

Supplementary Information

Elastomeric polyethylenes accessible via ethylene homo-polymerization using an unsymmetrical α -diimino-nickel catalyst

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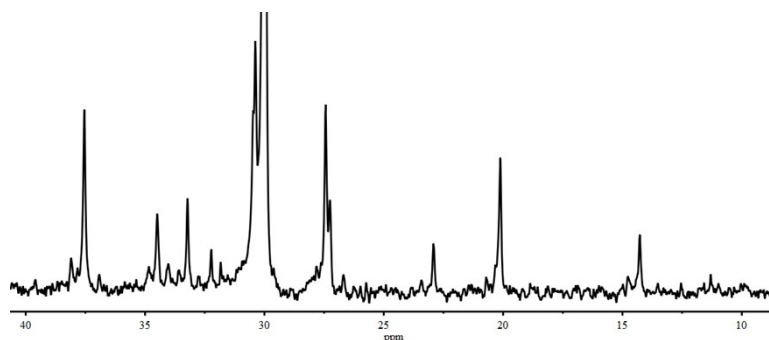


Figure S1. ^{13}C NMR spectrum of the polyethylene obtained with **Ni1**/ Me_2AlCl at $\text{Al/Ni} = 900$ (run 8, Table 3)

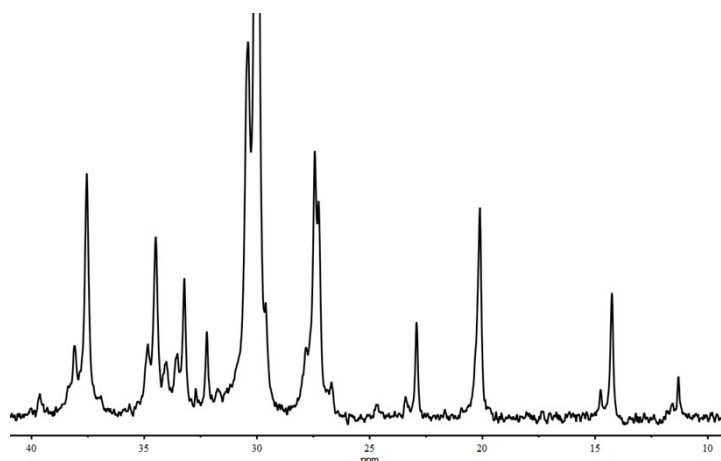


Figure S2. ^{13}C NMR spectrum of the polyethylene obtained with **Ni1**/ Me_2AlCl at $70\text{ }^\circ\text{C}$ (run 13, Table 3)

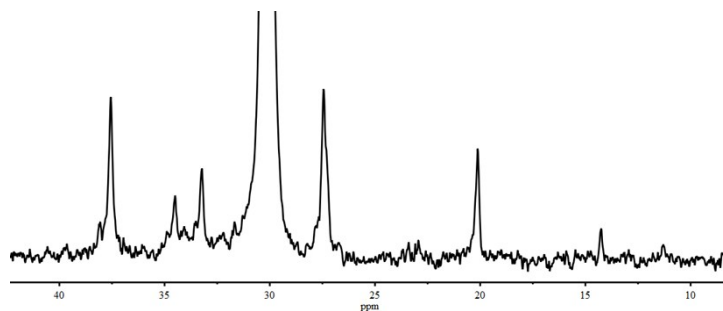


Figure S3. ^{13}C NMR spectrum of the polyethylene obtained with **Ni1**/ Me_2AlCl after 60 mins (run 20, Table 3)

Table S1. Branching analysis of the polyethylene obtained using **Ni1**/ Me_2AlCl at $\text{Al/Ni} = 900$ (run 8, Table 3)

Peak No.	chemical shift	Integral exp.	Branch content		Percentage over total branching
1	11.31	1	N_M	1.82	46.14%
2	14.27	4.01	$\text{N}_{\text{M}(1,4)}$	4.02	3.83%
3	14.77	0.78	$\text{N}_{\text{M}(1,5)}$	1.16	4.91%
4	19.86	0.37	$\text{N}_{\text{M}(1,6)}$	2.02	7.33%
5	20.12	9.15	N_E	1.05	7.41%
6	20.33	0.42	N_P	5.17	9.42%
7	22.93	2.78	N_B	0.52	0.37%
8	23.42	0.73	N_A	4.37	6.38%
9	24.67	0.52	N_L	1.93	11.19%
10	26.69	1.66	$\text{N}_{\text{L}(1,4)}$	1.07	3.02%
11	27.25	8.59			
12	27.44	10.17	[E]	74.64	
13	27.83	8.73	[R]	24.44	100%
14	29.53	0.94			
15	29.61	4.31	Total branching		
16	30	60.94	=123		
17	30.38	18.47	Branches/1000C		
18	30.48	4.56			
19	31.68	1.5	Methyl branches		62.21%
20	32.23	3.37	Ethyl branches		7.41%
21	32.72	1.05	Propyl branches		9.42%
22	33.22	5.49	Butyl branches		0.37%
23	33.57	2.9	Amyl branches		6.38%
24	33.83	1.06	Long branches		14.21%
25	34.01	3.3			
26	34.49	8.42			
27	34.86	8.88			
28	36.94	1.16			

29	37.55	11.22
30	37.86	1.13
31	38.1	3.19
32	38.37	1.39
33	39.62	9.86

Table S2. Branching analysis of the polyethylene obtained using **Ni1/Me₂AlCl** at 70 °C (run 13, Table 3)

Peak No.	chemical shift	Integral exp.	Branch content		Percentage over total branching
1	11.31	1	N _M	11.28	7.86%
2	14.27	4.38	N _{M(1,4)}	0.94	17.39%
3	14.77	1.28	N _{M(1,5)}	1.20	5.02%
4	19.86	0.45	N _{M(1,6)}	1.79	8.72%
5	20.12	10.11	N _E	1.81	4.55%
6	20.33	2.05	N _P	2.30	22.36%
7	22.93	3.44	N _B	0.09	2.25%
8	23.42	0.71	N _A	1.56	18.89%
9	24.67	0.09	N _L	2.74	8.33%
10	26.69	0.93	N _{L(1,4)}	0.74	4.63%
11	27.25	7.41			
12	27.44	15.3	[E]	28.79	
13	27.83	3.12	[R]	23.10	100%
14	29.53	0.87			
15	29.61	2.1	Total branching		
16	30	153.3	=223		
17	30.38	19.06	Branches/1000C		
18	30.48	16.39			
19	31.68	2.23	Methyl branches		38.99%
20	32.23	4.03	Ethyl branches		4.55%
21	32.72	1.81	Propyl branches		22.36%
22	33.22	7.78	Butyl branches		2.25%
23	33.57	2.55	Amyl branches		18.89%
24	33.83	1.67	Long branches		12.96%
25	34.01	2.87			
26	34.49	8.15			
27	34.86	3.33			
28	36.94	1.2			
29	37.55	16.25			
30	37.86	2.64			
31	38.1	2.67			
32	38.37	0.36			
33	39.62	1.04			

Table S3. Branching analysis of the polyethylene obtained using **Ni1/Me₂AlCl** after 60 mins (run 20, Table 3)

Peak No.	chemical shift	Integral exp.	Branch content		Percentage over total branching
1	11.31	1	N _M	19.03	61.78%
2	14.27	1.86	N _{M(1,4)}	1.24	4.01%
3	14.77	0.39	N _{M(1,5)}	1.53	4.97%
4	19.86	0.52	N _{M(1,6)}	1.82	5.89%
5	20.12	11.75	N _E	1.95	6.33%
6	20.33	1.47	N _P	1.70	5.50%
7	22.93	1.29	N _B	0.17	0.55%
8	23.42	0.73	N _A	1.27	4.12%
9	24.67	0.17	N _L	0.58	1.87%
10	26.69	1.67	N _{L(1,4)}	1.53	4.98%
11	27.25	3.41			
12	27.44	22.51	[E]	109.02	
13	27.83	2.54	[R]	30.80	100%
14	29.53	2.4			
15	29.61	5.34	Total branching		
16	30	221.4	=110		
17	30.38	106.5	Branches/1000C		
18	30.48	7.45			
19	31.68	5.05	Methyl branches		76.65%
20	32.23	3.37	Ethyl branches		6.33%
21	32.72	1.95	Propyl branches		5.50%
22	33.22	10.89	Butyl branches		0.55%
23	33.57	1.76	Amyl branches		4.12%
24	33.83	2.01	Long branches		6.85%
25	34.01	2.9			
26	34.49	8.88			
27	34.86	2.51			
28	36.94	1.53			
29	37.55	19.3			
30	37.86	3.81			
31	38.1	3.54			
32	38.37	0.54			
33	39.62	1.03			

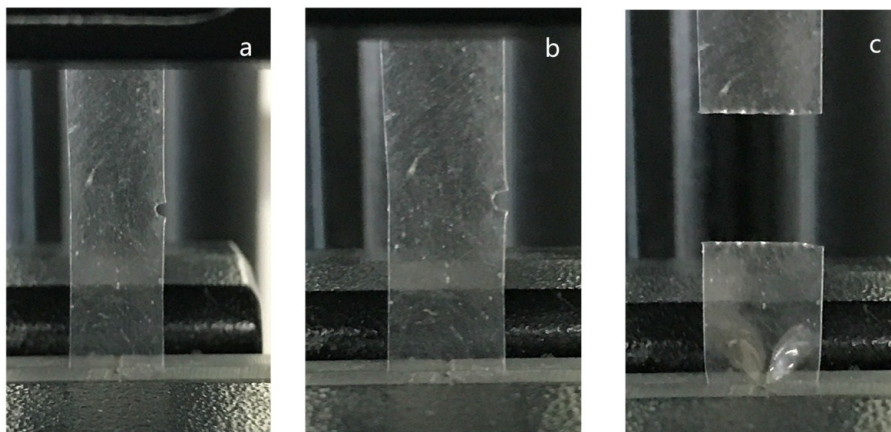


Figure S4. Single edge notched tensile test of *N*-PE-30 (a, strain was 20%; b, strain was 50%; c, elongation at break).

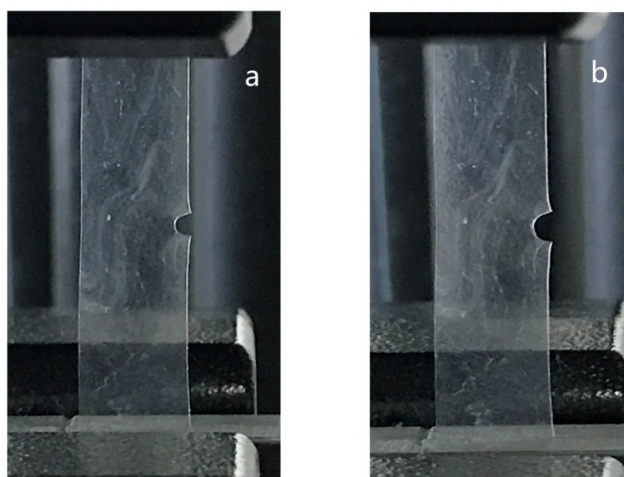


Figure S5. Single edge notched tensile test of *N*-PE-40 (a, strain was 20%; b, strain was 50%).

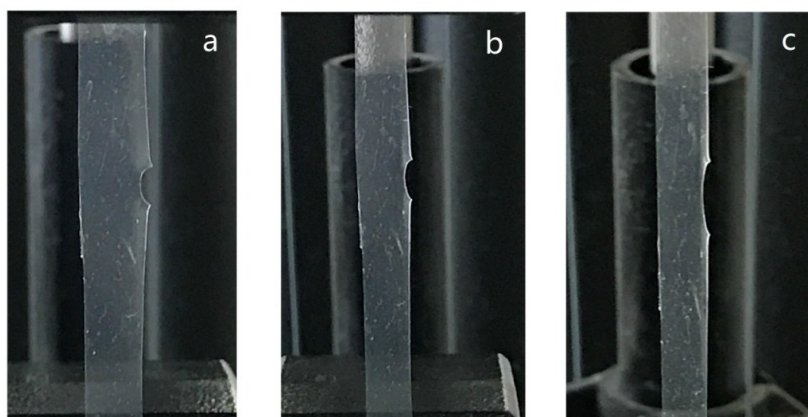


Figure S6. Single edge notched tensile test of *N*-PE-80 (a, strain was 100%; b, strain was 300%; c, strain was 500%).