Electronic Supplementary Material (ESI) for Polymer Chemistry.

Supporting Information

(Bipyridine bisphenolate)-aluminum/onium salt pair: A highly active binary catalysts for ring-opening polymerization of lactide with improved thermostability and protic tolerance

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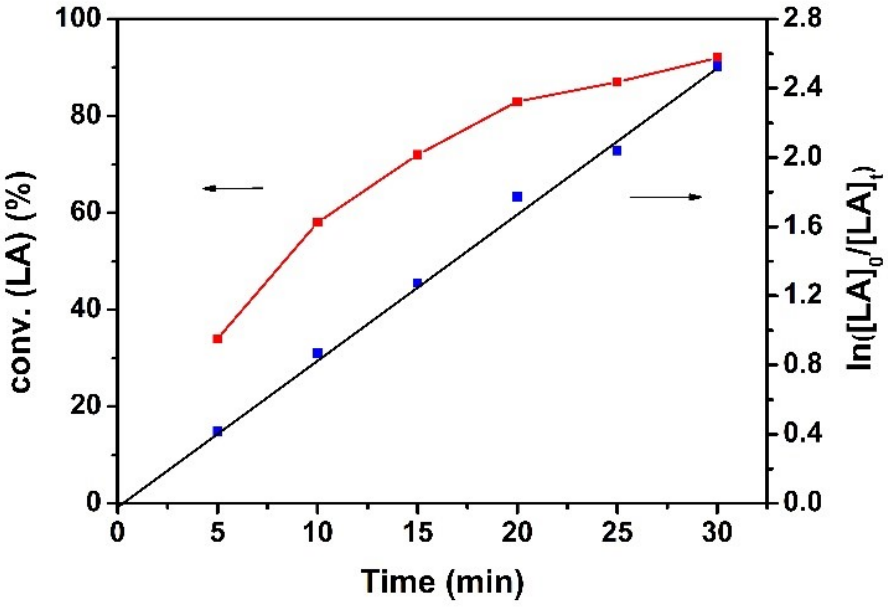

Figure S1. The polymerization kinetic plot for ring-opening polymerization.

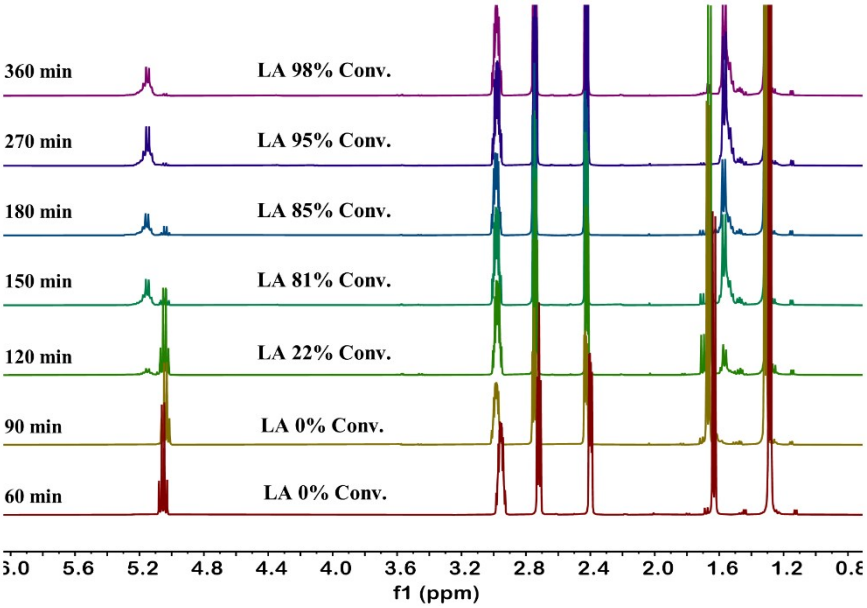

Figure S2. The ^{1}H NMR spectra of the LA polymerization mixture by using PPNCl as catalyst.

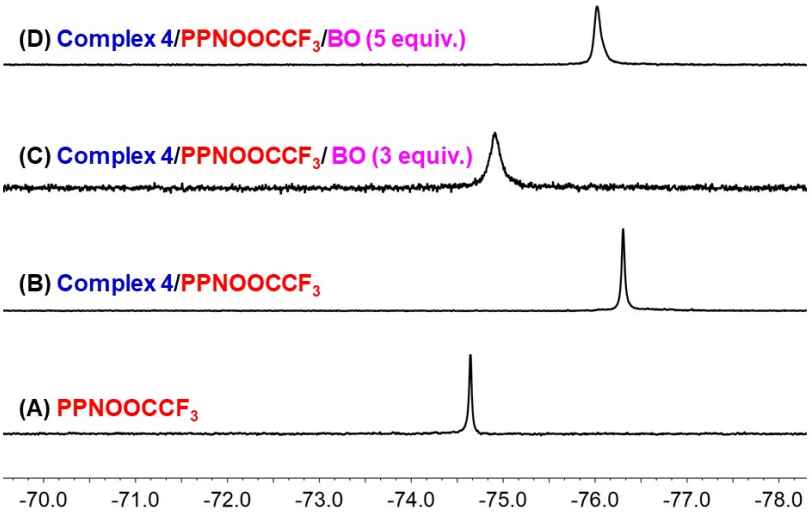

Figure S3. The *in situ* ^{19}F NMR spectra of the cocatalyst (**A**), Al/cocatalyst pair (**B**), Al/cocatalyst/BO and Al/cocatalyst/BO (**C** and **D**).

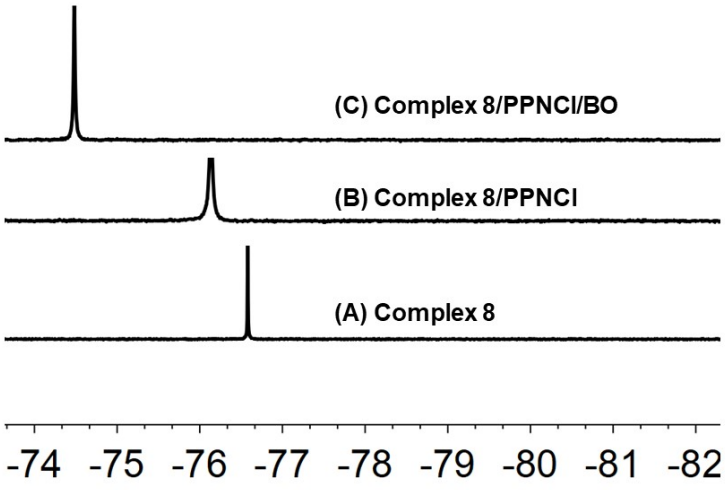

Figure S4. The ^{19}F NMR spectra for the complex **8** (A), complex **8**/PPNCl (molar ratio =1:1) and complex **8**/PPNCl/BO mixtures (1:1:3).

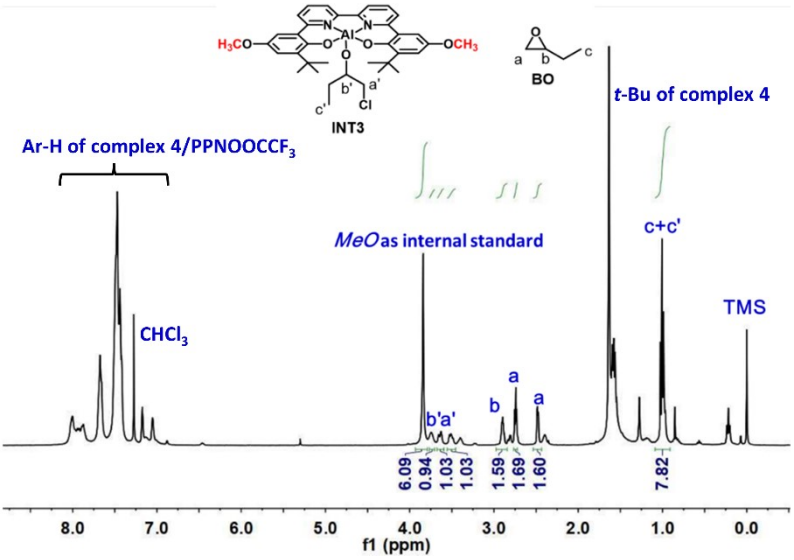

Figure S5. ^{1}H NMR peak assignments of complex **4**/PPNOOCCF$_3$ combination with BO (molar ratio=1:1:3).

Table S1. Selected chemical shifts corresponding to the representative signal for alkoxides and their integral analysis (data were extracted from figure S4).

Compound	Representative peaks	δ(ppm)	Integral
BO	a (*CH2*CH-O)	2.77-2.72 2.53-2.43	3.29
	b (CH2*CH*-O)	2.98-2.84	1.59
	c (*CH3*CH2-)	1.13-0.90	4.80
INT3A	*CH3*O-Ar	3.93-3.79	6.09
	a' (*CH2*CH-O)	3.68-3.59 3.56-3.45	2.06
	b' (CH2*CH*-O)	3.77-3.70	0.94
	c'(*CH3*CH2-)	1.13-0.90	3.00

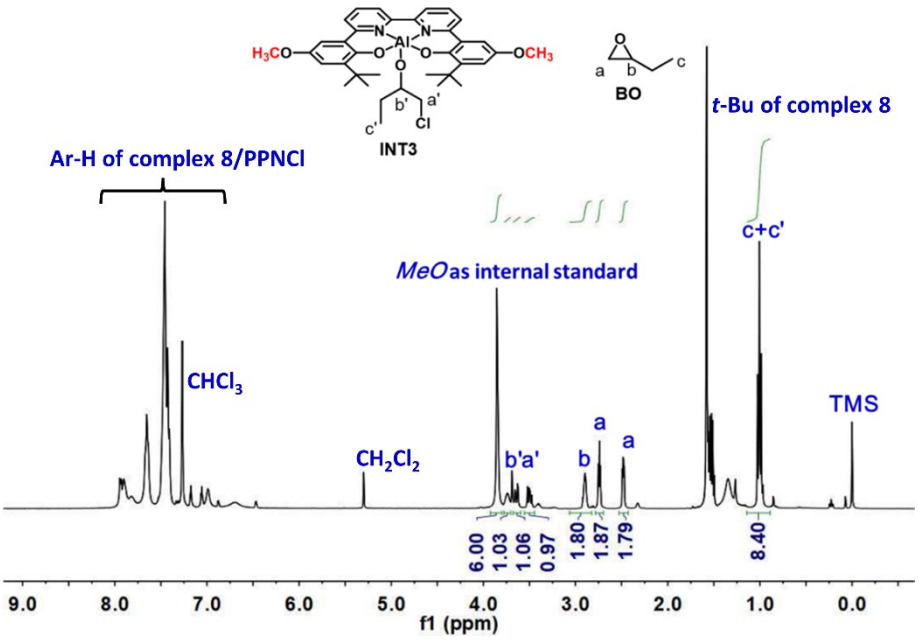

Figure S6. ^{1}H NMR peak assignments of complex **8**/PPNCl combination with BO (molar ratio=1:1:3).

Table S2. Selected chemical shifts corresponding to the representative signal for alkoxides and their integral analysis (data were extracted from figure S5).

Compound	Representative peaks	δ(ppm)	Integral
BO	a (*CH2*CH-O)	2.77-2.72 2.53-2.43	3.66
	b (CH2*CH*-O)	2.98-2.84	1.80
	c (*CH3*CH2-)	1.13-0.90	5.40
INT3A	*CH3*O-Ar	3.93-3.79	6.00
	a’ (*CH2*CH-O)	3.68-3.59 3.56-3.45	2.03
	b’ (CH2*CH*-O)	3.77-3.70	1.03
	c’ (*CH3*CH2-)	1.13-0.90	3.00

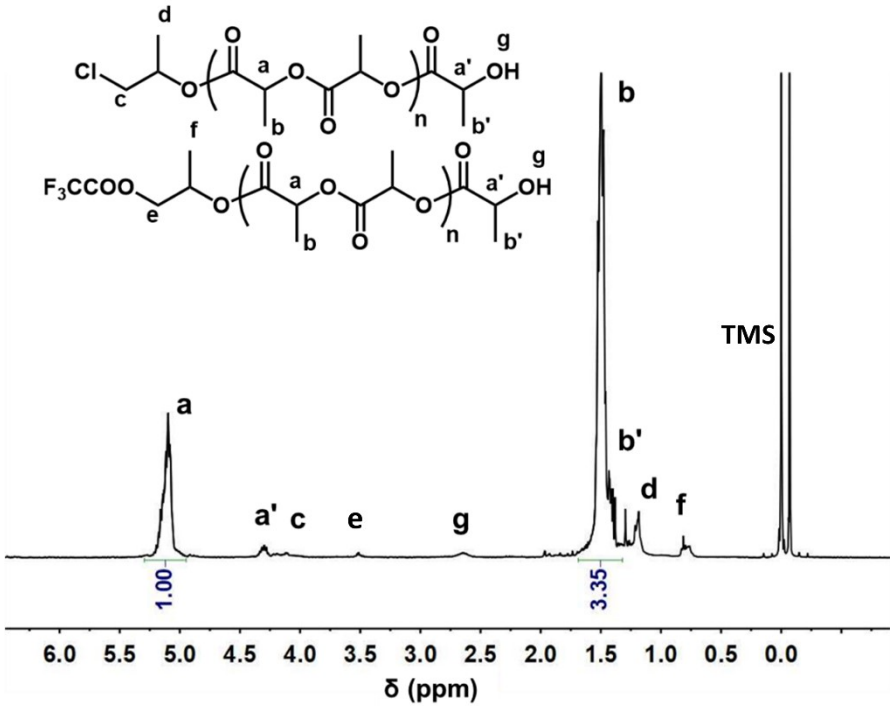

Figure S7. The ^{1}H NMR spectrum of the PLA obtained by **8**/PPNCl.

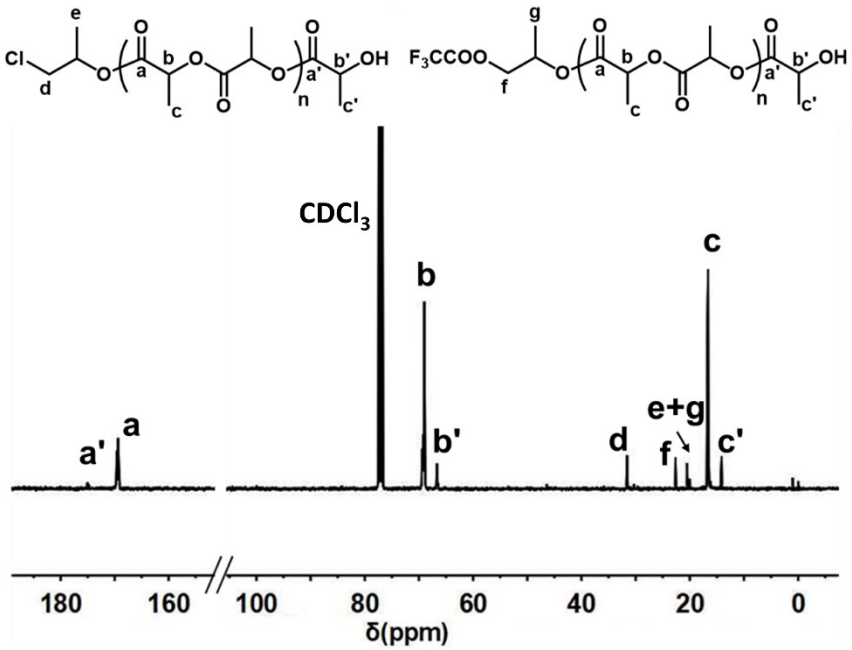

Figure S8. The ^{13}C NMR spectrum of the PLA obtained by **8**/PPNCl.

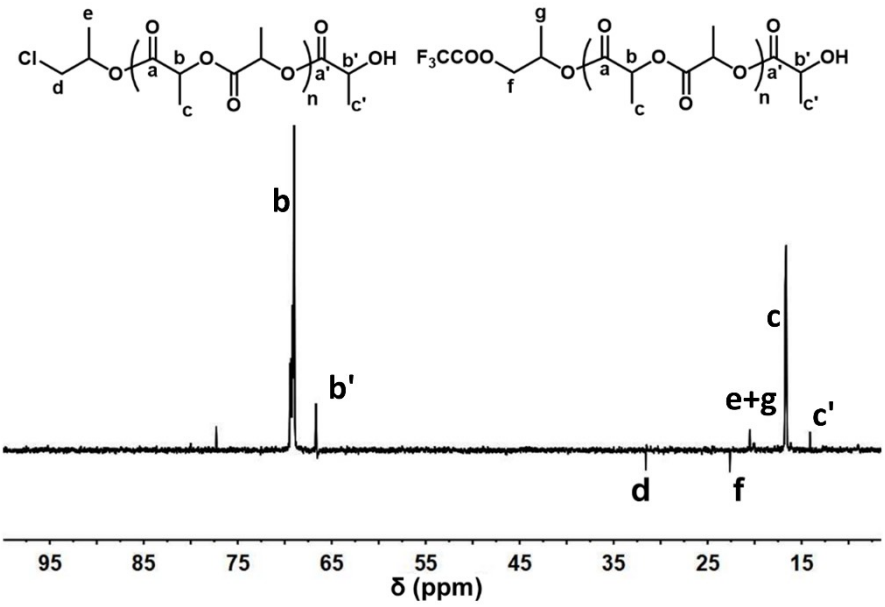

Figure S9. The DEPT(135) spectrum of the PLA obtained by **8**/PPNCl.

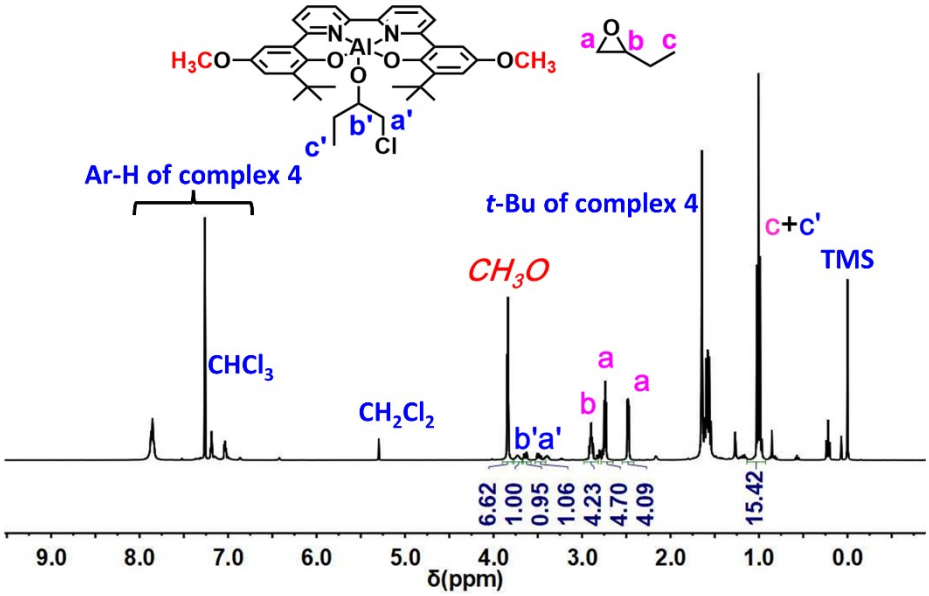

Figure S10. ^{1}H NMR peak assignments of complex **4** combination with BO (molar ratio=1:5).