Supporting information

Synthesis of Fluoropolymer Containing Tunable Unsaturation by a Controlled Dehydrochlorination of P(VDF-*co*-CTFE) and its Curing for High Performance Rubber Application

Shaobo Tan,[1] Junjie Li,[1] Guoxin Gao,[1] Huayi Li,[3] Zhicheng Zhang[1,2*]

1. Department of Applied Chemistry, School of Science, Xi'an Jiaotong University, Xi'an, P. R. China, 710049
2. MOE Key Laboratory for Nonequilibrium Synthesis and Modulation of Condensed Matter, Xi'an, P. R. China, 710049
3. Joint Laboratory of Polymer Science and Materials, Key Laboratory of Engineering Plastics, Institute of Chemistry, the Chinese Academy of Sciences, Beijing, P. R. China, 100190

1. Synthesis and characterization of P(VDF-*co*-CTFE) containing tunable internal double-bond.

Electronic Supplementary Material (ESI) for Journal of Materials Chemistry

A series of copolymers containing tunable internal double-bond from P(VDF-*co*-CTFE) have been synthesized under varied reaction conditions including reaction temperature, reaction time, solvents and amines as listed in Table 1S.

Table 1S. Reaction conditions for the synthesis of P(VDF-*co*-CTFE) containing tunable internal double-bond.

Entry	Catalyst (mmol)	Solvent (ml)	Temperature (℃)	Time (h)	CTFE conversion (mol %)
1	TEA(5.36)	NMP(60)	50	24	67.91
2	TEA(5.36)	DMF(60)	50	24	46.37
3	TEA(5.36)	DMSO(60)	50	24	48.89
4	TEA(5.36)	Acetone(60)	50	24	19.14
5	TEA(5.36)	THF(60)	50	24	10.8
6	TEA(5.36)	NMP(60)	50	1	16.12
7	TEA(5.36)	NMP(60)	50	2	19.91
8	TEA(5.36)	NMP(60)	50	4	26.08
9	TEA(5.36)	NMP(60)	50	7	31.97
10	TEA(5.36)	NMP(60)	50	16	43.33
11	TEA(0)	NMP(60)	50	24	2.73
12	TEA(1.34)	NMP(60)	50	24	20.18
13	TEA(2.68)	NMP(60)	50	24	34.95
14	TEA(4.02)	NMP(60)	50	24	53.45
15	TEA(6.7)	NMP(60)	50	24	71.96
16	TEA(10.72)	NMP(60)	50	24	79.36
17	TEA(0)	DMF(60)	50	24	2.83
18	TEA(2.68)	DMF(60)	50	24	32.31
19	TEA(6.7)	DMF(60)	50	24	49.7
20	TEA(10.72)	DMF(60)	50	24	54.09
21	TEA(1.34)	DMSO(60)	50	24	20.0
22	TEA(2.68)	DMSO(60)	50	24	32.86
23	TEA(10.72)	DMSO(60)	50	24	67.95
24	TEA(10.72)	Acetone(60)	50	24	28.94
25	TEA(21.44)	Acetone(60)	50	24	36.49
26	TEA(42.88)	Acetone(60)	50	24	40.09
27	TEA(64.32)	Acetone(60)	50	24	43.81
28	TEA(85.76)	Acetone(60)	50	24	45.04
29	TEA(10.72)	THF(60)	50	24	14.46
30	TEA(21.44)	THF(60)	50	24	17.50
31	TEA(42.88)	THF(60)	50	24	22.77
32	TEA(64.32)	THF(60)	50	24	35.45

33	TEA(5.36)	Acetone(60)	r.t	24	3.47
34	HMTA(1.34)	NMP(60)	50	16	7.84
35	HMTA(1.34)	NMP(60)	50	24	10.42
36	N,N-Dimethylaniline(5.36)	NMP(60)	50	24	1.94
37	Tri-n-butylamine(2.68)	NMP(60)	50	24	23.8
38	Tri-n-butylamine(4.02)	NMP(60)	50	24	26.9
39	Tri-n-butylamine(5.36)	NMP(60)	50	24	32.5
40	Tri-n-butylamine(6.7)	NMP(60)	50	24	45.9
41	Tri-n-butylamine(8.04)	NMP(60)	50	24	53.7
42	TEA(21.44)	NMP(60)	50	24	80.96
43	TEA(21.44)	NMP(60)	50	36	80.96

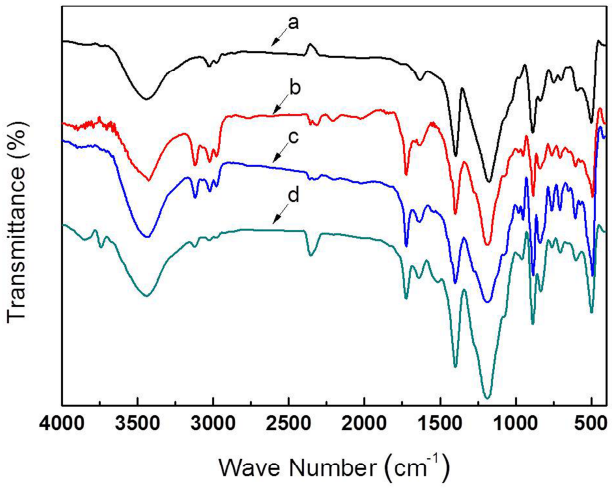

Figure 1S. FTIR spectrum of P(VDF-*co*-CTFE) before (line a) and after reacted with TEA at 50 °C in different solvents (line b: in DMSO; line c: in DMF; line d: in NMP). Reaction time: 24 h.

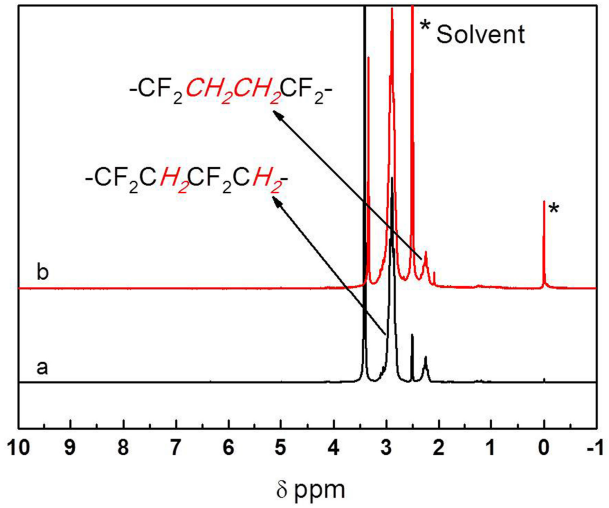

Figure 2S. ^{1}H NMR spectrum of PVDF before (line a) and after reacted with TEA at 80 °C (line b). Reaction time: 24 h.

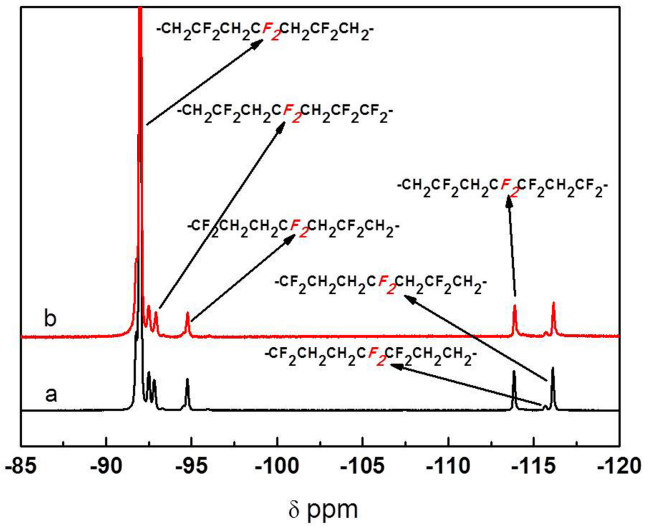

Figure 3S. ^{19}F NMR spectrum of PVDF before (line a) and after reacted with TEA at 80 ^{o}C (line b). Reaction time: 24 h.