31	C30	N30	120.6(3)
O5C	C4C	O2C	125.7(3)	N32	C30	N30	119.5(3)
O5C	C4C	C3C	116.5(2)	N32	C30	N31	119.9(3)
C3C	O3C	La	121.65(15)	C4B	C3B	O3B	108.3(2)
C2C	O3C	La	123.30(15)	C1B	C2B	O3B	109.0(2)
C2C	O3C	C3C	112.8(2)				
