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Tailor design of renewable copolymers based on poly(1,4-butylene 2,5-furandicarboxylate) and poly(ethylene glycol) with refined thermal properties

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1 Structural characterisation of the PBF/PEGFs

1.1 FTIR spectra

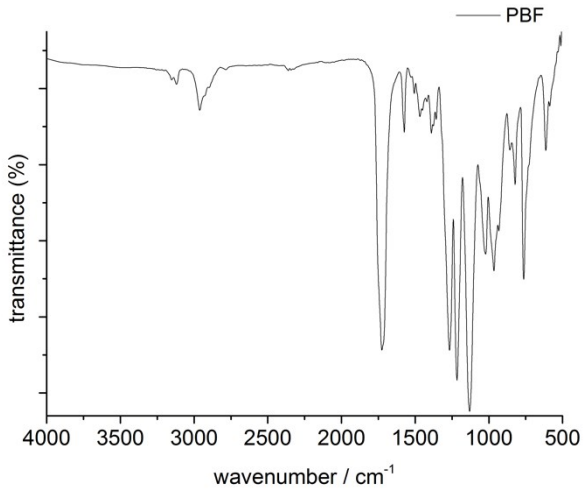

Fig. S1 FTIR spectrum of PBF homopolyester.

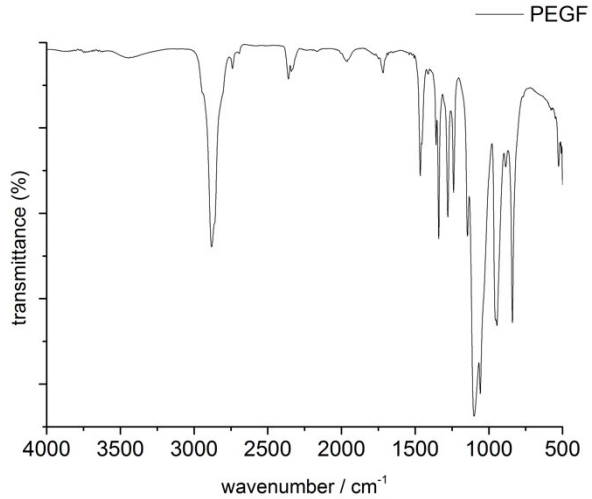

Fig. S2 FTIR spectrum of PEGF homopolymer.

1.2 NMR spectra

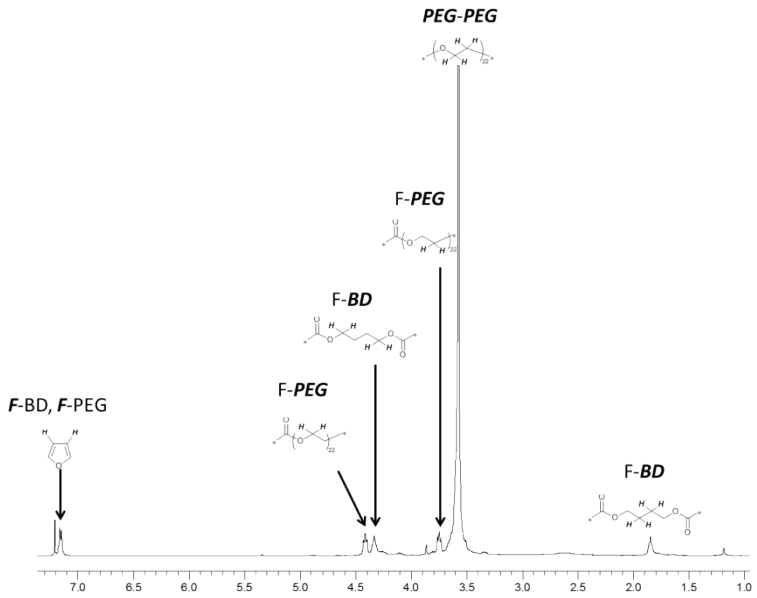

Fig. S3 ^{1}H NMR spectra of PBF/PEGF2 in deuterated chloroform.

Table S1 Assignments of the main ^{13}C NMR resonances ($CDCl_3$) of PBF/PEGF copolymers and of PBF and PEGF homopolymers.

assign.[a]	δ / ppm					
	PBF [b]	**PBF/PEGF**[c]				**PEGF**[c]
		1 [b]	2	3	4	
C=O; ***F***-BD, ***F***-PEG	158.0	160.5	158.0	157.9	157.9	161.0
C2, ***C5***; ***F***-BD, ***F***-PEG	146.8	146.6	146.8	146.7	146.7	154.7
C3, ***C4***; ***F***-BD, ***F***-PEG	118.5	119.7	118.5	118.6	118.6	119.0
O***C***H$_2$; ***PEG***-***PEG***	-	69.5	70.5	70.6	70.6	70.56
C(O)OCH$_2$***C***H$_2$O; F-***PEG***	-	68.6	68.9	68.9	68.9	68.8
C(O)O***C***H$_2$; F-***BD***	64.9	66.7	64.9	64.9	n.d	-
C(O)O***C***H$_2$; F-***PEG***	-	66.7	64.5	64.5	64.5	63.0
C(O)OCH$_2$***C***H$_2$; F-***BD***	25.3	24.4	25.3	25.2	n.d.	-

[a] ^{13}C NMR resonances assignment and corresponding group and diad (two adjacent structural units F-BD, F-PEG and/or PEG-PEG). F, BD and PEG stand for 2,5-furandicarboxylate, 1,4-butanediyl and PEG moieties, respectively. [b] ^{13}C NMR spectra in deuterated TFA. [c] ^{13}C NMR spectra were recorded in deuterated chloroform.

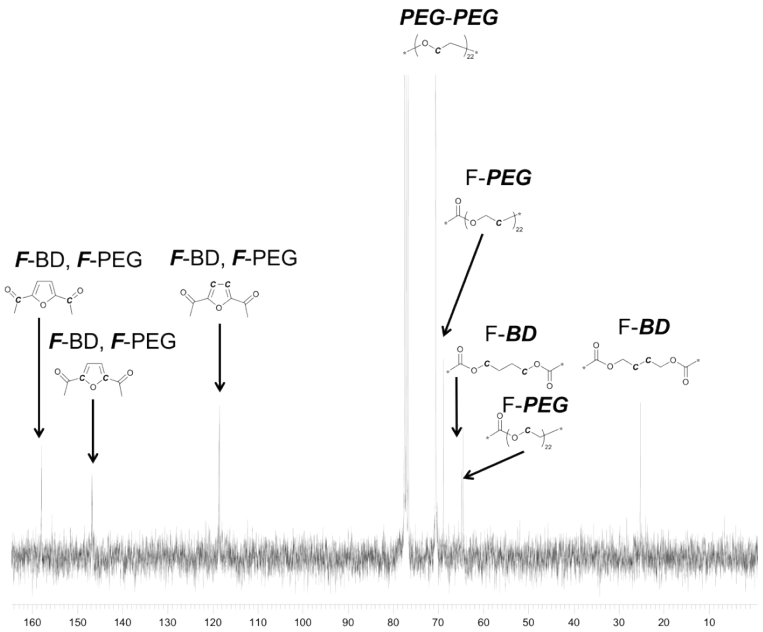

Fig. S4 ^{13}C NMR spectra of PBF/PEGF2 in deuterated chloroform.

2 Thermal behaviour of PBF/PEGFs

2.1 TGA traces

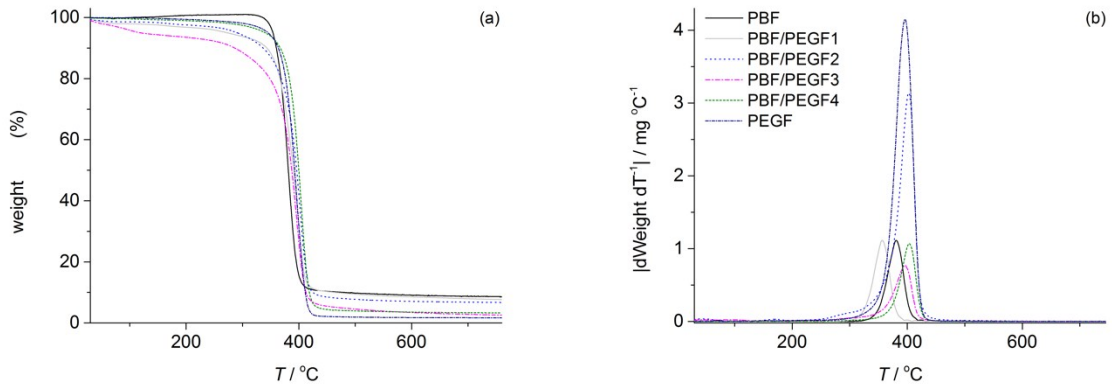

Fig. S5 Thermogravimetric curves of the PBF/PEGFs, PBF and PEGF: (a) TG and (b) DTG.

2.2 DMTA trace

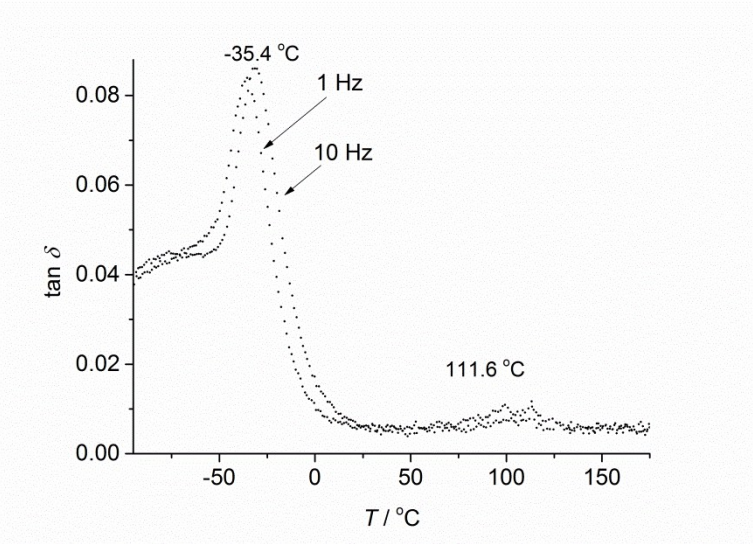

Fig. S6 DMTA traces of PBF/PEGF1 at 1 and 10 Hz.

3 XRD pattern

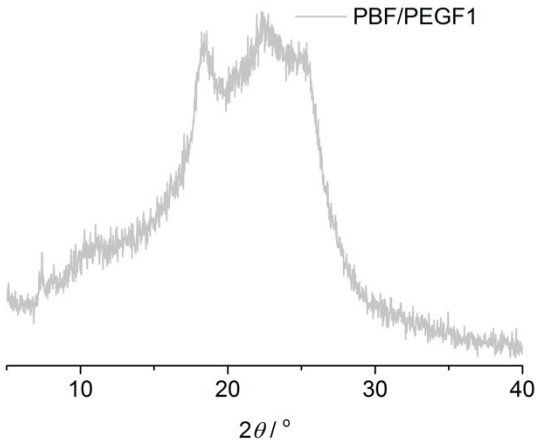

Fig. S7 XRD pattern of PBF/PEGF1.