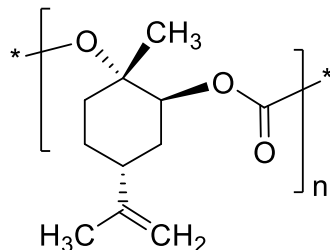


**Sample name: Poly(limonene carbonate):**  
*Alternating copolymer of limonene oxide and carbon dioxide (regioregular form)*

**Sample #: P41333-LimC**

**Structure:**



**Composition:**

$M_n \times 10^3$ (g/mol)	$M_w/M_n$
4.0	1.17

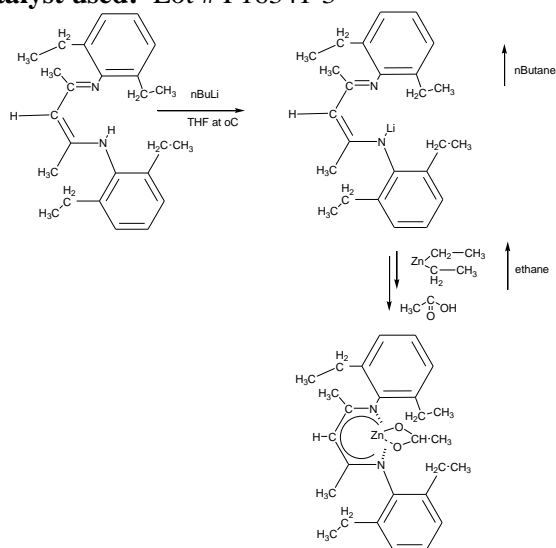
**Thermal properties:**

Glass transition temperature	$T_g = 113\text{ }^\circ\text{C}$
Onset of decomposition (5% wt loss):	$T_{on} = 212\text{ }^\circ\text{C}$

**Synthesis:**

The polymer was synthesized in a pressure reactor in presence of  $\text{CO}_2$  and catalyst.

**Catalyst used: Lot # P16341-3**



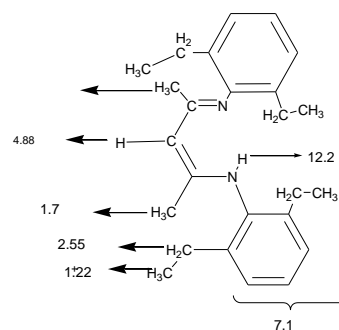
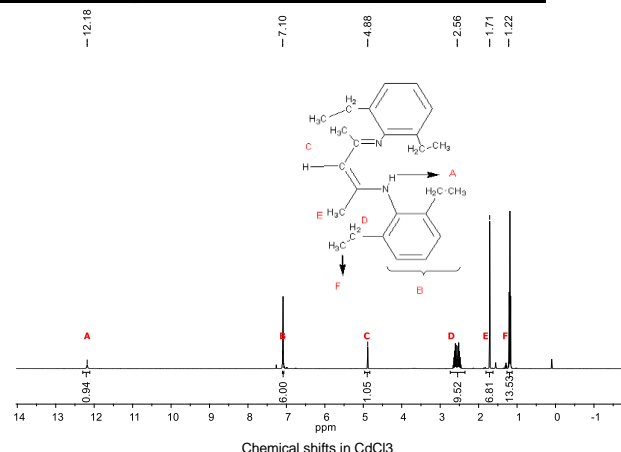
**Characterization:**

The product was characterized by size exclusion chromatography (SEC) and proton NMR.

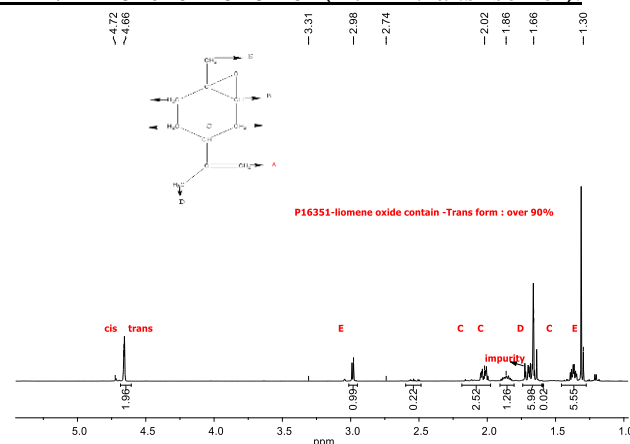
**Thermal analysis** was performed on TA Instruments TGA-550 Discovery (TGA) and Q100 differential

scanning calorimeter (DSC). **TGA:** The degradation temperature was measured at a scan rate of  $5^\circ\text{C}/\text{min}$  under a nitrogen atmosphere. **DSC:** The glass transition temperature ( $T_g$ ) of the polymer was measured at a scan rate of  $10^\circ\text{C}/\text{min}$  shortly after creating thermal history of the sample.

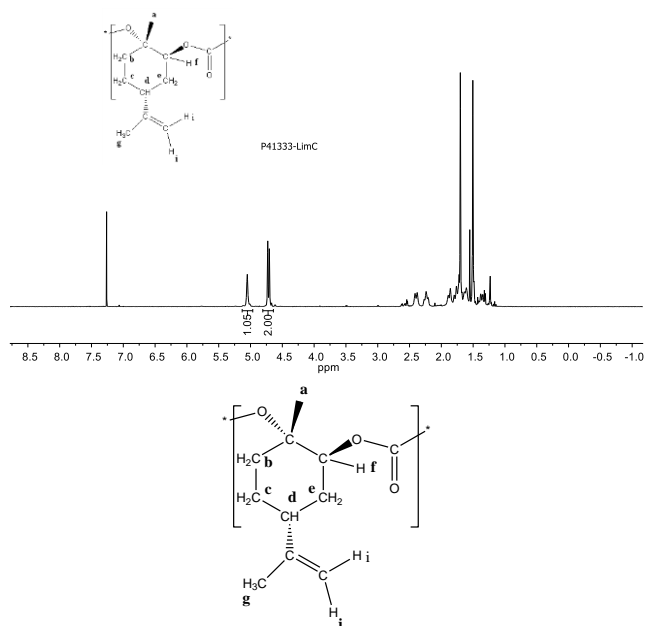
**$^1\text{H}$  NMR spectrum of the catalyst (BDEt)-H**



**$^1\text{H}$  NMR of the monomer (rich in *trans* isomer):**

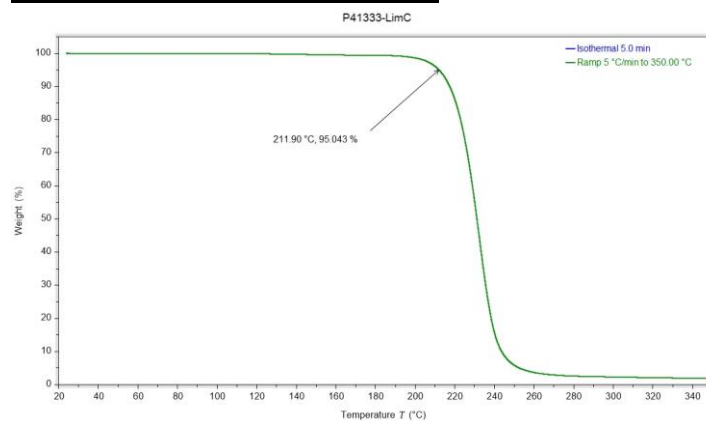


## <sup>1</sup>H NMR of the polymer (regio-regular form):



Proton group	Peak assignment	Chemical shift
CH <sub>3</sub>	a	1.7ppm
CH <sub>2</sub>	b	2.4 ppm
CH <sub>2</sub>	c	1.58 and 1.36 ppm
H	d	2.2ppm
CH <sub>2</sub>	e	1.87 and 1.6 ppm
H	f	5.04 ppm
CH <sub>3</sub>	g	1.5 ppm
=CH <sub>2</sub>	h	4.71 and 4.69

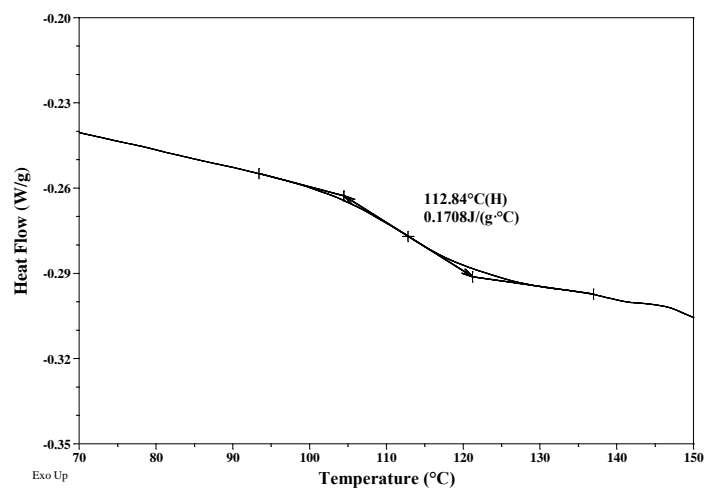
## TGA thermogram of the polymer:



## DSC thermogram (2<sup>nd</sup> heating scan):

Sample: P41333-LimC  
Size: 7.3000 mg

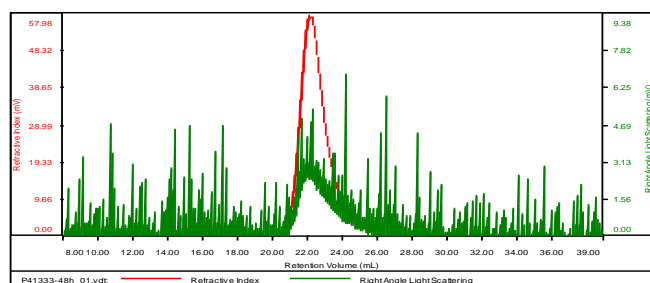
File: P41333-LimC.001



## SEC chromatogram:

P41333-LimC

Concentration (mg/mL)	3.4528
Sample dn/dc (mL/g)	0.1850
Method File	PS80K_2017-12-21-0000.vcm
Column Set	3x PL 1113-6300
Solvent	THF



Sample	Mn (Da)	Mw (Da)	Mw/Mn	IV (dL/g)	Mp (Da)
P41333-48h_01.vdt	4,119	4,815	1.169	0.2248	3,524