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Supporting information for article:

Isomorphous rare-earth tris[bis(2,6-diisopropylphenyl) phosphate] complexes and their catalytic properties in 1,3-diene polymerization and in inhibited oxidation of polydimethylsiloxane

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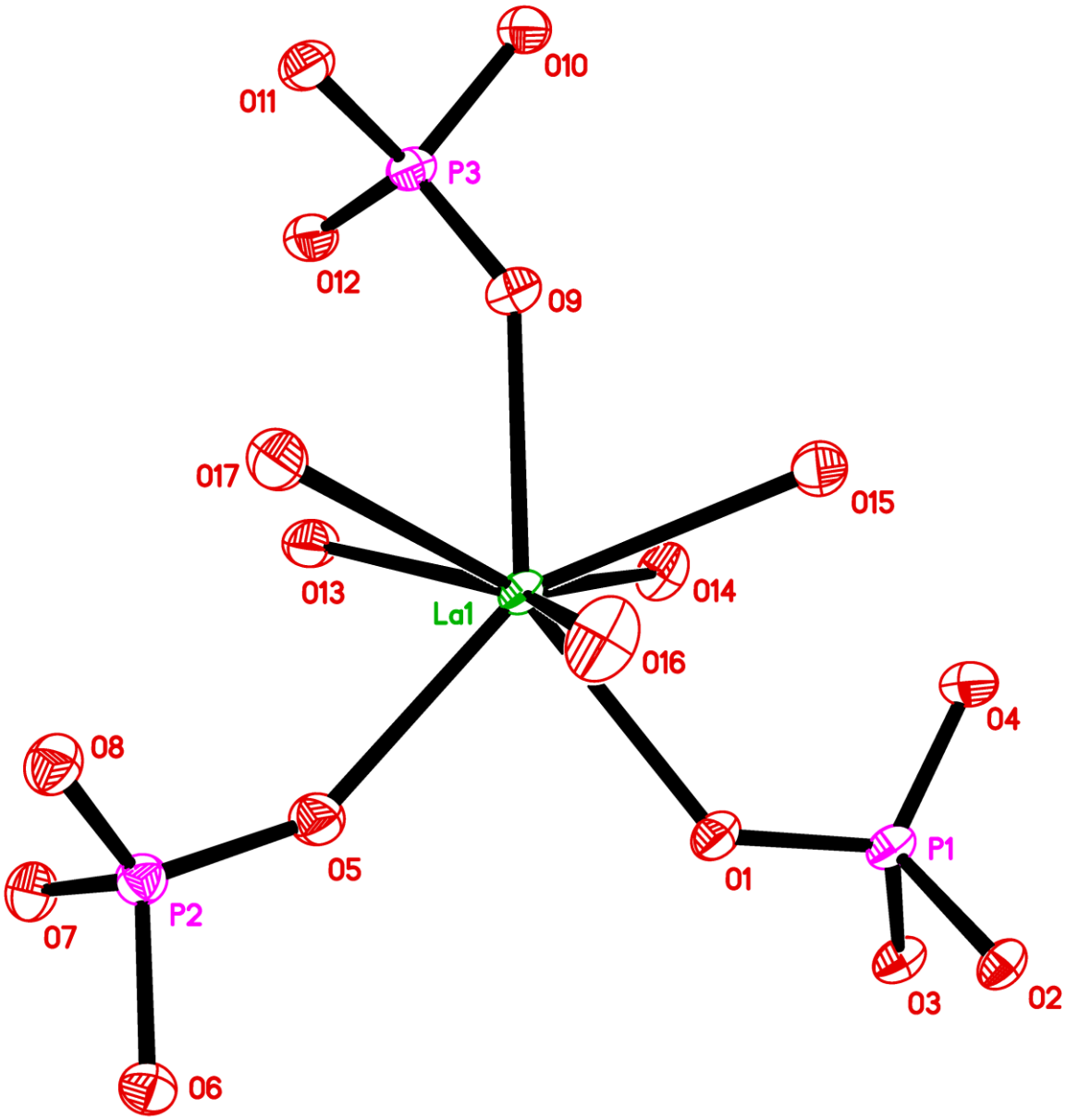

Figure S1 Environments about Ln and P atoms in $[Ln(C_{24}H_{34}O_4P)_3(CH_4O)_5]\cdot CH_3OH$, using (**1**) (Ln=La) as an example.

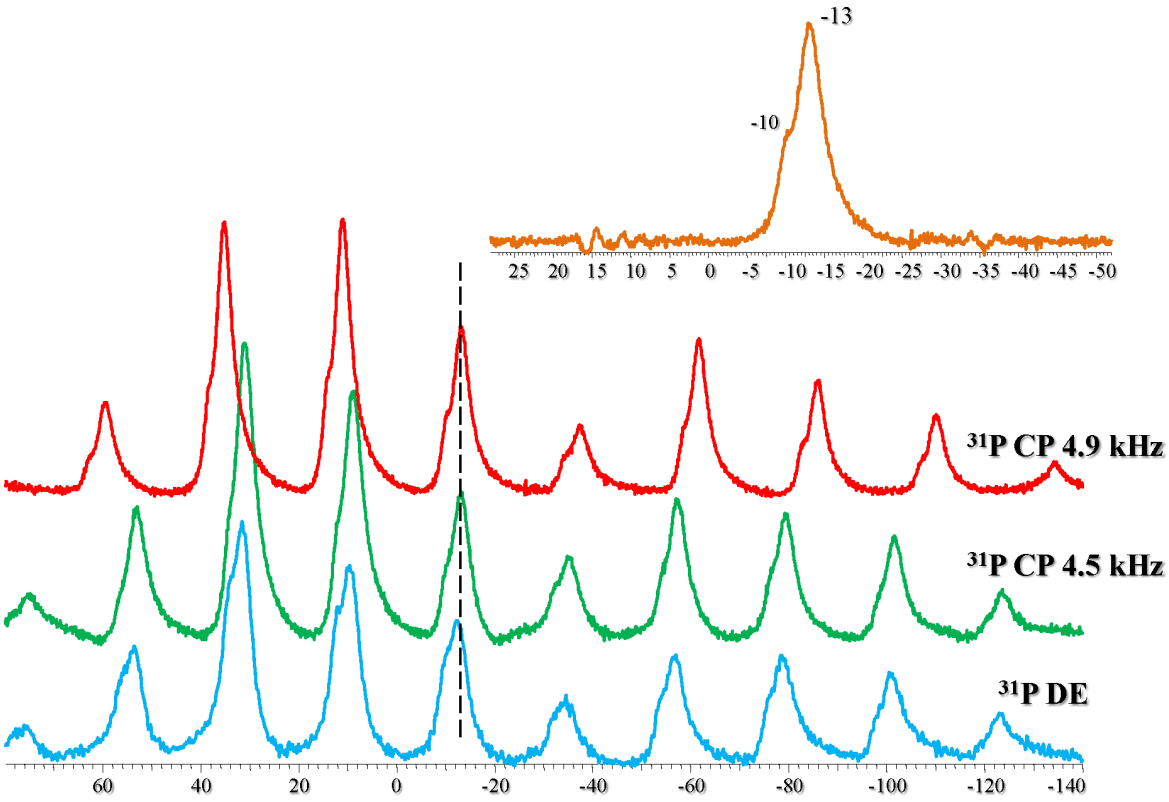

Figure S2 ^{31}P CP MAS NMR spectra of $[La(C_{24}H_{34}O_4P)_3(CH_4O)_5]\cdot CH_3OH$, (**1**), at different rotation frequencies demonstrate signals that correspond to two symmetrically non-equivalent phosphorous centers.

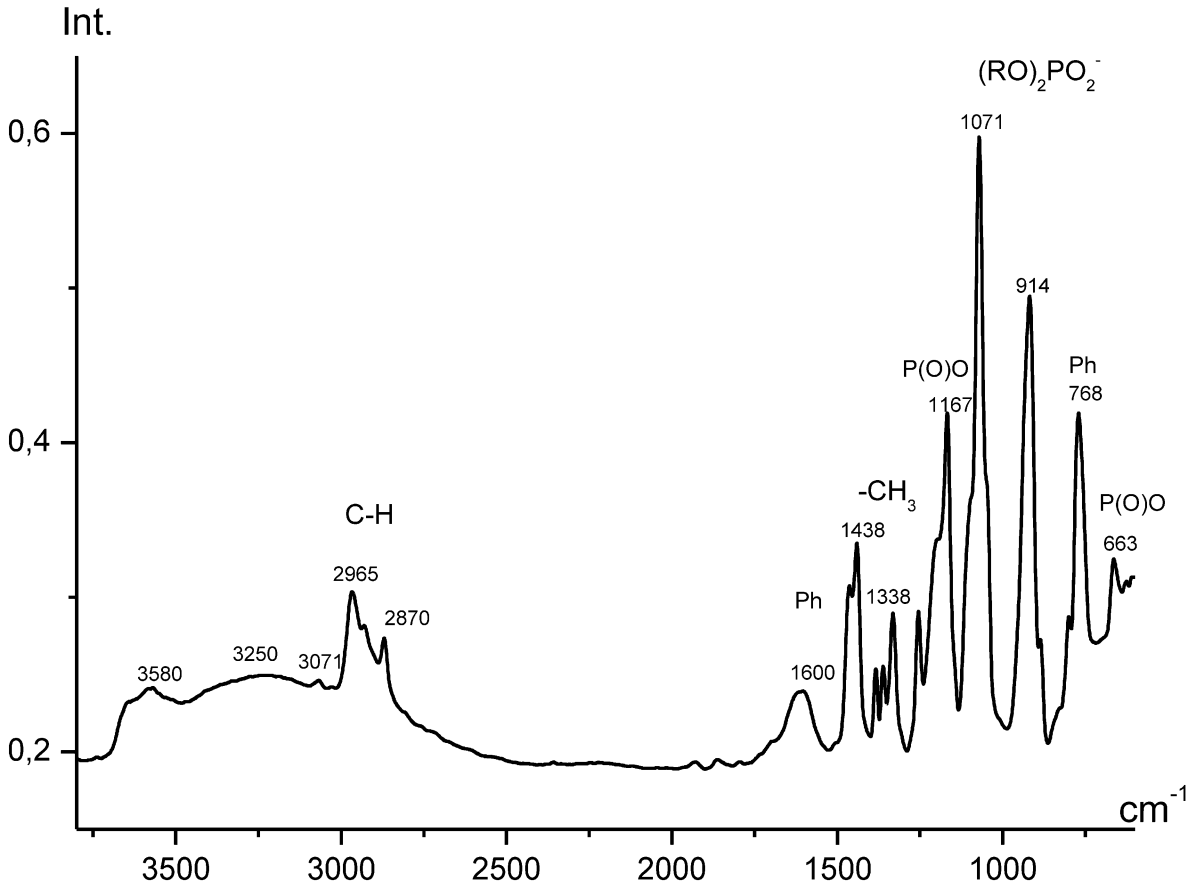

Figure S3 ATR-FT-IR spectrum for $[Ce(C_{24}H_{34}O_4P)_3(CH_4O)_5]\cdot CH_3OH$, (**2**).

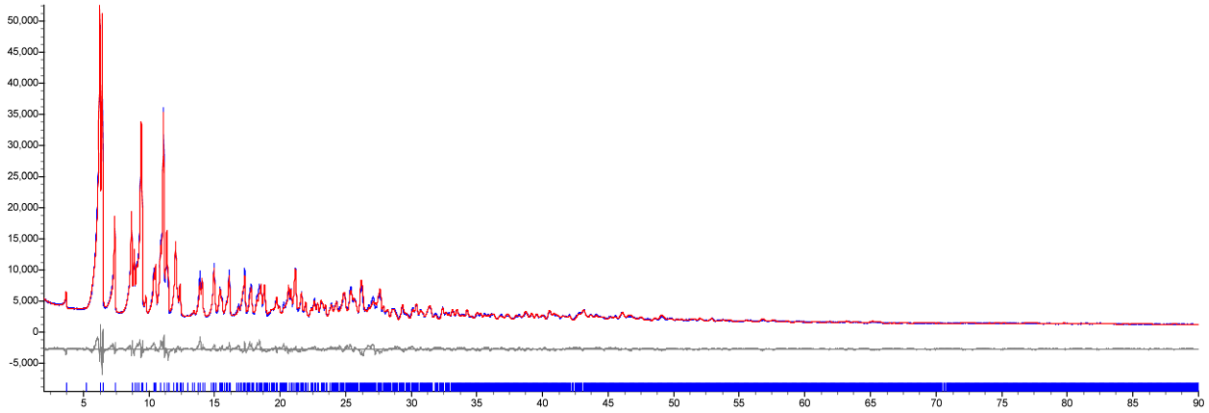

Figure S4 The experimental (blue line), calculated (red line), and difference (grey line) powder XRD patterns of (**1**) (Ln=La). The unit cell parameters found by the Rietveld method at room temperature: a = 23.8015(8)Å, b = 10.6296(3)Å, c= 34.0486(14)Å, β = 91.889(2)°, V=8609.6(5)Å^3.

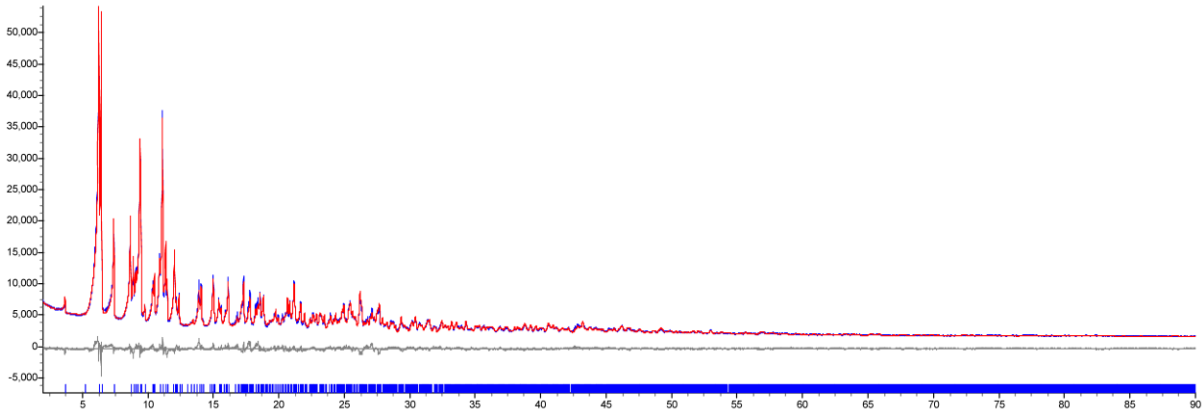

Figure S5 The experimental (blue line), calculated (red line), and difference (grey line) powder XRD patterns of (**2**) (Ln=Ce). The unit cell parameters found by the Rietveld method at room temperature: a = 23.7395(5)Å, b = 10.6163(2)Å, c= 33.9902(9)Å, β = 91.8523(16)°, V=8561.9(3) $Å^3$.

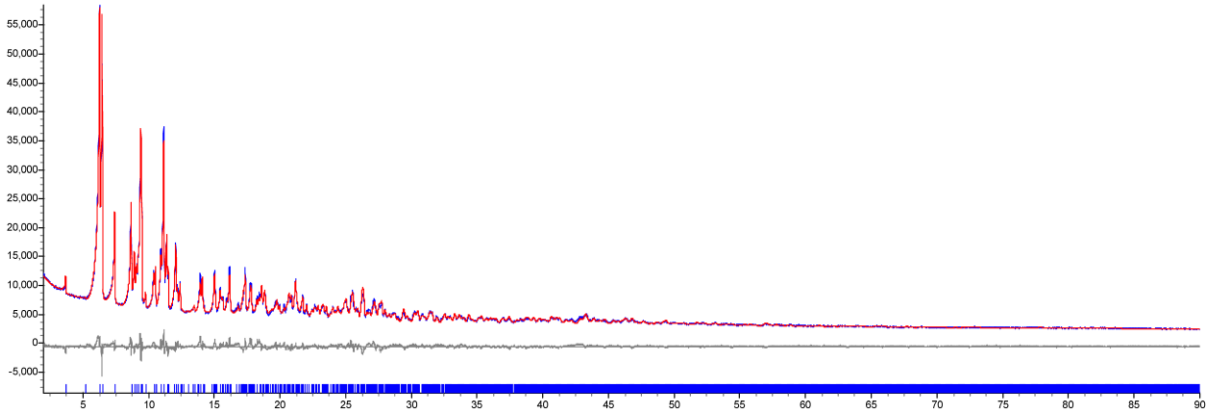

Figure S6 The experimental (blue line), calculated (red line), and difference (grey line) powder XRD patterns of (**3**) (Ln=Nd). The unit cell parameters found by the Rietveld method at room temperature: a = 23.6788(8)Å, b = 10.6196(3)Å, c= 33.8903(14)Å, β = 91.862(2)°, V=8517.5(5)Å^3.

Table S1 Weight loss (g) in pyrolysis of PDMS-50 in the presence of additive (2) or (3) and without a rare-earth complex.

The starting mass of PDMS-50 was 2.000g. Thermal destruction experiments were carried out at T=573K.

Entry	Additive	Time						
		1h	2h	3h	5h	8h	9h	10h
1*	Blank experiment	0.03	0.07	0.11	0.18	0.24	0.27	n/d
2*	0.1% (3), Ln=Nd	0.04	0.08	0.12	0.17	n/d	0.28	n/d
3**	0.1% (2), Ln=Ce	0.02	0.03	0.04	0.06	n/d	0.09	0.10

*Abrupt increase in viscosity and formation of some precipitate after 1h. PDMS-50 was fully solidified after 5h. **No precipitate, low viscosity, clear liquid even after 10h.