Electronic Supplementary Information

Poly(benzofurane-*co*-arylacetic acid) – a new type of highly functionalized polymers

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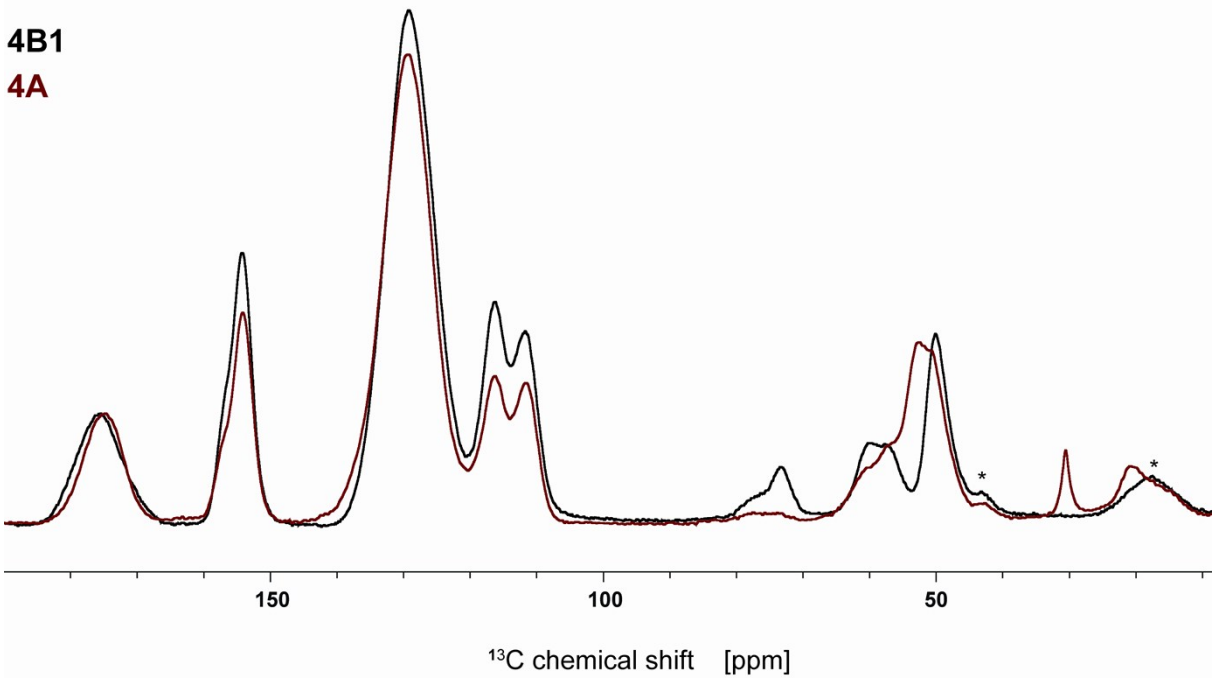
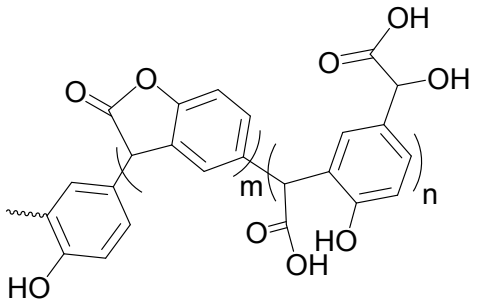


Fig. S1 ^{13}C ss-NMR spectra of PHMA **4A** obtained by Method A and of **4B1**. The asterisk indicates a sideband.

Table S1. Selected ESI(-)-HRMS-peaks of polymers **4B1**, **4B2**, **4B3** obtained by Method B1 (150 °C 18 h), B2 (150 °C 8 h) and B3 (160 °C, 18 h) (formula on top of the table shows only one possible isomer out of several other possibilities where the lactone units are distributed in different ways along the polymer chain and/or branching occurred). All MS peaks appear from the deprotonated molecule **S4**.



S4 simplified formula

x-mer	Method: m/z found/ relative Intensity **4B1: 150 °C, 18 h** **4B2: 150 °C, 8 h** **4B3: 160°C, 18 h**	m/z calculated	m	n
2-mer	**4B1**: 299.0554/55.2 **4B2**: 299.0552/49.1 **4B3**: 299.0550/20.2	299.0556	1	0
2-mer – CO_2	**4B1** 255.0657/40.6 **4B2**: 255.0657/50.8 **4B3**: 255.0655/21.4	255.0657	1	0
3-mer	**4B1** 431.0762/100 **4B2**: 431.0762/ 42.0 **4B3**: 431.0753/100	431.0767	2	0
4-mer	**4B1**: 581.1071/24.6 **4B2**: 581.1067/42.5 **4B3**: 581.1062/31.1	581.1084	2	1
	4B1: 563.0971/42.9 **4B2**: 563.0952/6.1 **4B3**: 563.0955/62.4	563.0978	3	0
5-mer	**4B1**: 713.1284/29.4 **4B2**: 713.1284/29.7 **4B3**: 713.1263/52.9	713.1295	3	1
5-mer – CO_2	**4B1**: 669.1380/14.9 **4B2**: 669.1383/15.9 **4B3**: 669.1367/56,3	669.1397	3	1
6-mer	**4B1**: 863.1595/17.6 **4B2**: 863.1586/12.9 **4B3**: 863.1573/66.6	863.1612	3	2
7-mer	**4B1**: 995.1803/13.3 **4B2**: 995.1893/1.1 **4B3**: 995.1777/58.7	995.1823	4	2
8-mer	**4B1**: 1145.2118/7.1	1145.2140	4	3

	4B2: 1145.2083/2.4 **4B3**: 1145.2089/47.9			
9-mer	**4B1**: 1295.2432/2.5[b] **4B3**: 1295.2394/28.7	1295.2457	4	4
	4B1: 1277.2322/3.3[b] **4B3**: 1277.2299/30.9	1277.2352	5	3
10-mer	**4B1**: 1427.2635/1.3 **4B2**: 1427.2479/0.02 **4B3**: 1427.2612/21.4	1427.2669	5	4
12-mer	**4B1**: 1710.3186/0.14[b] **4B3**: 1710.3169/7.5	1710.3275	6	5

[a] missing in **4B1** [b] missing in **4B2** [c] missing in **4B3**

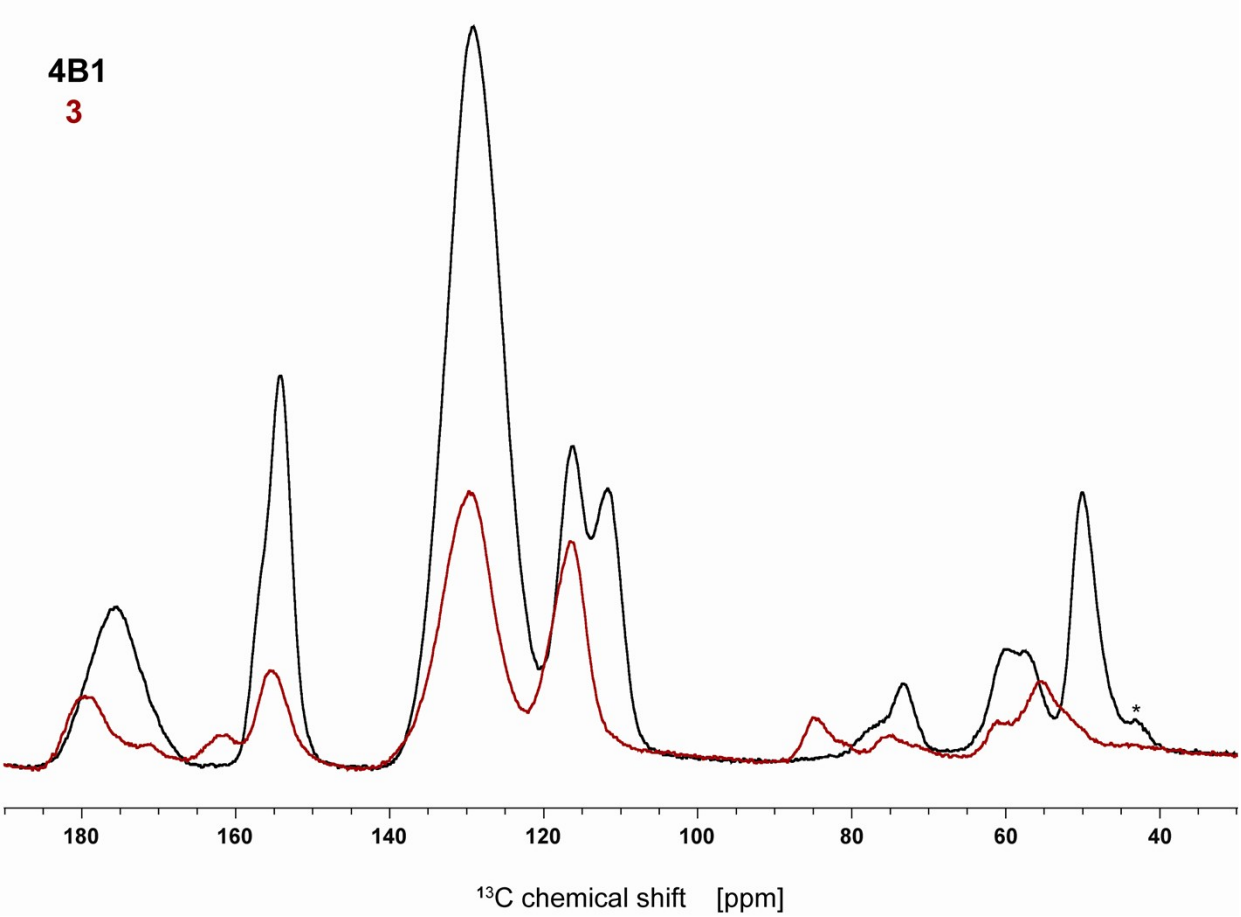


Fig.S2 ^{13}C-ss NMR spectrum of PHMA **3** (red) and precursor PHMA **4** (black). The asterisk indicates a sideband.

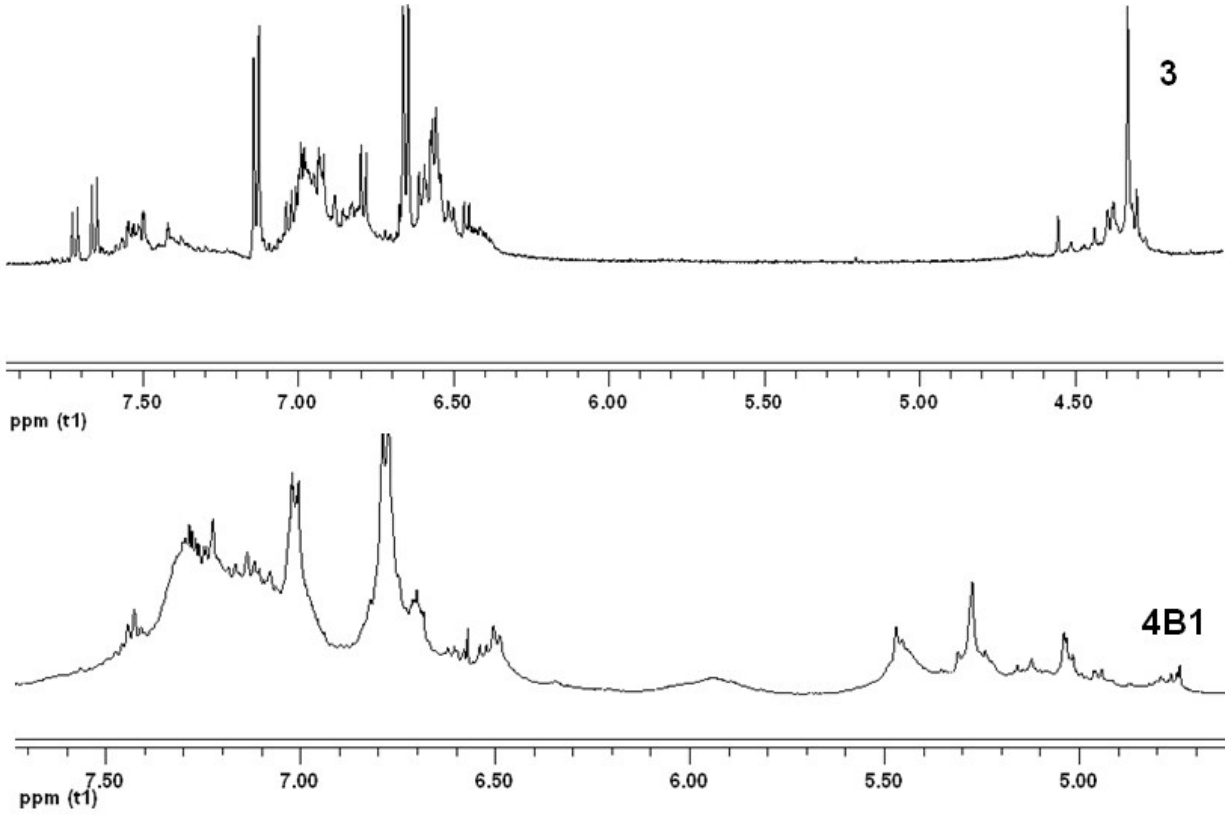


Fig. S3 ^{1}H-NMR spectra of PHMA **4B1** and **3** (DMSO).

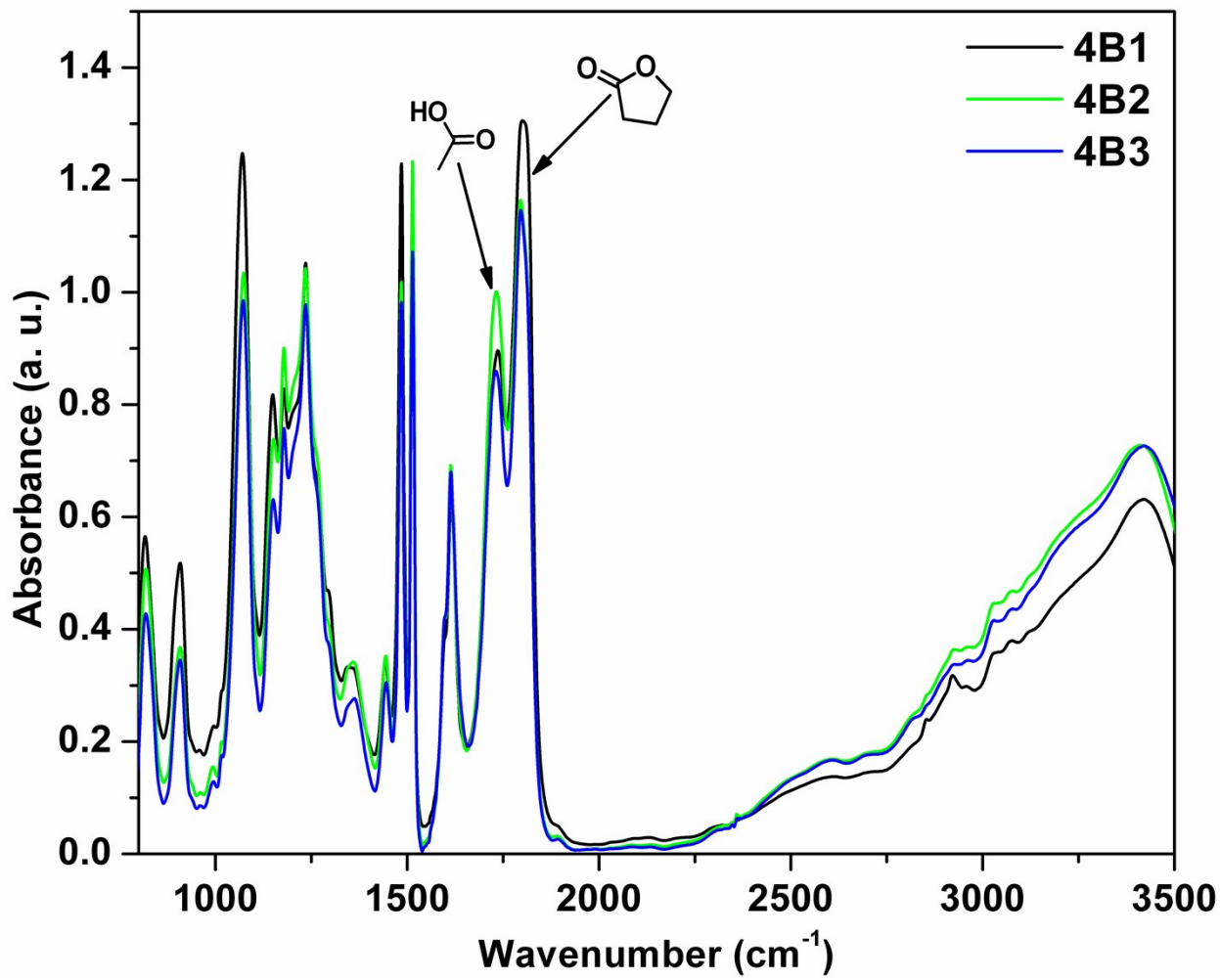


Fig. S4 FTIR spectra of PHMA **4B1**, **4B2** and **4B3**.

Table S2 Relative contributions (%) of the C=O unit of polymer **4B1**, **4B2** and **4B3**.

Polymer	C=O bond from the carboxyl group	C=O bond from the benzofuranone group
4B1	52	64
4B2	61	57
4B3	48	56

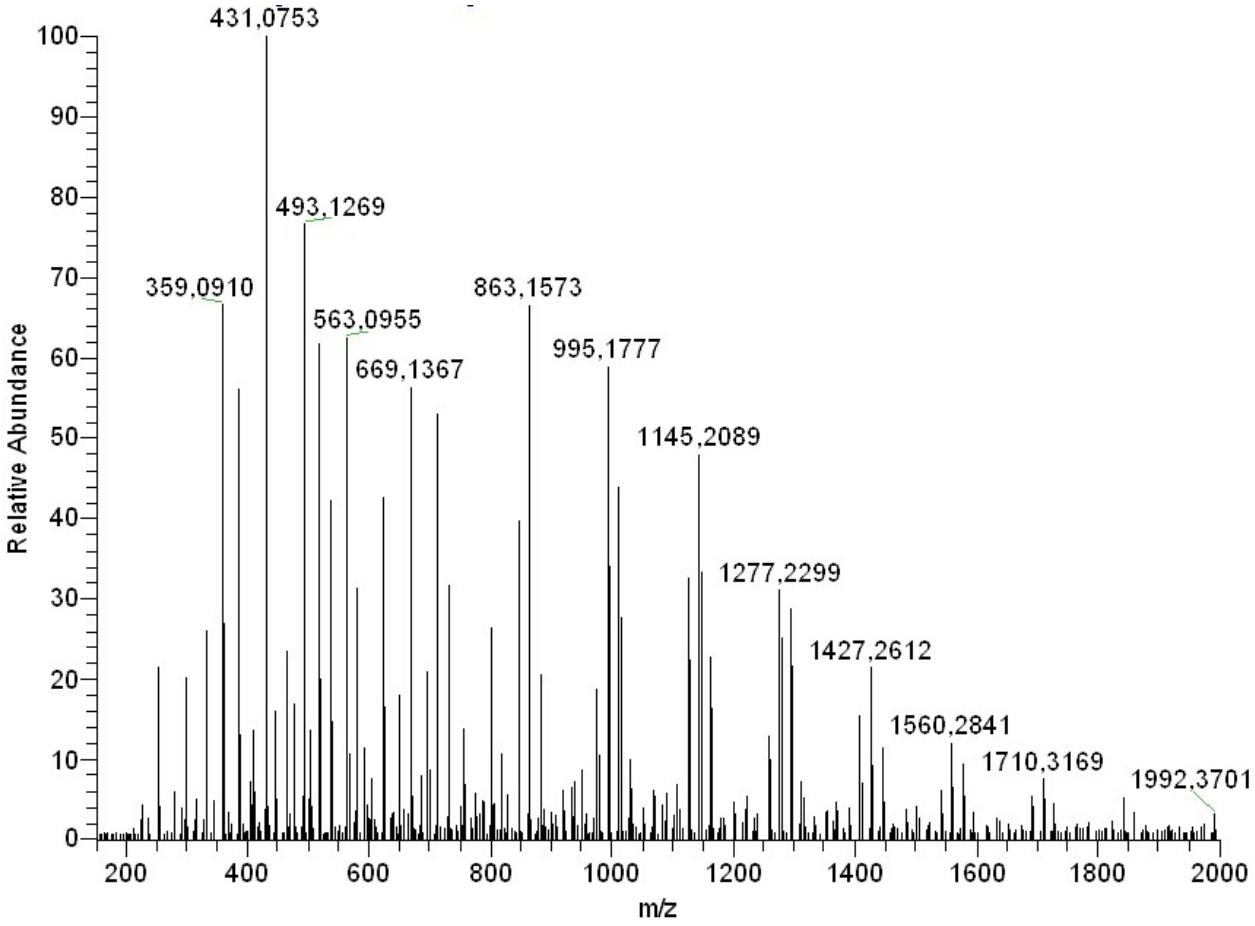


Fig. S5 HRMS ESI(-)spectrum of PHMA **4B3**.

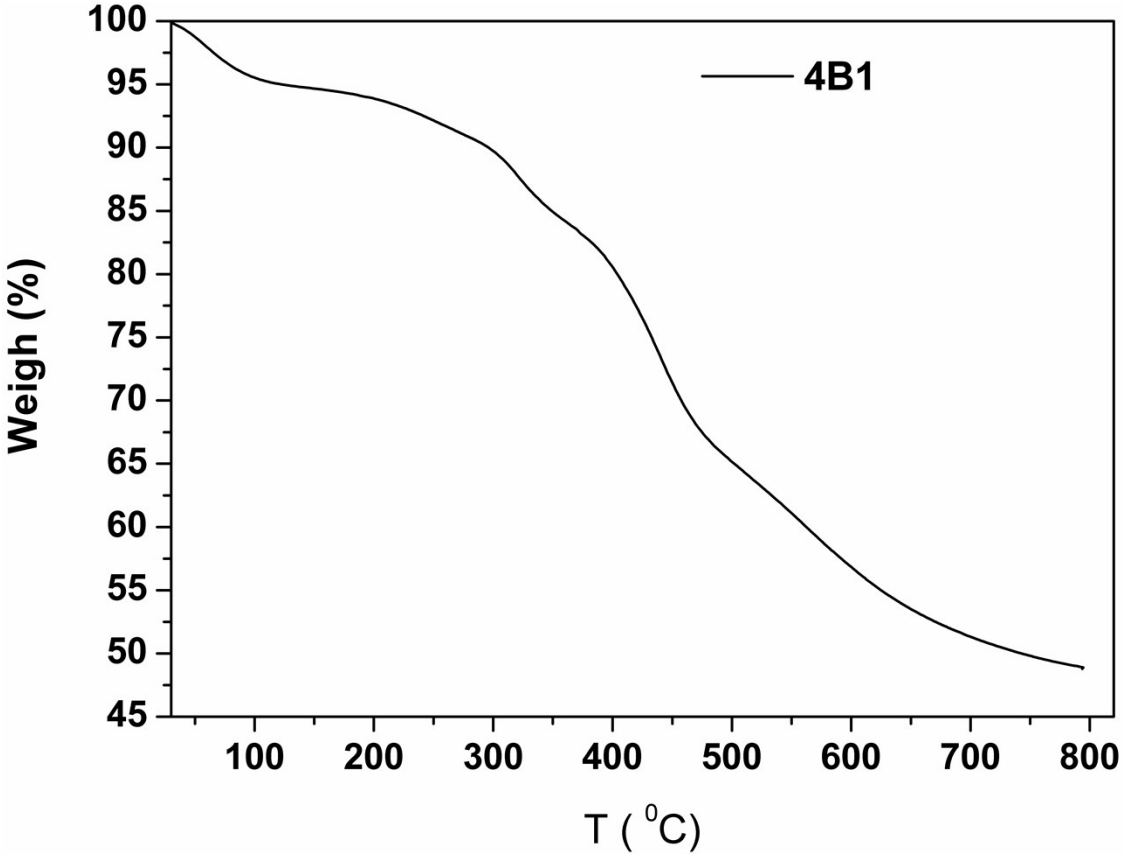


Fig. S6 TGA of PHMA **4B1**.

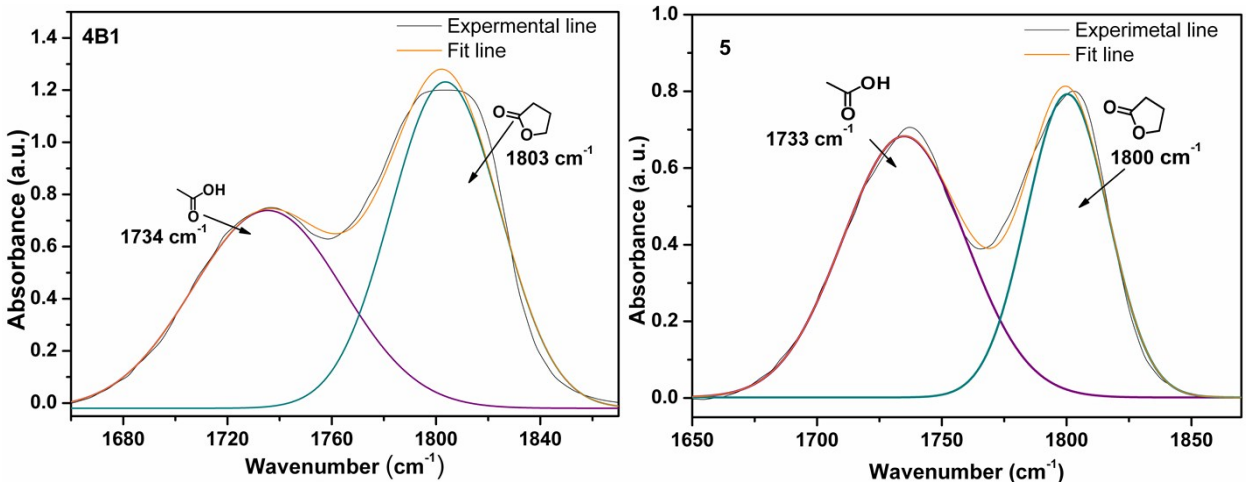


Fig. S7 Structure analysis of polymer **4B1** and **5** by the C=O band deconvolution.

Table S3 Relative contributions (%) of the C=O unit of polymer **4B1** and **5**.

Polymer	C=O bond from the carboxyl group	C=O bond from the benzofuranone group
4B1	52	64
5	43	33

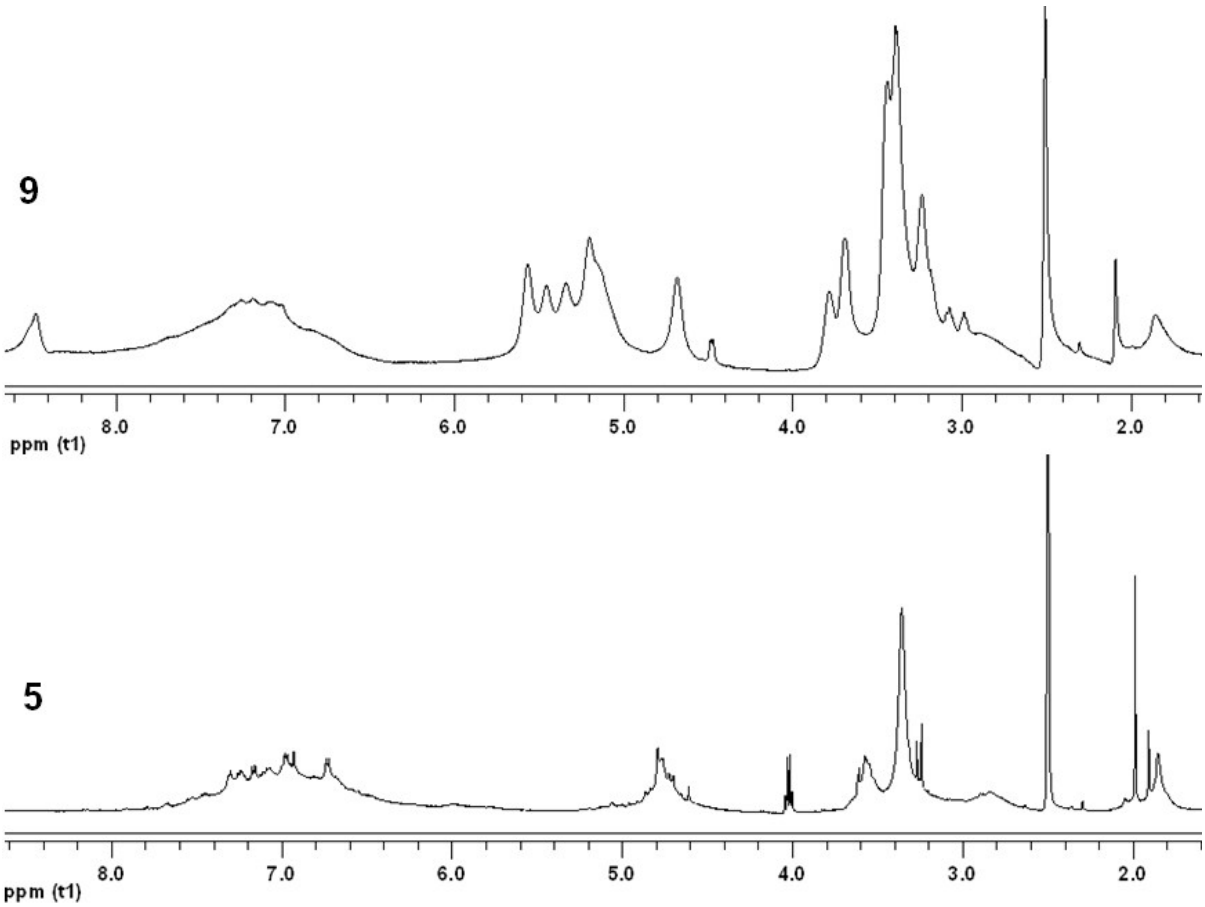


Fig. S8 ^{1}H NMR spectra of polymer **5** and **9**.

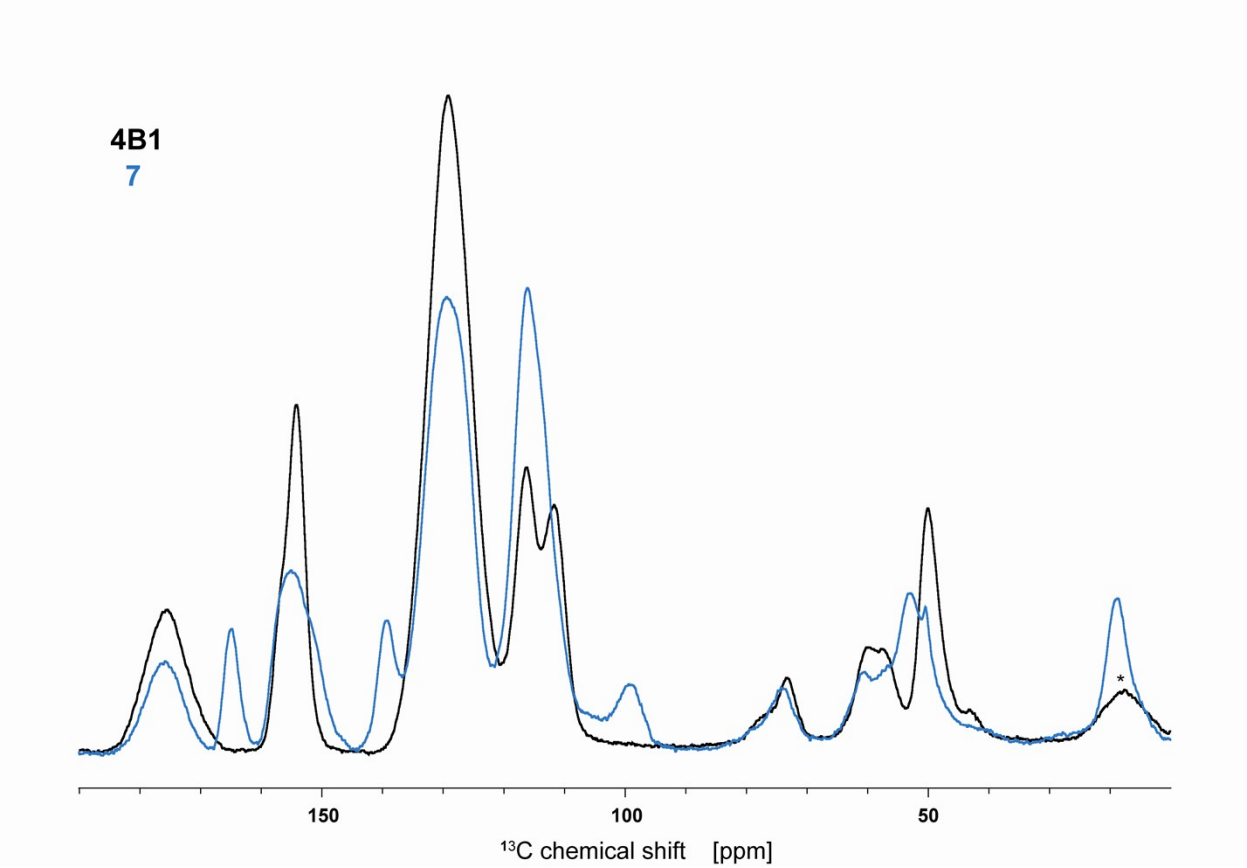


Fig. S9 ^{13}C ss-NMR spectra of PHMA **4B1** (black) and of **7** (blue). The asterisk indicates a sideband.

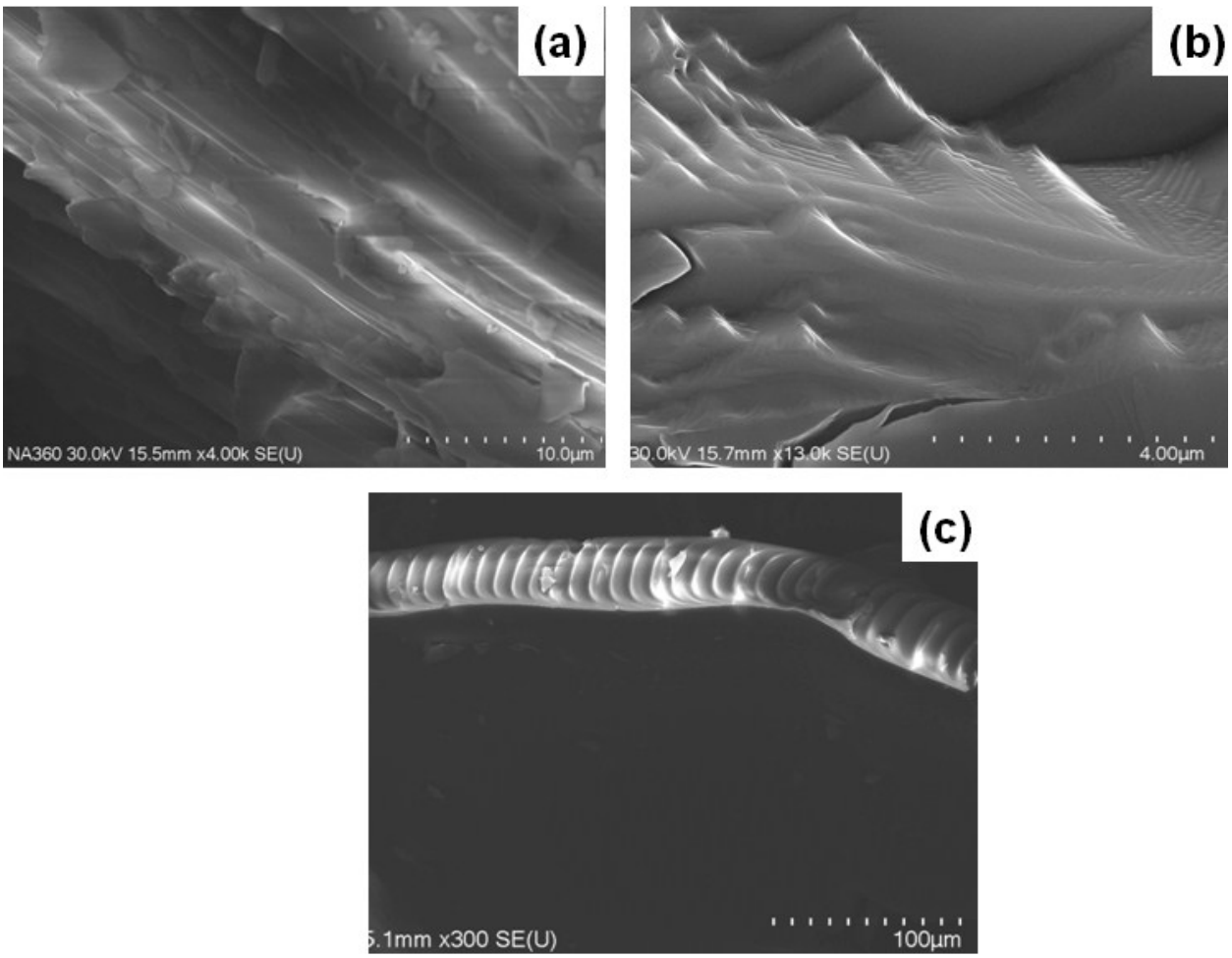


Fig. S10 SEM images of the polymers **4** (a), **3** (b) and **7** (c).

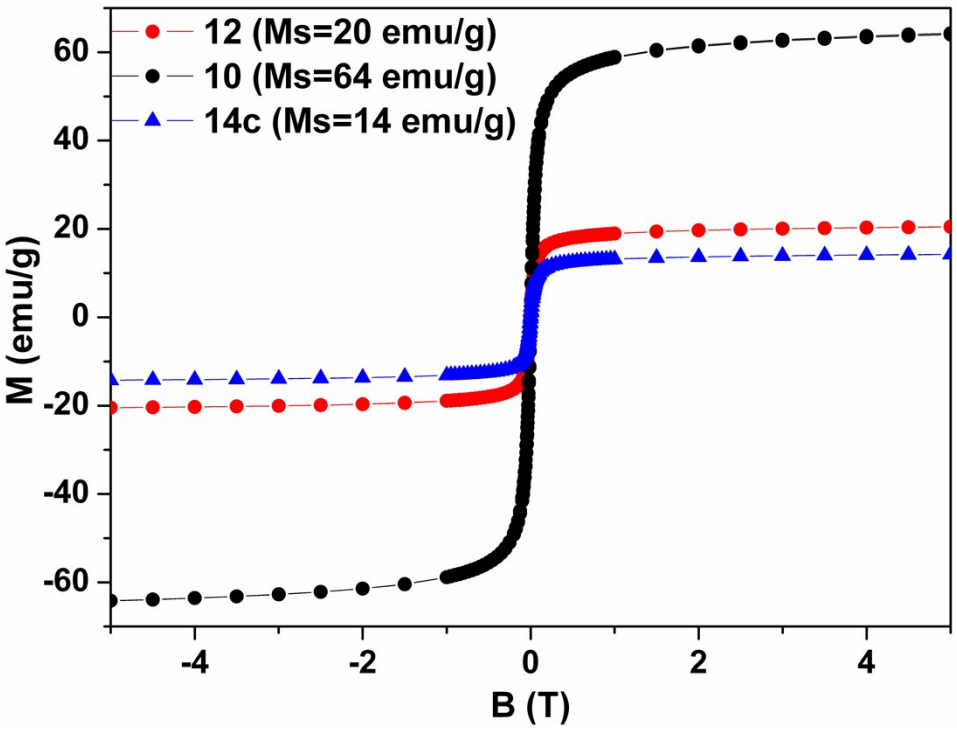


Fig. S11 Magnetization curves of starting MNP **10**, propargylated MNS **12** and functionalized MNS **14c**.

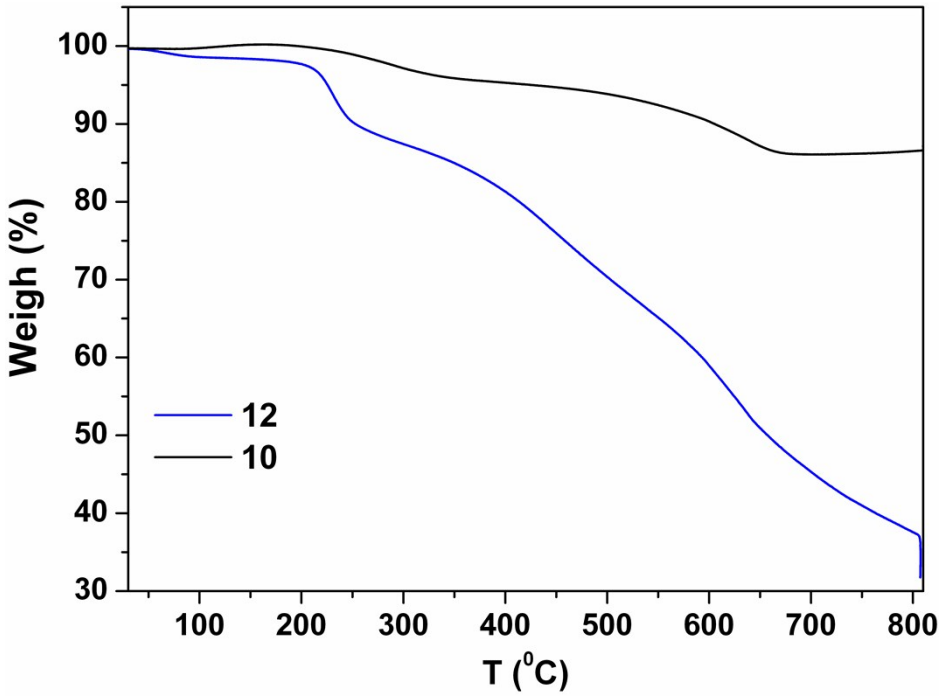


Fig. S12 TGA of MNP **10** and MNS **12**.