Electronic Supplementary Information

Thermal curing of novel carborane-containing phenylethynyl terminated imide oligomers

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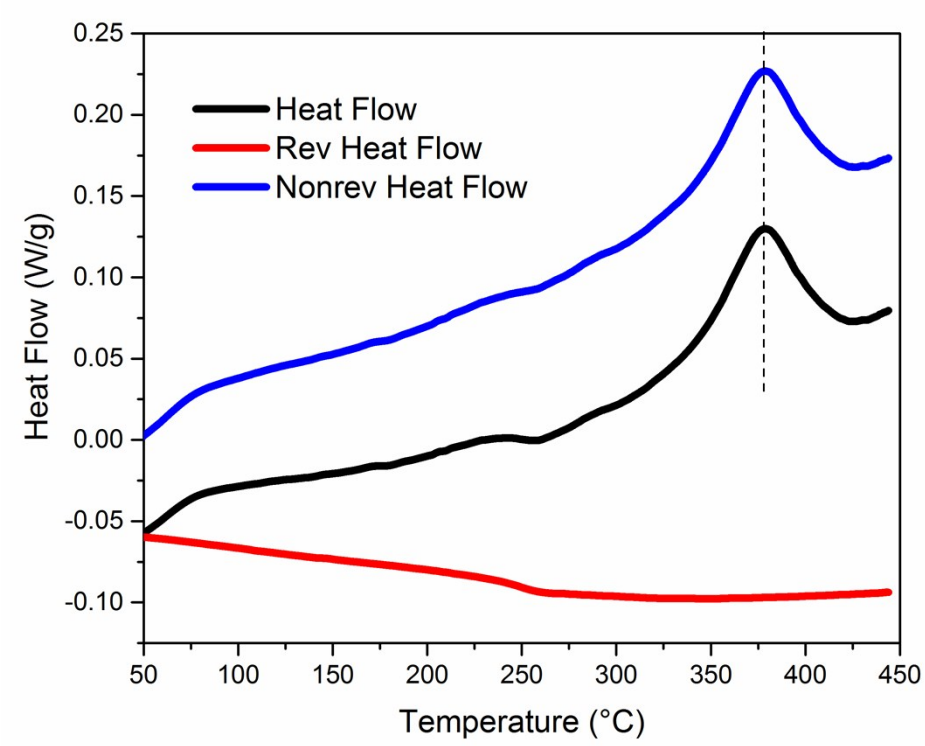
Table S1. The cure reaction characteristic parameters of imide oligomers calculated from the DSC results

Sample	β(°C/min)	Tp(K)	1000/Tp(K^{-1})	-ln(β/Tp^2)	lnβ
AFR-PEPA	2.5	647.2	1.545	12.03	0.92
	5	664.3	1.505	11.39	1.61
	10	680.1	1.470	10.74	2.30
	15	689.0	1.451	10.36	2.71

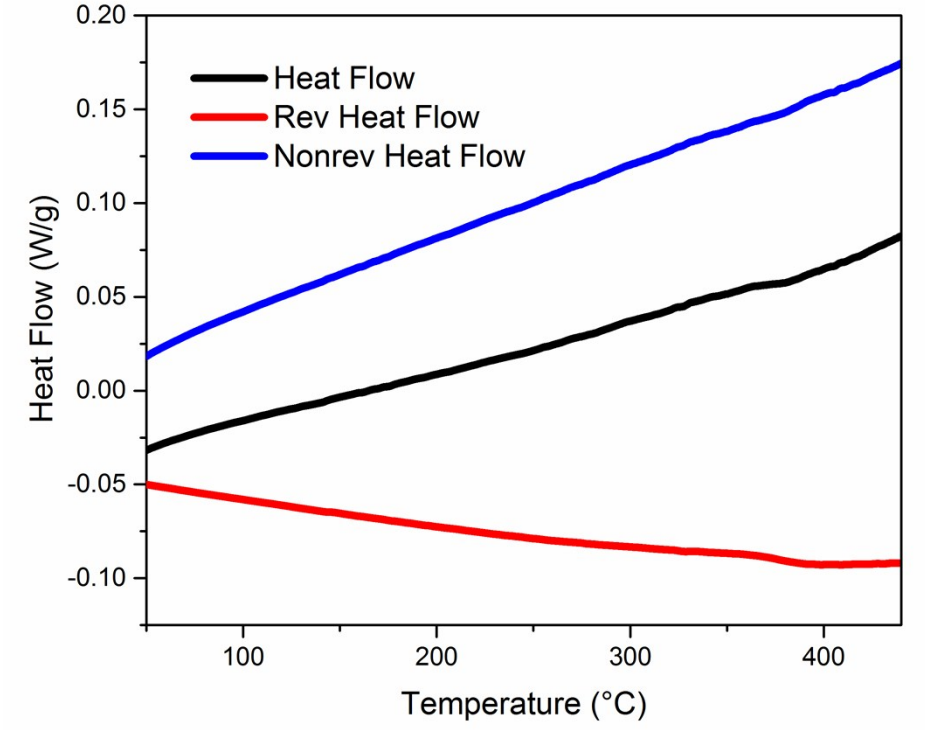
	20	694.8	1.439	10.09	2.99
	2.5	645.7	1.549	12.02	0.92
	5	658.0	1.520	11.37	1.61
AFR-PEPA-Carb-10	10	676.9	1.477	10.73	2.30
	15	683.4	1.463	10.35	2.71
	20	690.3	1.449	10.08	2.99
	2.5	642.4	1.557	12.01	0.92
	5	660.2	1.515	11.38	1.61
AFR-PEPA-Carb-20	10	675.2	1.481	10.73	2.30
	15	678.0	1.475	10.33	2.71
	20	683.8	1.463	10.06	2.99

Table S2. The cure reaction characteristic parameters of Carb-PEPA calculated from the DSC results

Sample	β(°C/min)	Tp(K)	1000/Tp(K^{-1})	-ln(β/Tp^2)	lnβ
	2.5	636.9	1.570	12.00	0.92
	5	652.1	1.534	11.35	1.61
Carb-PEPA	10	666.7	1.499	10.70	2.30
	15	673.8	1.484	10.32	2.71
	20	680.6	1.469	10.05	2.99



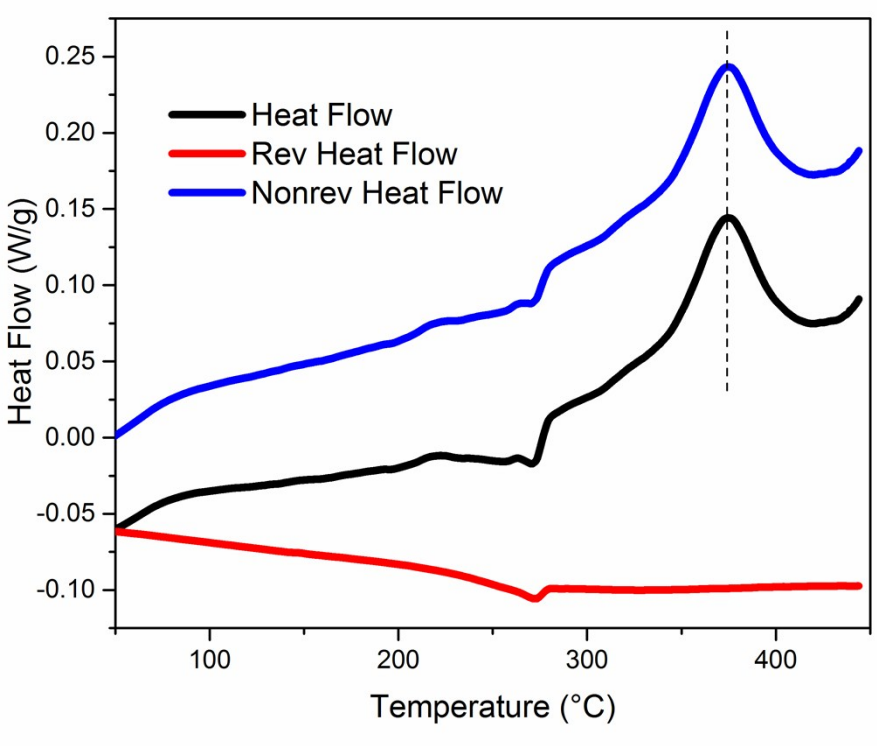
(a)



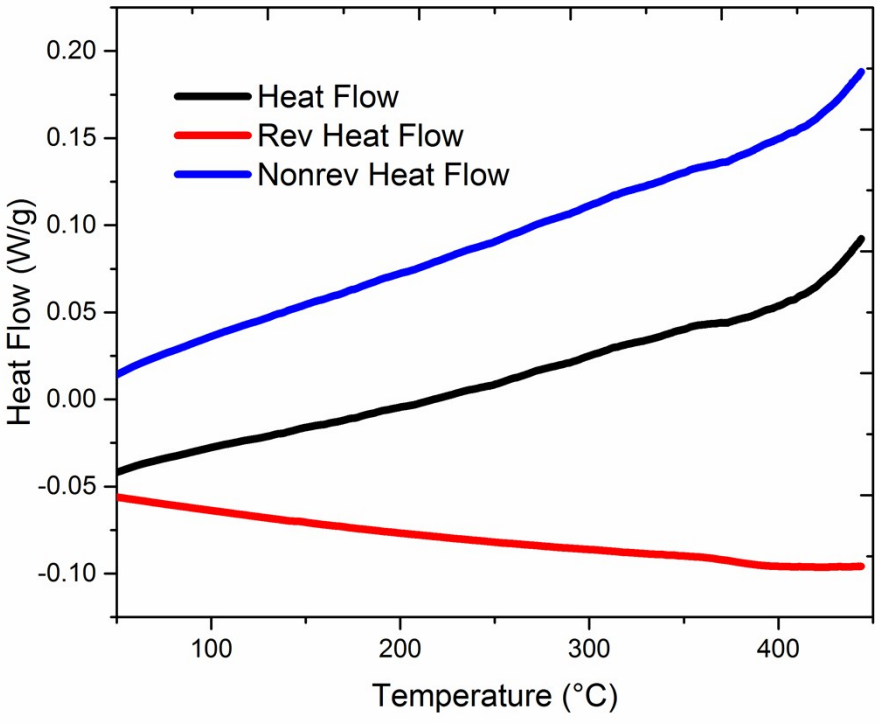
(b)

Figure S1. MDSC thermograms of AFR-PEPA. (a) imide oligomers, (b) cured

polyimides.

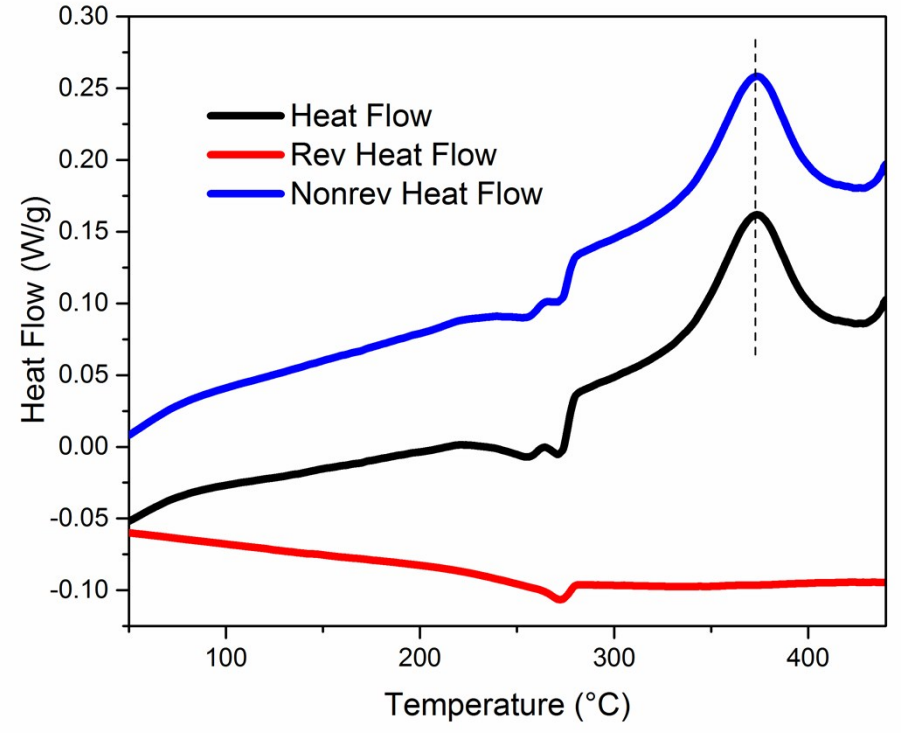


(a)

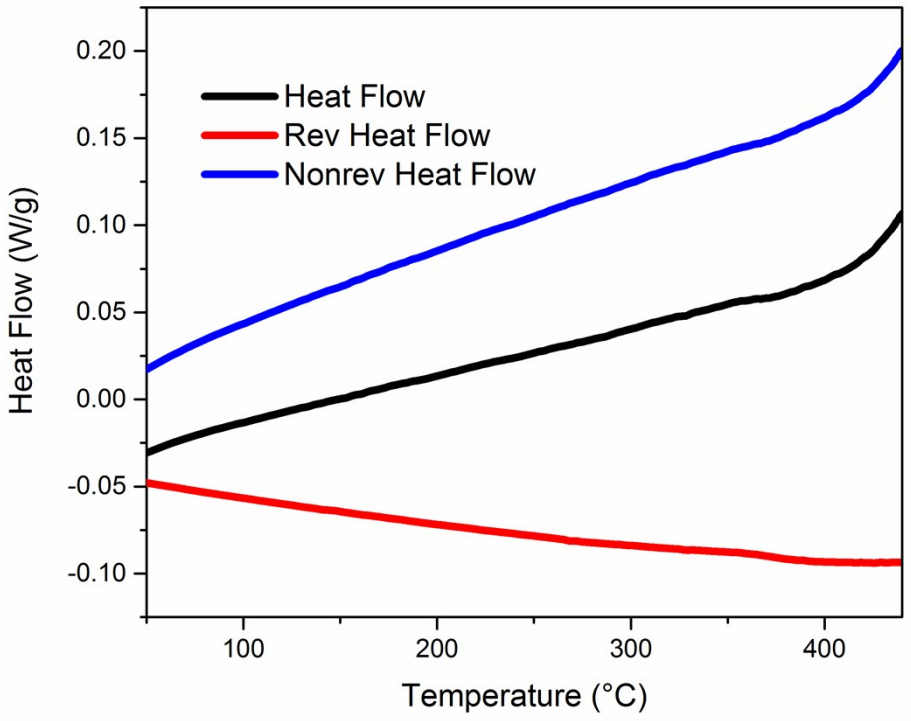


(b)

Figure S2. MDSC thermograms of AFR-PEPA-Carb-10. (a) imide oligomers, (b) cured polyimides.



(a)



(b)

Figure S3. MDSC thermograms of AFR-PEPA-Carb-20. (a) imide oligomers, (b) cured polyimides.

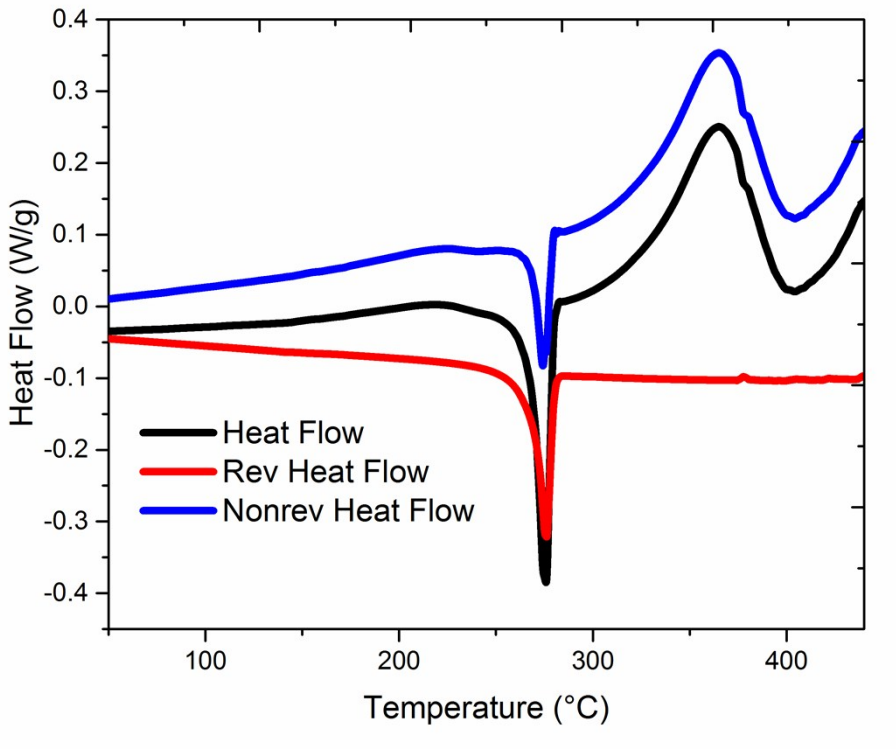
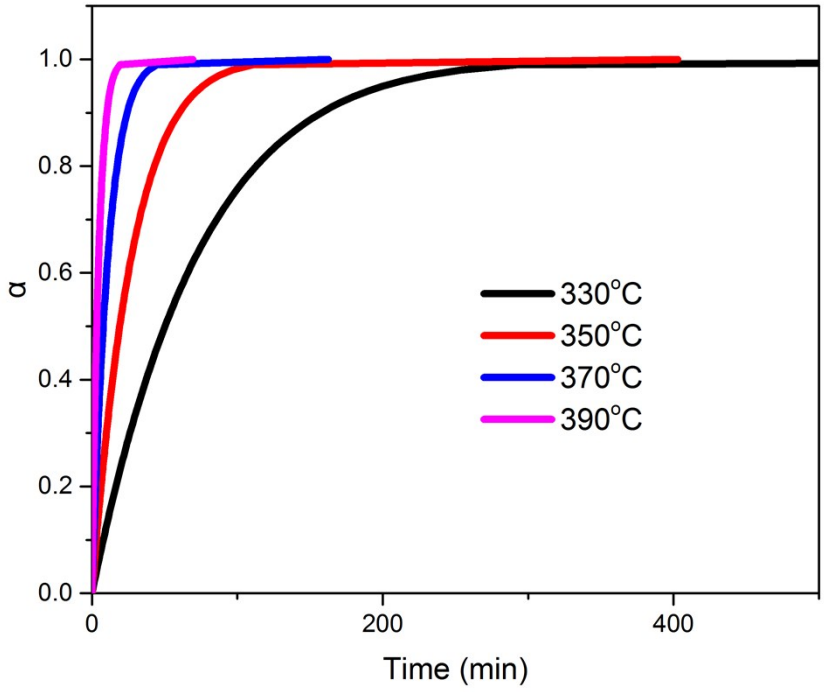
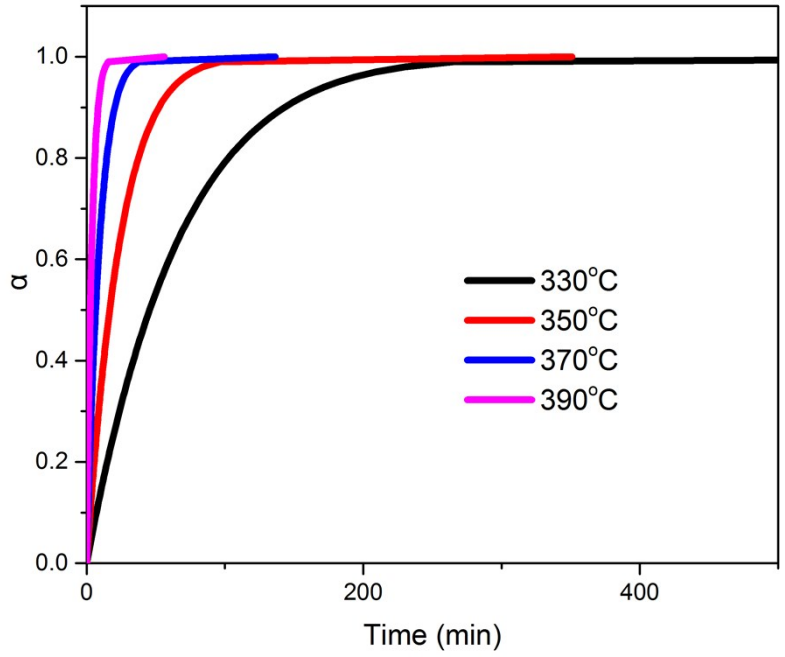


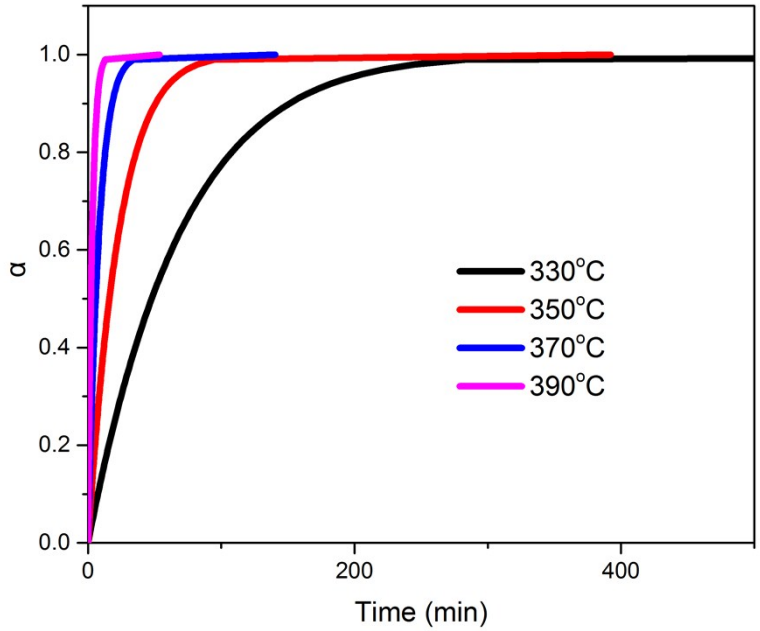
Figure S4. MDSC thermograms of Carb-PEPA


1.0
0.8
0.6
0.4
0.2
0.0
α
0
200
400
Time (min)
330°C
350°C
370°C
390°C

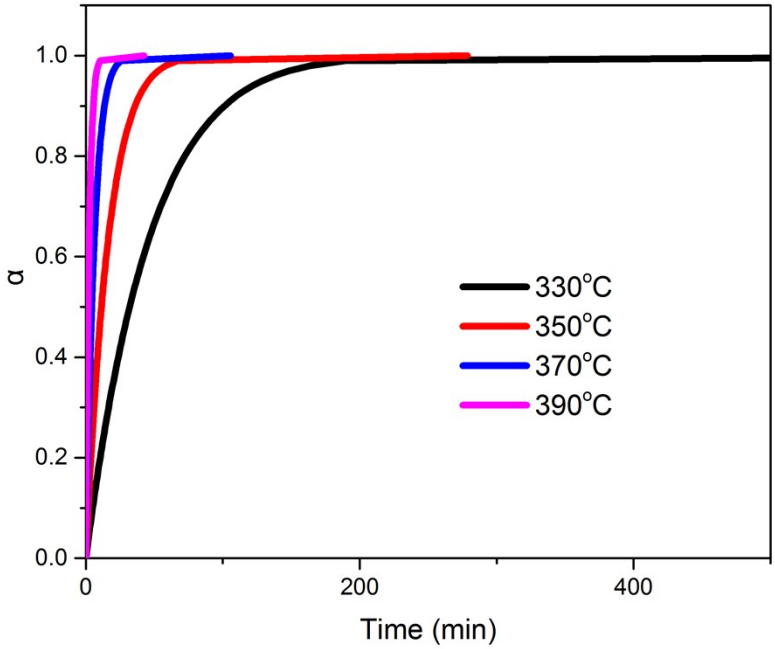
(a)


1.0
0.8
0.6
0.4
0.2
0.0
α
0
200
400
Time (min)
330°C
350°C
370°C
390°C

(b)



(c)



(d)

Figure S5. Plots of conversion α versus time at different cure temperatures. (a). AFR-PEPA. (b).AFR-PEPA-Carb-10. (c). AFR-PEPA-Carb-20. (d). Carb-PEPA