

Electronic Supplementary Information for:

Facile synthesis of chain end functionalized polyethylenes via epoxide ring-opening and thiol-ene addition click chemistry

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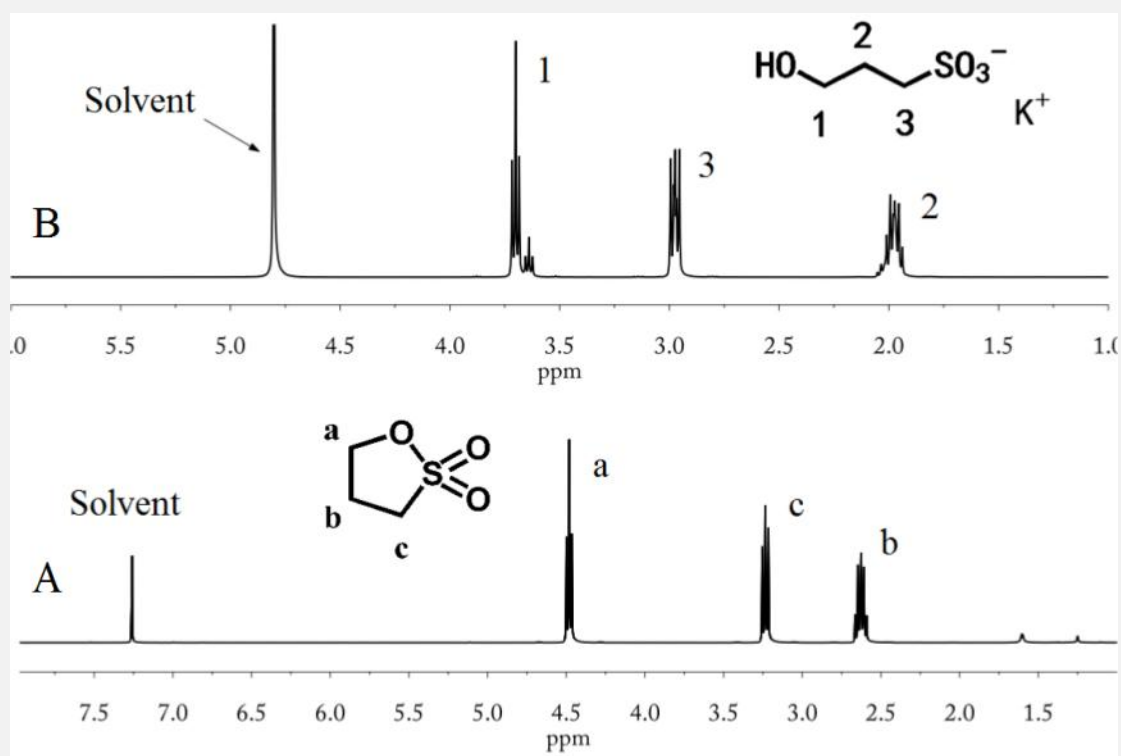


Figure S1 ¹H NMR of 1,3-PS (A, CDCl₃) and KPS (B, D₂O)

assignments similar to carboxy-t-PE)

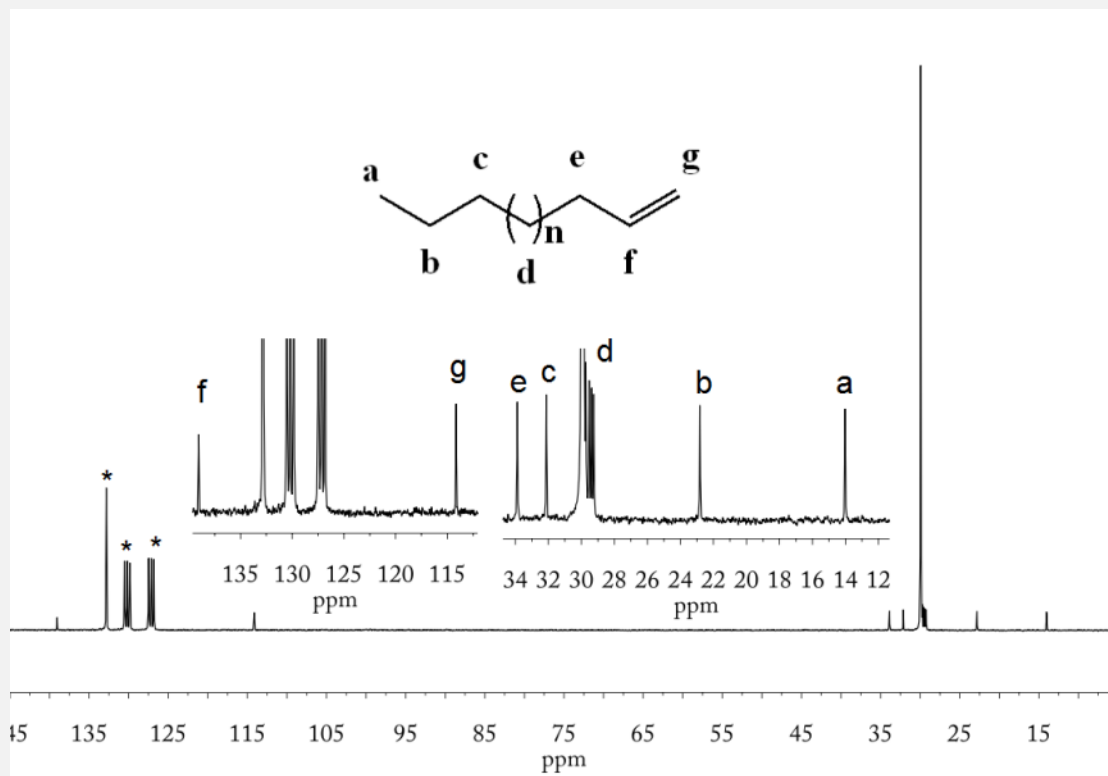


Figure S4 ^{13}C NMR spectrum of v-PE1 (1,2-Dichlorobenzene-d₄)

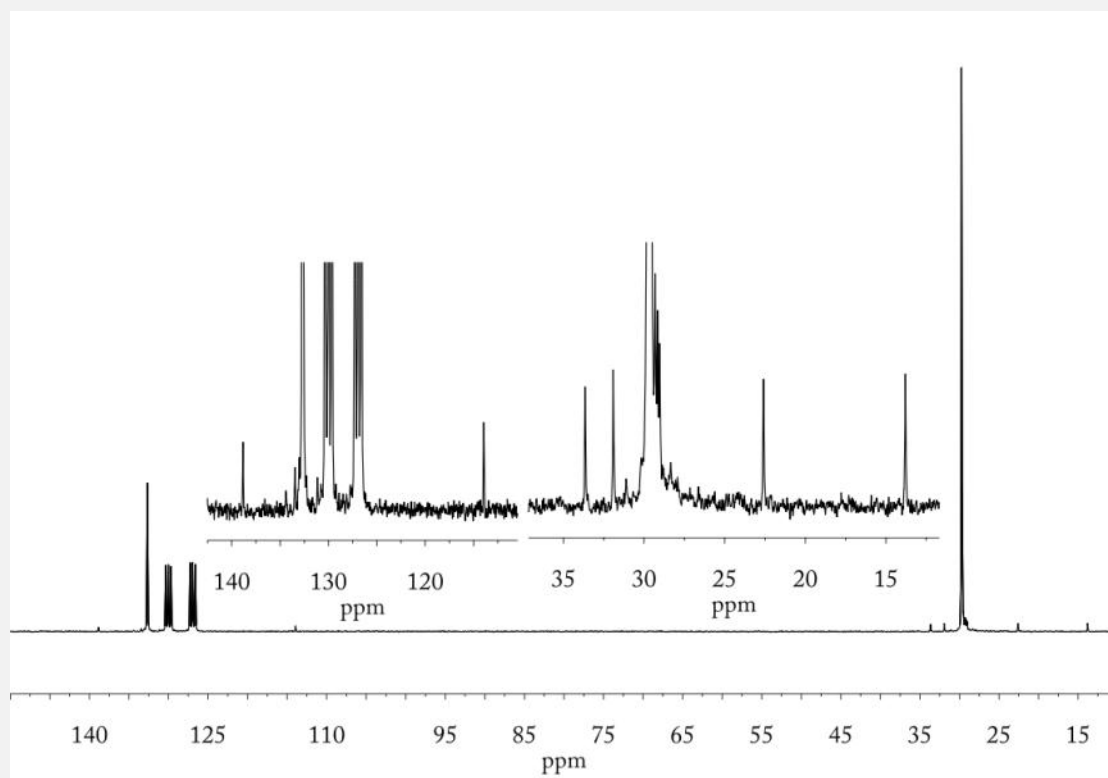


Figure S5 ^{13}C NMR spectrum of v-PE2 (1,2-Dichlorobenzene-d₄, assignments similar to v-PE1)

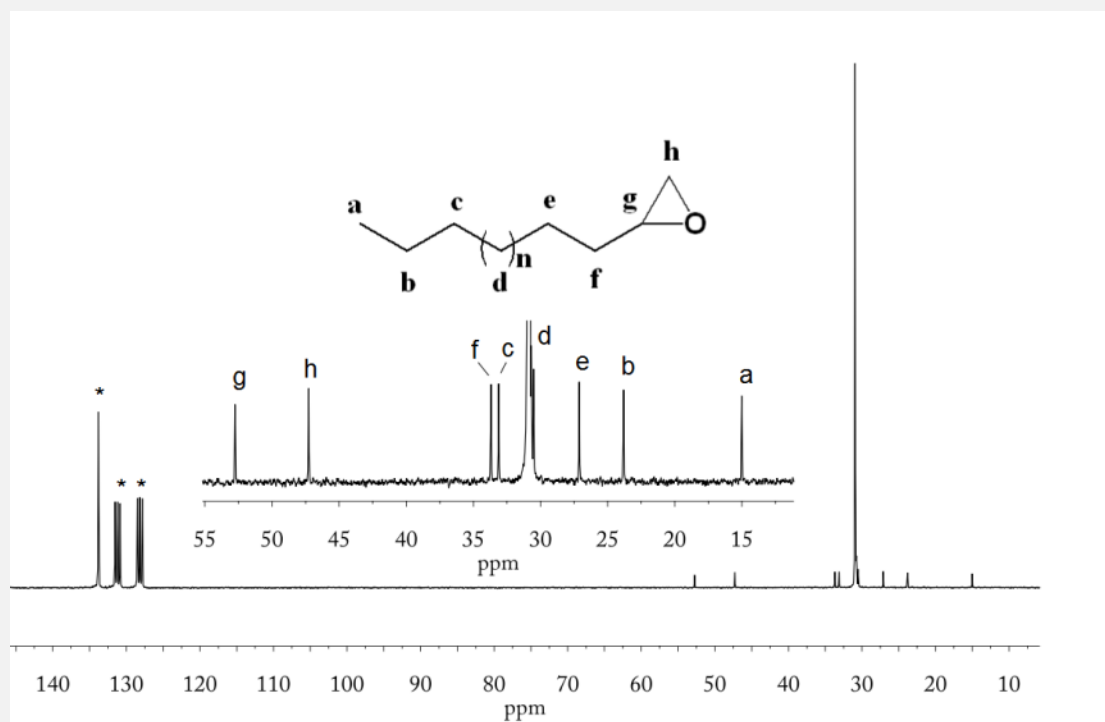


Figure S6 ^{13}C NMR spectrum of e-PE (1,2-Dichlorobenzene-d₄)

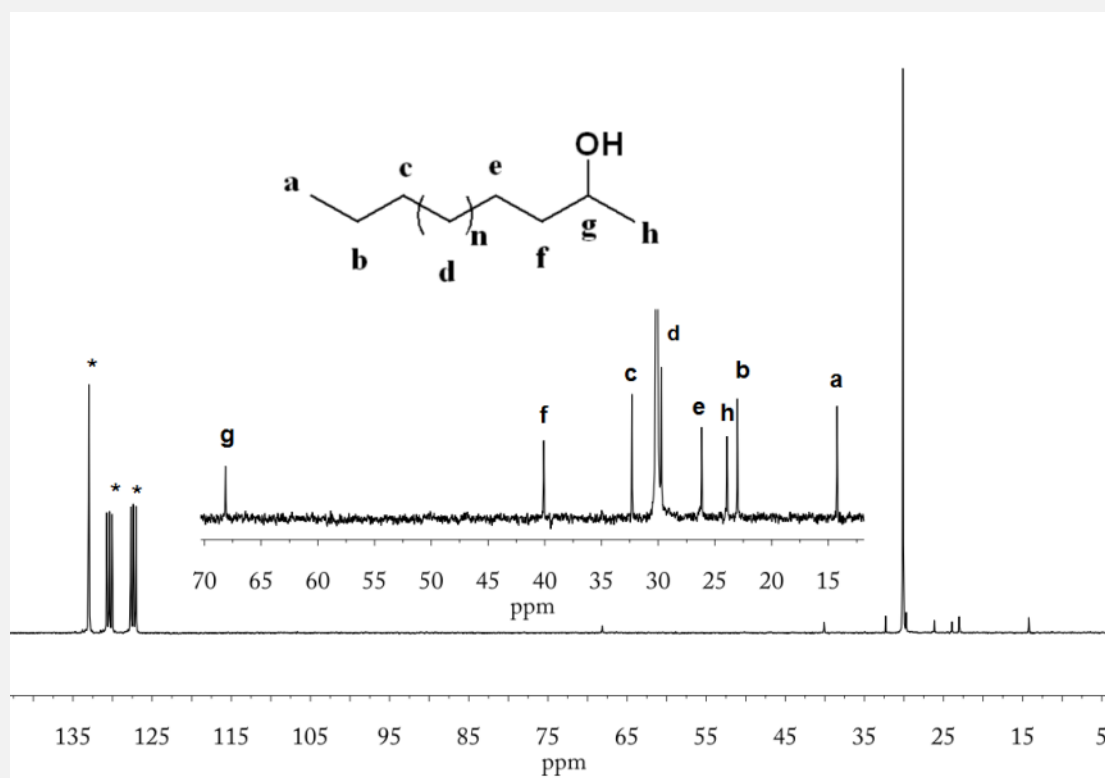


Figure S7 ^{13}C NMR spectrum of 2-hydroxy PE (1,2-Dichlorobenzene- d_4)

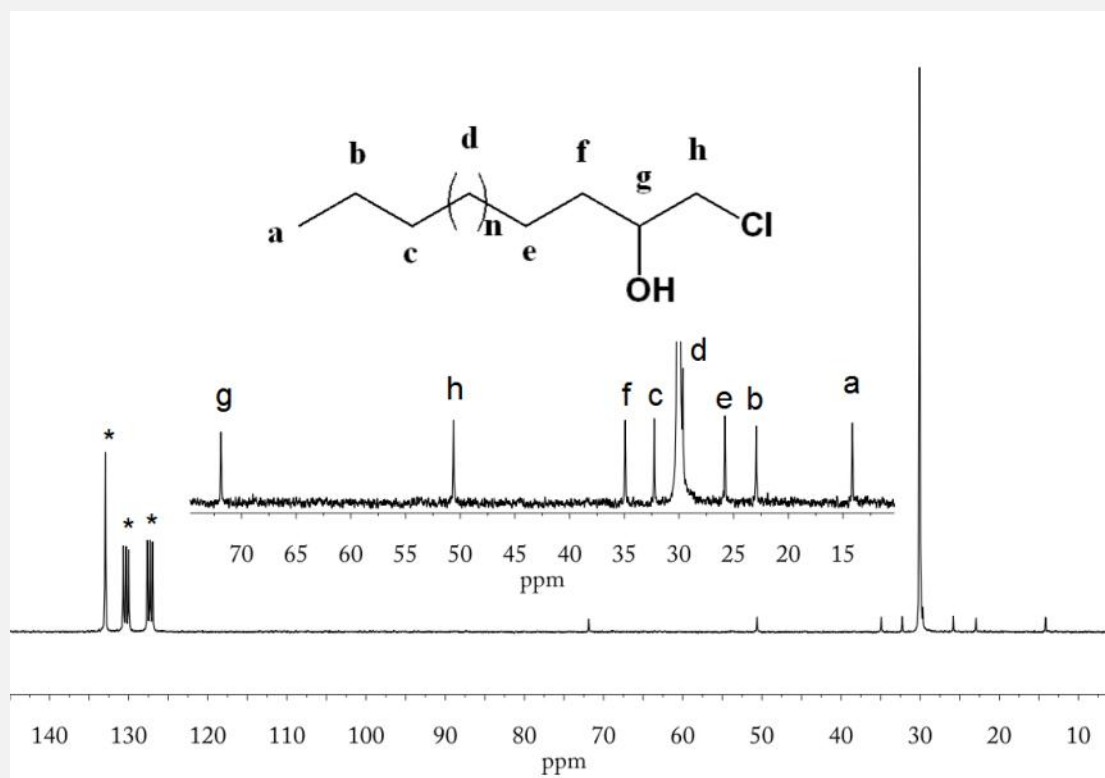


Figure S8 ^{13}C NMR spectrum of chloro-t-PE (1,2-Dichlorobenzene- d_4)

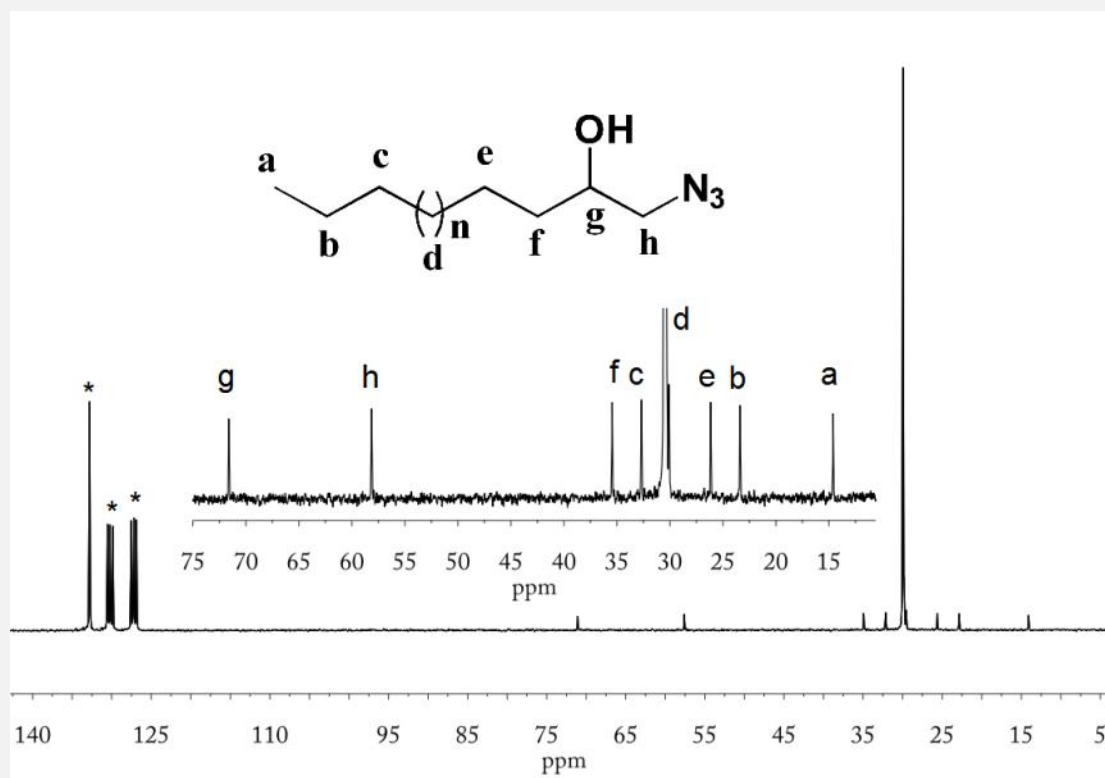


Figure S9 ^{13}C NMR spectrum of azide-t-PE (1,2-Dichlorobenzene- d_4)

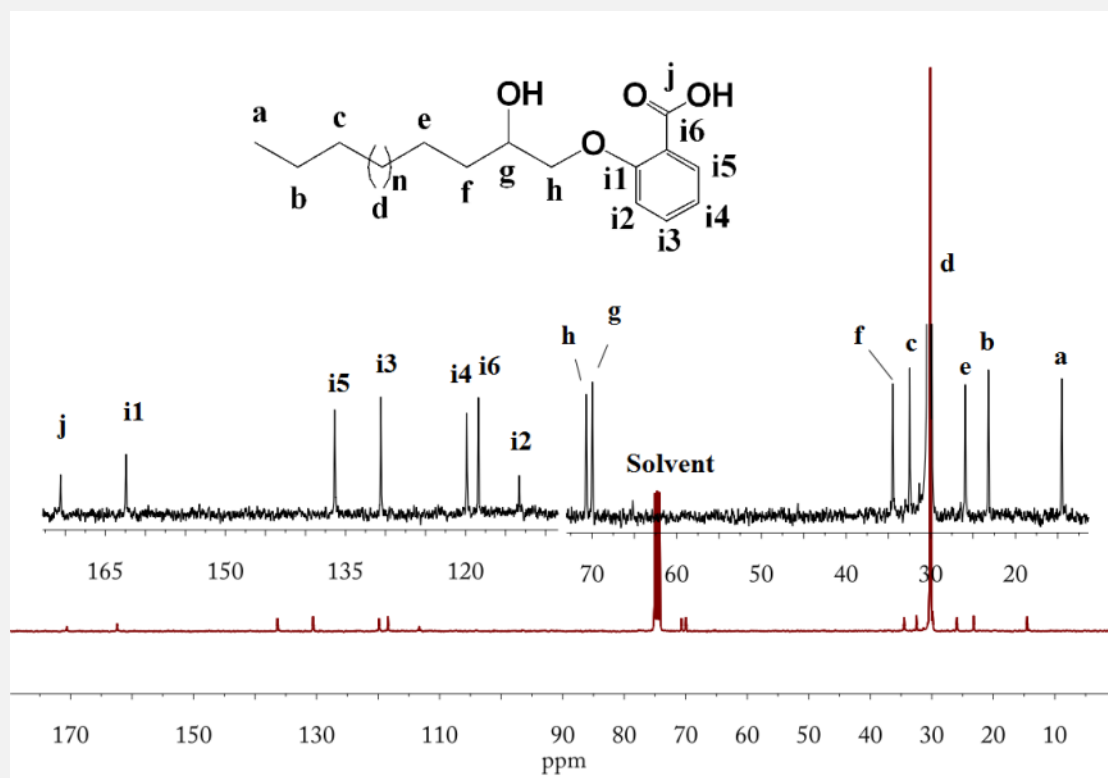


Figure S10 ^{13}C NMR spectrum of carboxy-t-PE (1,1,2,2-Tetrachloroethane- D_2)

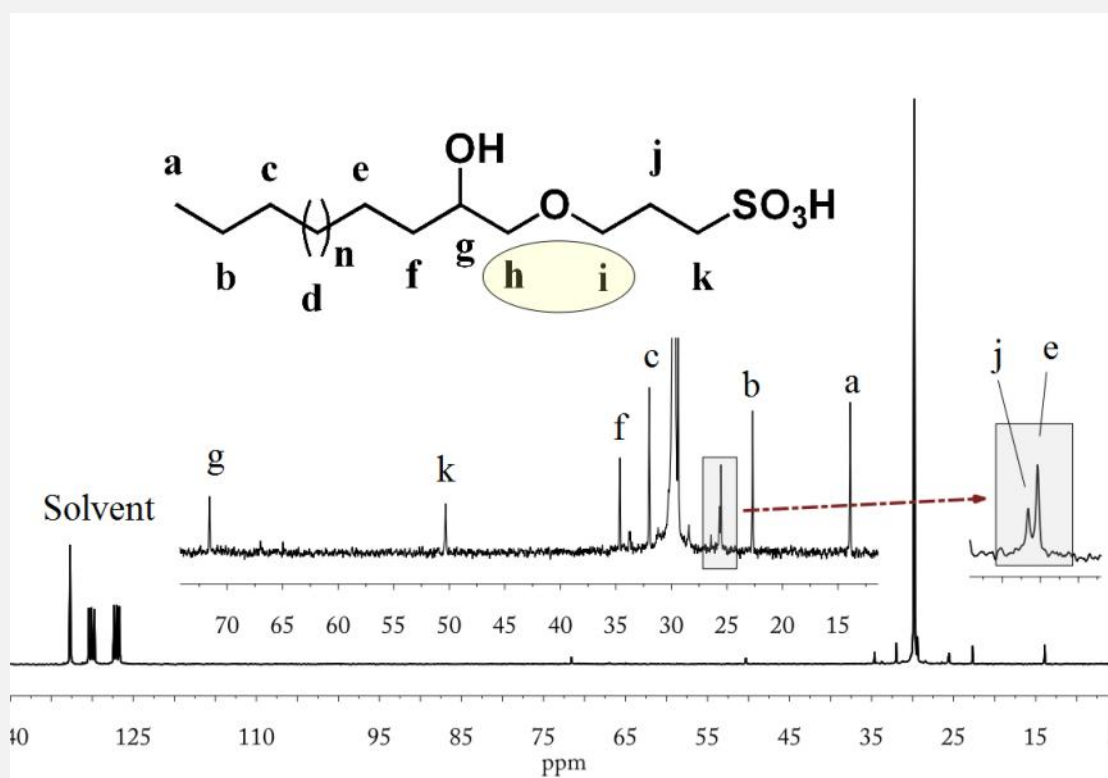


Figure S11 ^{13}C NMR spectrum of sulfo-t-PE (1,2-Dichlorobenzene- d_4 , carbons

labelled with *h* and *i* not found)

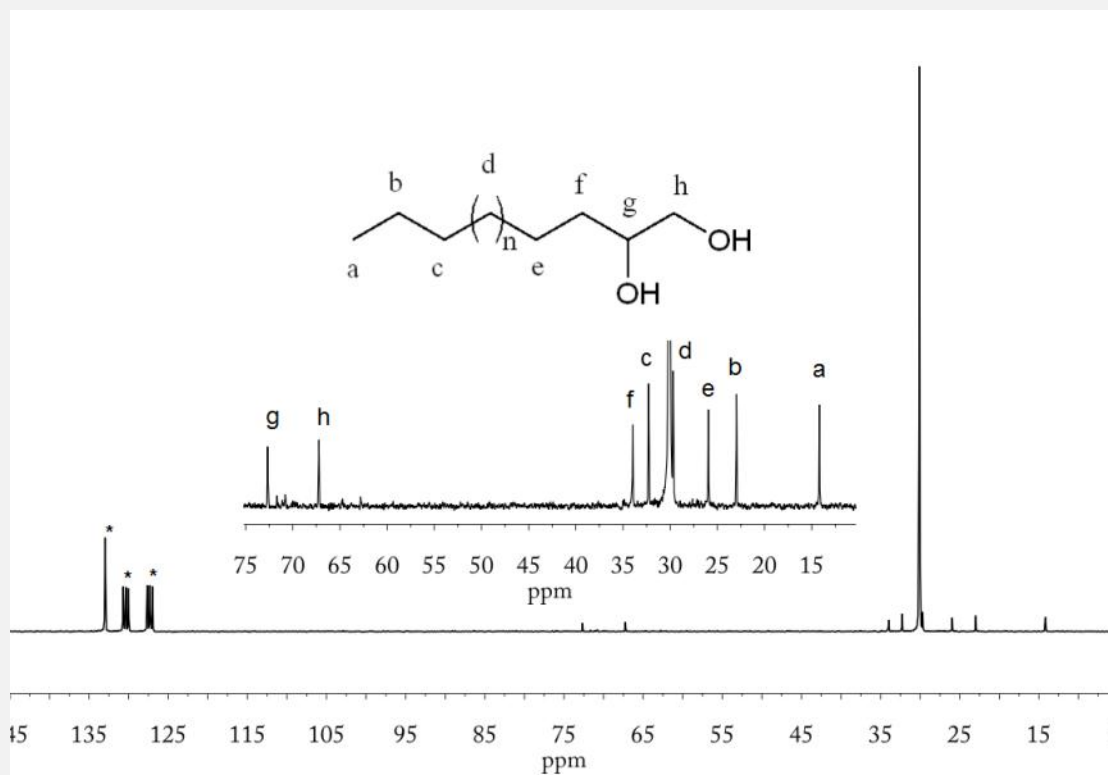


Figure S12 ¹³C NMR spectrum of diol-PE (1,2-Dichlorobenzene-d₄)

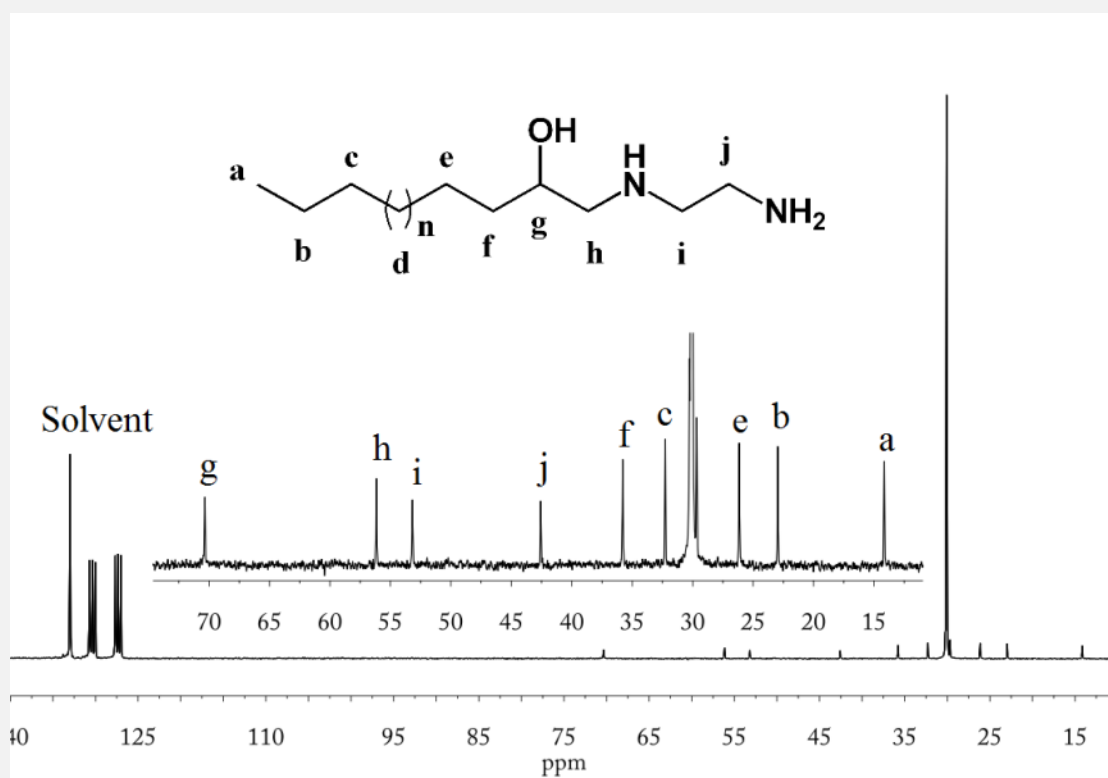


Figure S13 ¹³C NMR spectrum of NH₂-t-PE (1,2-Dichlorobenzene-d₄)

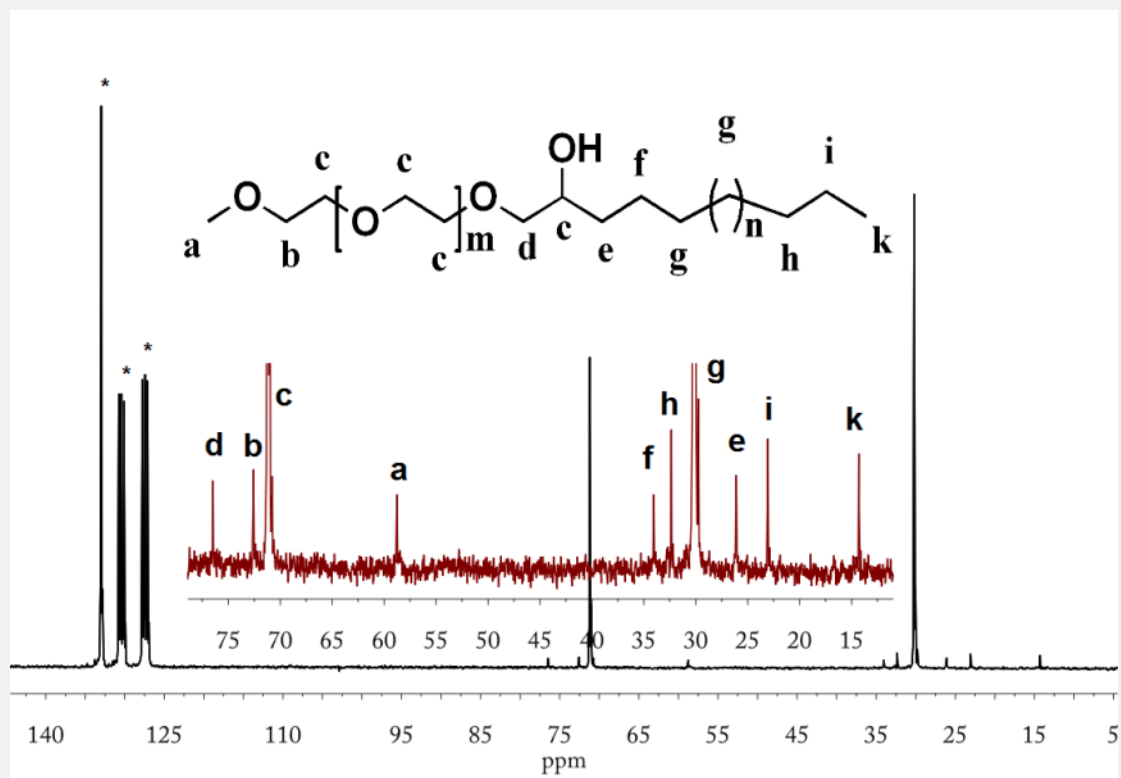


Figure S14 ^{13}C NMR spectrum of PE-*b*-PEG (1,2-Dichlorobenzene- d_4)

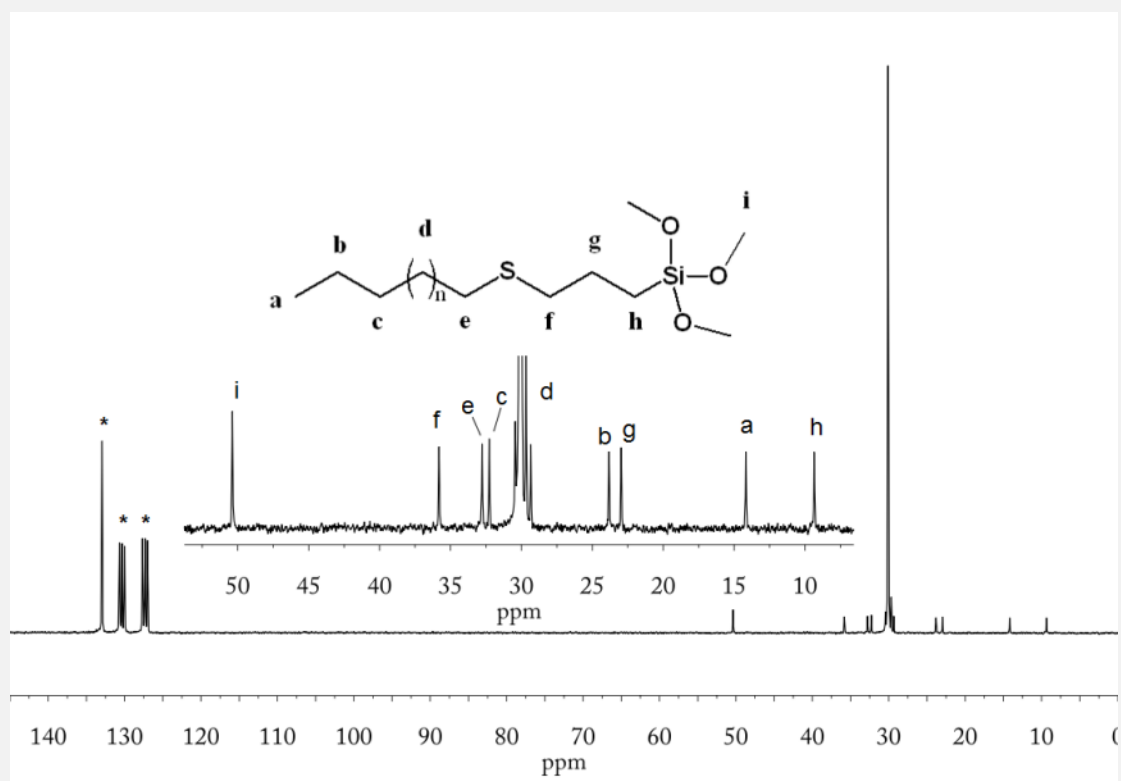


Figure S15 ^{13}C NMR spectrum of TMS-*t*-PE (1,2-Dichlorobenzene- d_4)

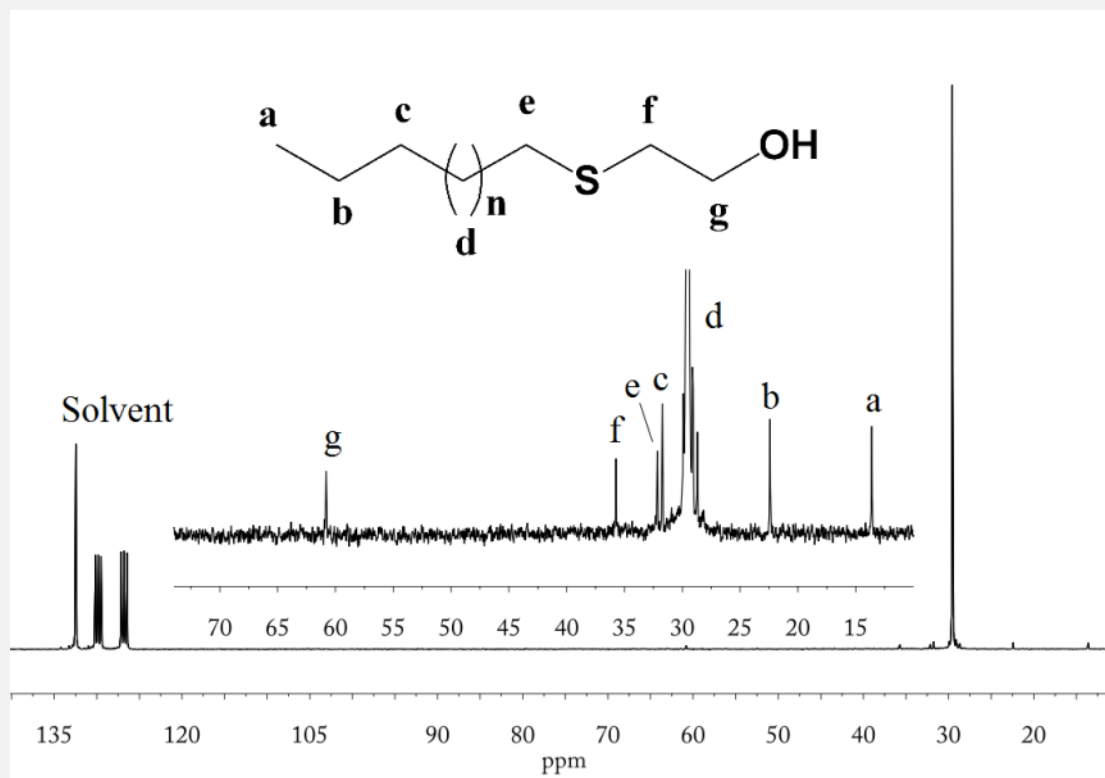


Figure S16 ¹³C NMR spectrum of PE-S-OH (1,2-Dichlorobenzene-d₄)

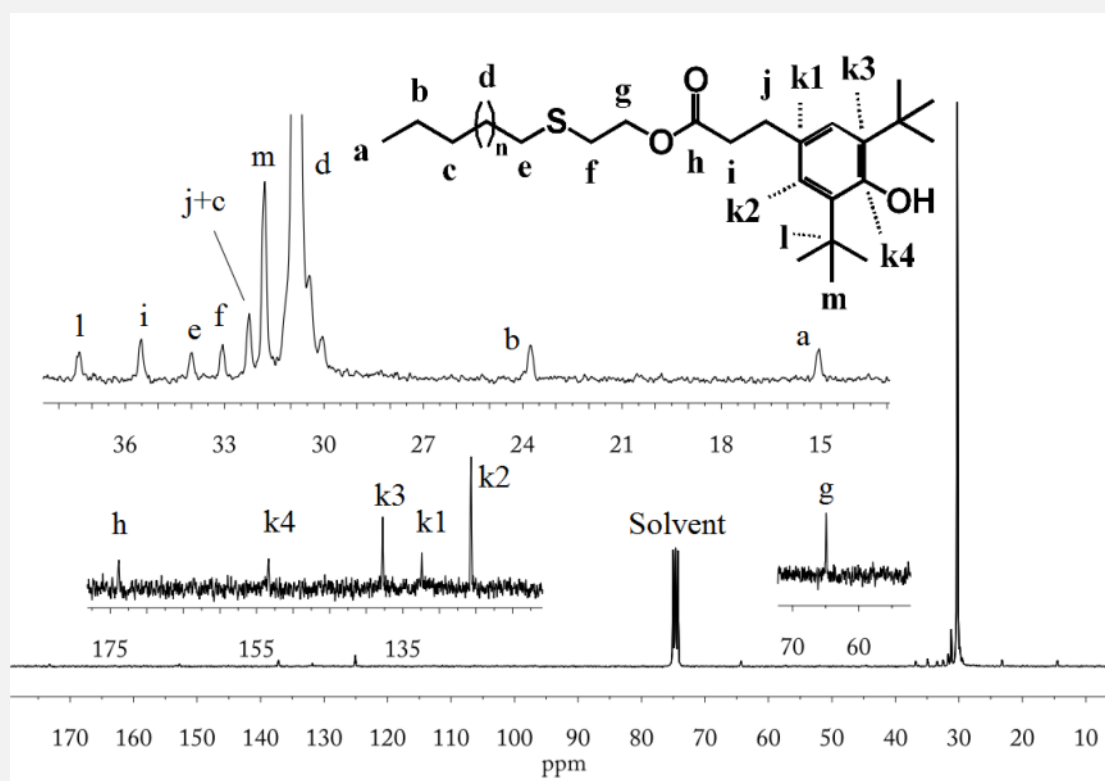


Figure S17 ¹³C NMR spectrum of AO-t-PE (1,1,2,2-Tetrachloroethane-D₂)

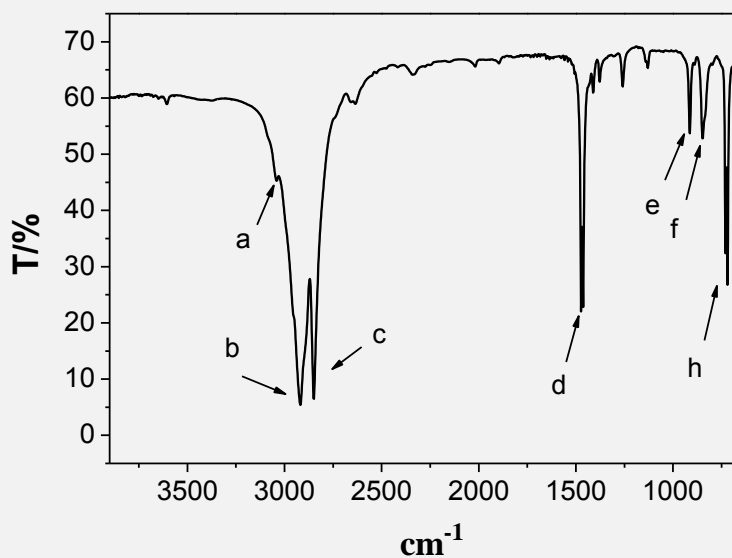


Figure S18 FT-IR spectrum of e-PE

Peaks: a (3040 cm^{-1}) C-H (in epoxy group) stretching, b (2918 cm^{-1}) and c (2849 cm^{-1}) C-H stretching, d (1470 cm^{-1}) C-H bending (CH_2), e (914 cm^{-1}) and f (848 cm^{-1}) C-O-C (in epoxy group) stretching, h (719 cm^{-1}) C-C out of plane bending

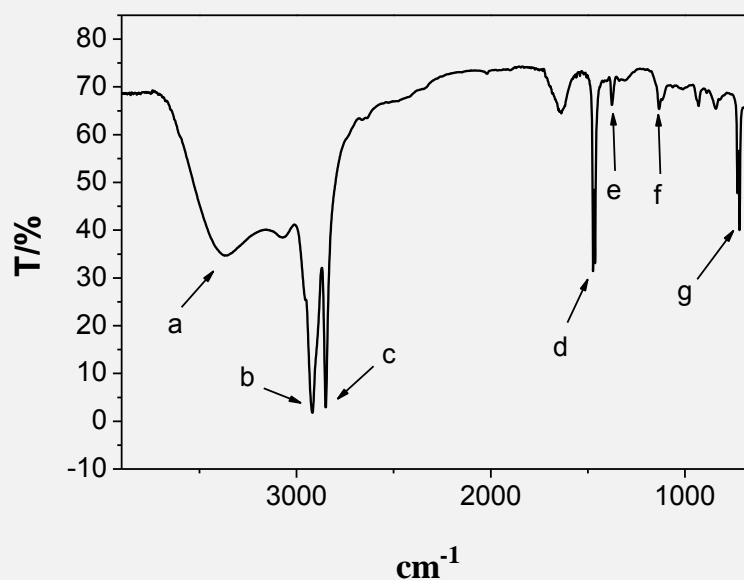


Figure S19 FT-IR spectrum of 2-hydroxy PE

Peaks: a (3363 cm^{-1}) O-H stretching, b (2918 cm^{-1}) and c (2849 cm^{-1}) C-H stretching, d (1473 cm^{-1}) C-H bending (CH_2), e (1376 cm^{-1}) C-H bending (CH_3), f (1133 cm^{-1}) C-O

stretching, g (719cm^{-1}) C-C out of plane bending

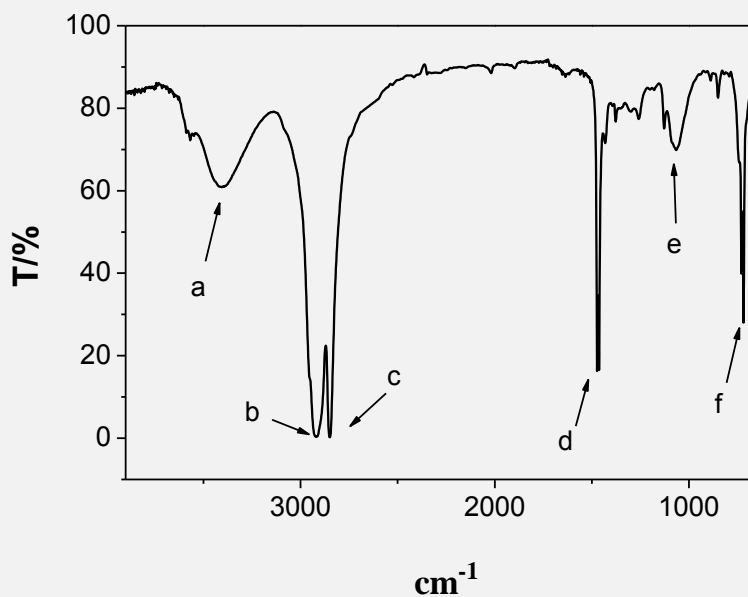


Figure S20 FT-IR spectrum of chloro-t-PE

Peaks: a (3405 cm^{-1}) O-H stretching, b (2918 cm^{-1}) and c (2849 cm^{-1}) C-H stretching, d (1473 cm^{-1}) C-H bending (CH_2), e (1066 cm^{-1}) C-O stretching, f (719 cm^{-1}) C-C out of plane bending

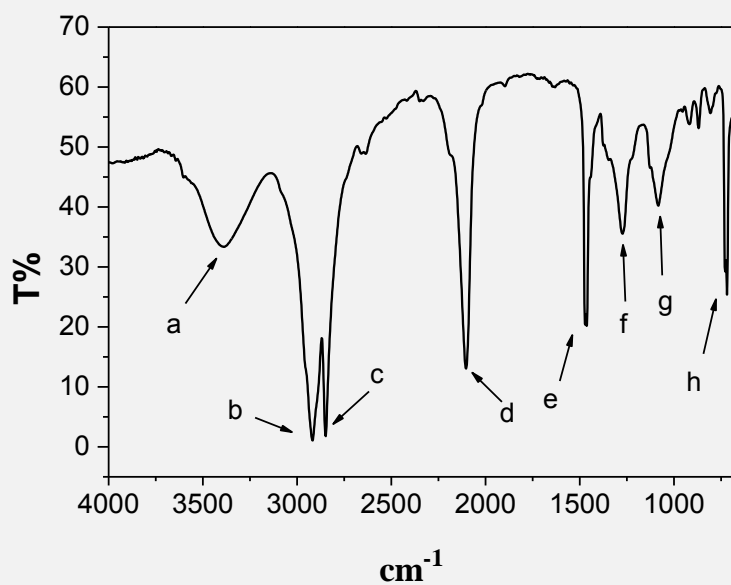


Figure S21 FT-IR spectrum of azide-t-PE

Peaks: a (3388 cm^{-1}) O-H stretching, b (2918 cm^{-1}) and c (2848 cm^{-1}) C-H stretching, d (2104 cm^{-1}) N=N=N stretching, e (1462 cm^{-1}) C-H bending (CH_2), f (1274 cm^{-1}), g (1084 cm^{-1}) C-O and C-N stretching, h (719 cm^{-1}) C-C out of plane bending

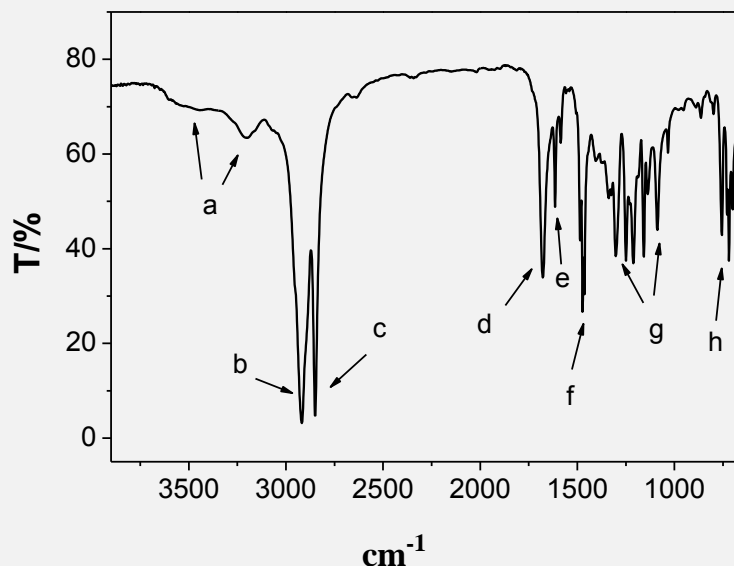


Figure 22 FT-IR spectrum of carboxy-t-PE

Peaks: a ($3500\text{-}3100\text{ cm}^{-1}$) Hydroxyl (left, broad) and carboxyl (right, sharp) O-H stretching, b (2918 cm^{-1}) and c (2849 cm^{-1}) C-H stretching, d (1678 cm^{-1}) C=O stretching, e (1614 cm^{-1}) C=C (Aromatic) stretching, f ($1490\text{-}1450\text{ cm}^{-1}$) C-H bending & C=C (Aromatic) stretching (CH_2), g ($1300\text{-}1100\text{ cm}^{-1}$) C-O stretching, h ($750\text{-}710\text{ cm}^{-1}$) C-C out of plane bending & C-H (Aromatic) out of plane bending

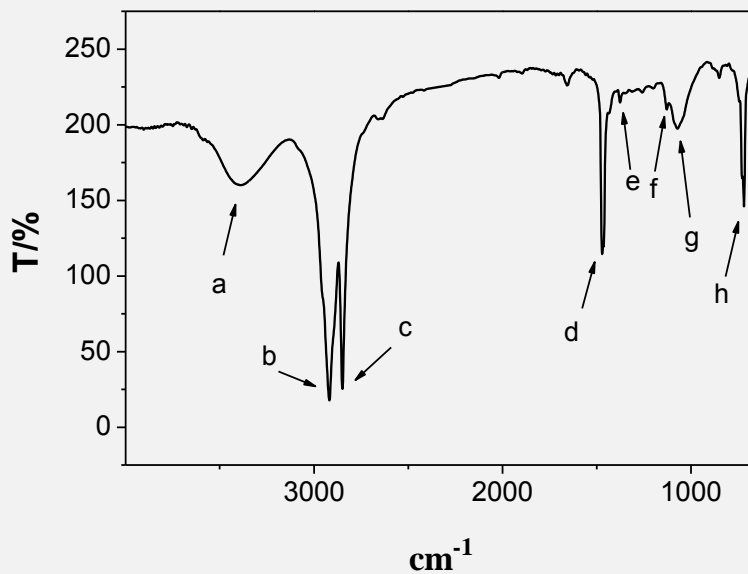


Figure S23 FT-IR spectrum of sulfo-t-PE

Peaks: a (3387 cm^{-1}) O-H stretching, b (2918 cm^{-1}) and c (2849 cm^{-1}) C-H stretching, d (1473 cm^{-1}) C-H bending (CH_2), e (1377 cm^{-1}) O=S=O asymmetrical stretching, f (1158 cm^{-1}) O=S=O symmetrical stretching, g (1072 cm^{-1}) C-O stretching, h (719 cm^{-1}) C-C out of plane bending

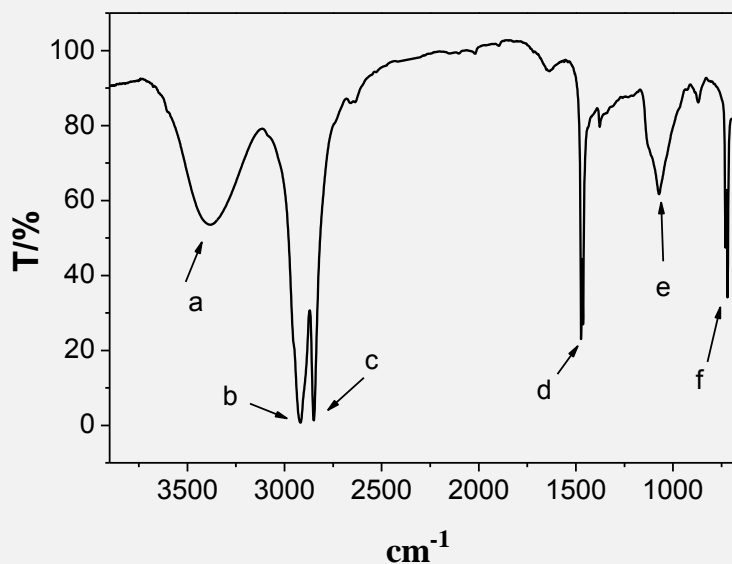


Figure S24 FT-IR spectrum of diol-PE

Peaks: a (3383 cm^{-1}) O-H stretching, b (2918 cm^{-1}) and c (2849 cm^{-1}) C-H stretching, d

(1473 cm^{-1}) C-H bending (CH_2), e (1072 cm^{-1}) C-O stretching, f (719 cm^{-1}) C-C out of plane bending

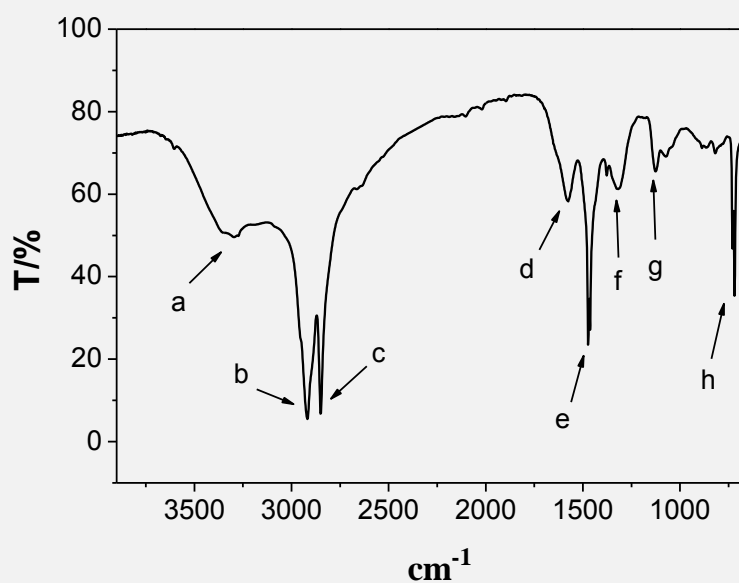


Figure S25 FT-IR spectrum of NH₂-t-PE

Peaks: a (3295 cm^{-1} , broad) O-H & N-H stretching, b (2918 cm^{-1}) and c (2849 cm^{-1}) C-H stretching, d (1576 cm^{-1}) N-H bending, e (1473 cm^{-1}) C-H bending (CH_2), f (1319 cm^{-1}) C-N stretching, g (1126 cm^{-1}) C-O stretching, h (719 cm^{-1}) C-C out of plane bending

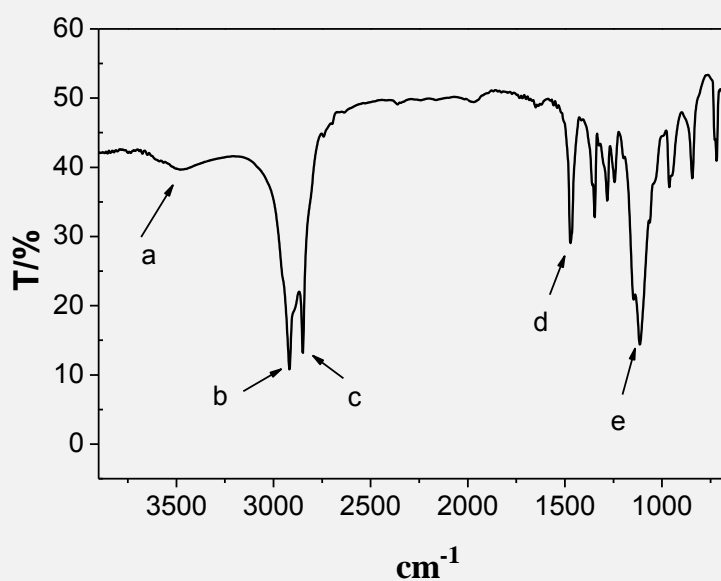


Figure S26 FT-IR spectrum of PE-*b*-PEG

Peaks: a (3480 cm^{-1}) O-H stretching, b (2917 cm^{-1}) and c (2848 cm^{-1}) C-H stretching, d (1470 cm^{-1}) C-H bending (CH_2), e (1114 cm^{-1}) C-O-C stretching

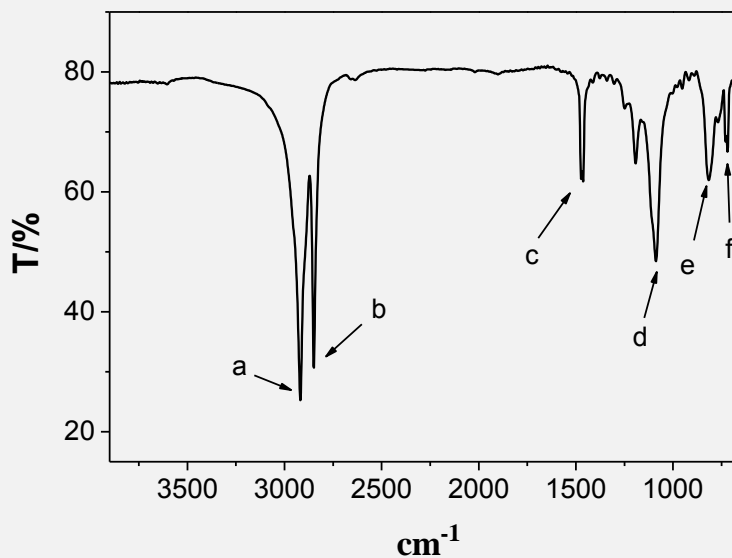


Figure S27 FT-IR spectrum of TMS-*t*-PE

Peaks: a (2918 cm^{-1}) and b (2849 cm^{-1}) C-H stretching, c (1470 cm^{-1}) C-H bending (CH_2), d (1088 cm^{-1}) C-O stretching, e (816 cm^{-1}) Si-O symmetric stretching vibration in Si-O-C structure (?), f (719 cm^{-1}) C-C out of plane bending

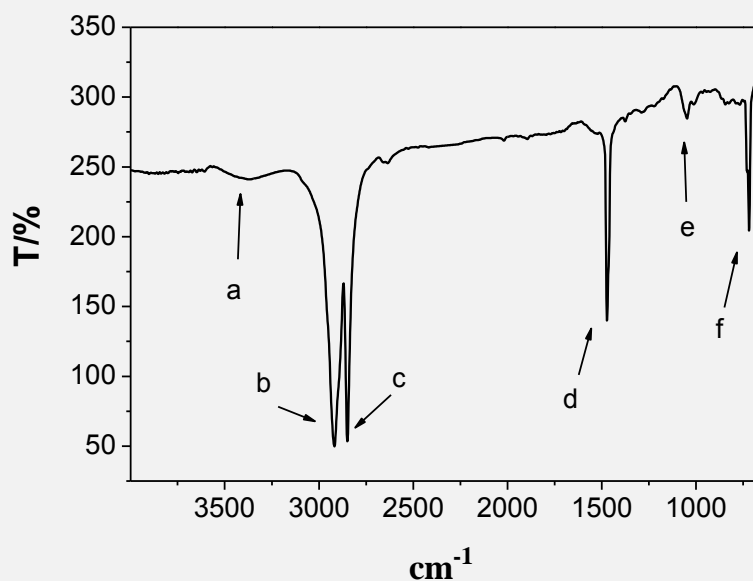


Figure S28 FT-IR spectrum of PE-S-OH

Peaks: a (3373 cm^{-1}) O-H stretching, b (2918 cm^{-1}) and c (2849 cm^{-1}) C-H stretching, d (1472 cm^{-1}) C-H bending (CH_2), e (1048 cm^{-1}) C-O stretching, f (719 cm^{-1}) C-C out of plane bending

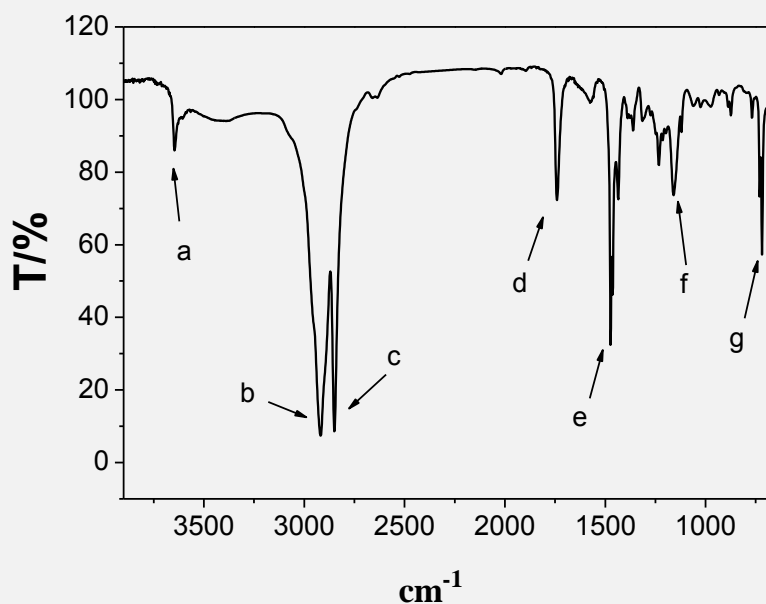


Figure S29 FT-IR spectrum of AO-t-PE

Peaks: a (3647 cm^{-1}) phenolic hydroxyl O-H stretching, b (2918 cm^{-1}) and c (2849 cm^{-1})

C-H stretching, d (1740 cm^{-1}) C=O (ester) stretching, e (1473 cm^{-1}) C-H bending
(CH_2), f (1159 cm^{-1}) C-O stretching, i (719 cm^{-1}) C-C out of plane bending

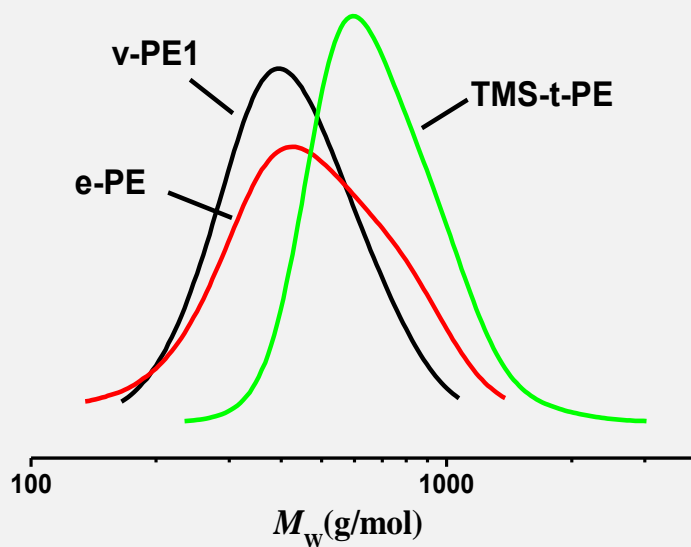


Figure S30 GPC curves of v-PE1, e-PE and TMS-t-PE

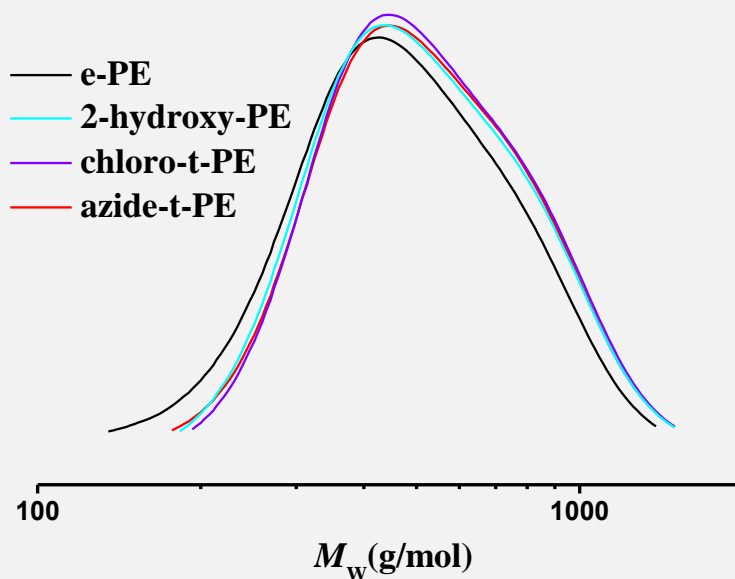


Figure S31 GPC curves of e-PE, 2-hydroxy-PE, chloro-t-PE and azide-t-PE

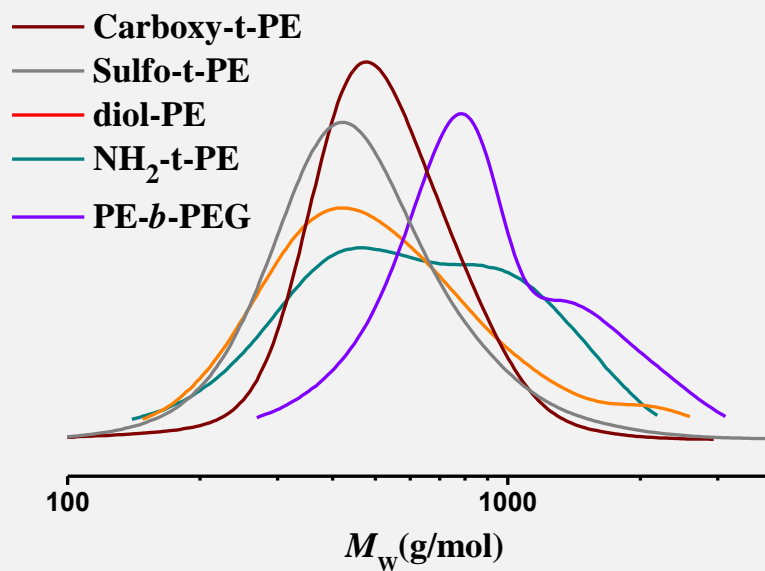


Figure S32 GPC curves of carboxy-t-PE, sulfo-t-PE, diol-PE, NH_2 -t-PE and PE-*b*-PEG

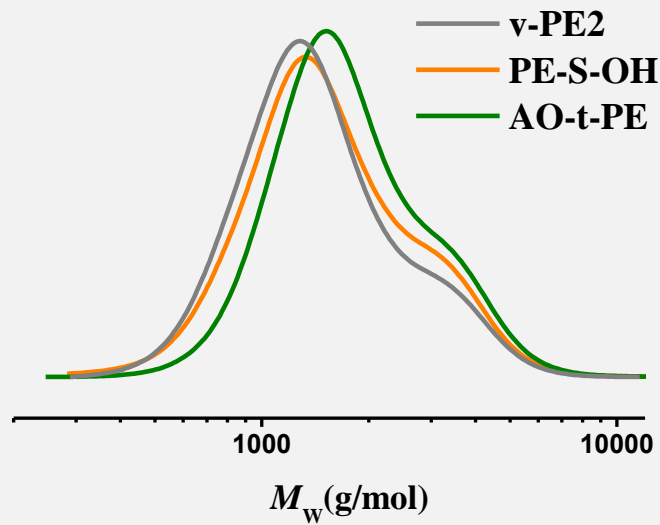


Figure S33 GPC curves of v-PE2, PE-t-OH, and AO-t-PE

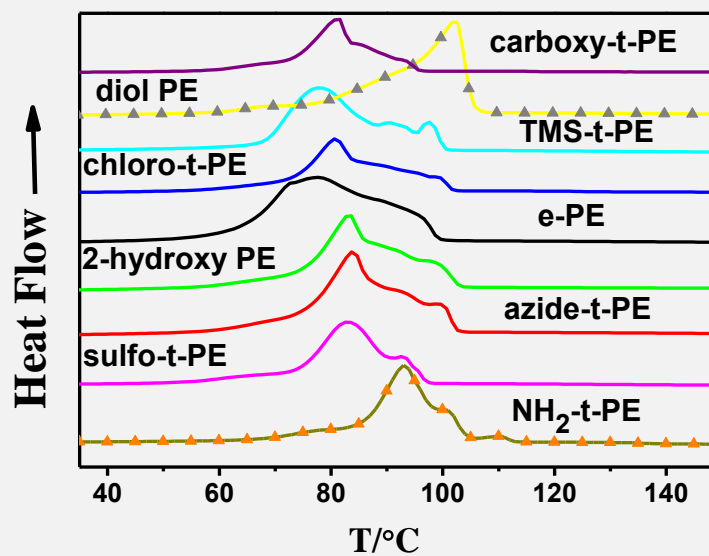


Figure S34 DSC heating curves of Cef-PEs (all derived from v-PE1)

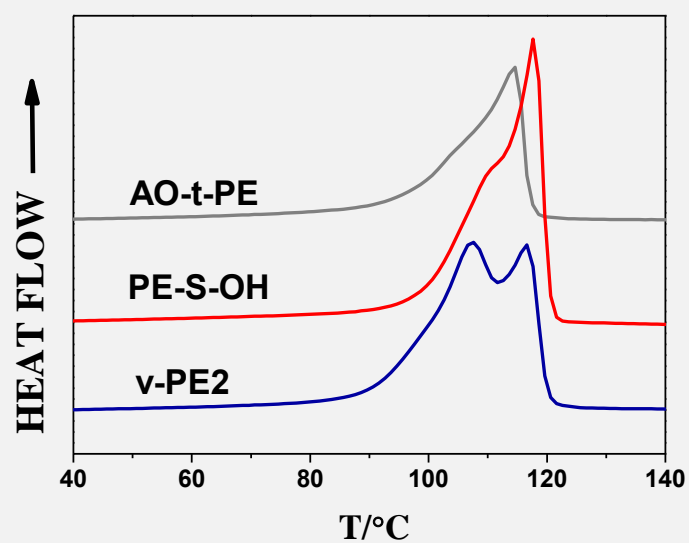


Figure S35 DSC heating curves of v-PE2, PE-S-OH, AO-t-PE