Electronic Supplementary Material (ESI) for Polymer Chemistry

SUPPORTING INFORMATION

Synthesis of fatty phosphonic acid based polymethacrylamide by RAFT polymerization and self-assembly in solution

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Synthesis of monomer

Undecylenic acid

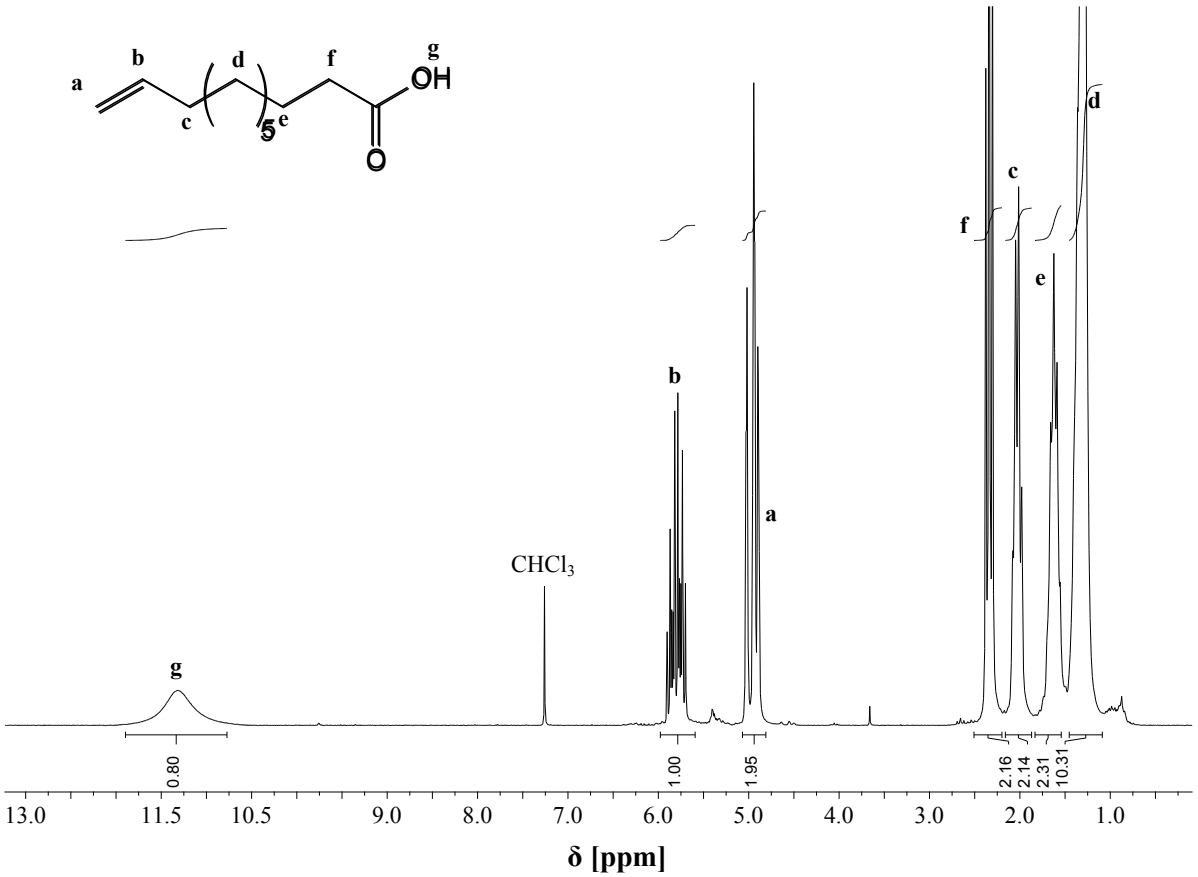

Fig. S1 ^{1}H NMR spectrum (200 MHz; $CDCl_3$) of undecylenic acid.

^{1}H NMR ($CDCl_3$, 200 MHz) δ (ppm): 11.3 (1H, br s, -COO*H*), 5.8 (1H, m, CH_2=C*H*-), 4.9 (2H, m, -CH_2=CH-), 2.3 (2H, t, -CH_2-COOH), 2.0 (2H, m, CH_2=CH-CH_2-), 1.6 (2H, m, -CH_2-CH_2-COOH); 1.3 (10H, m, -(CH_2)$_5$-).

(11-Dimethoxyphosphoryl) undecylenic acid

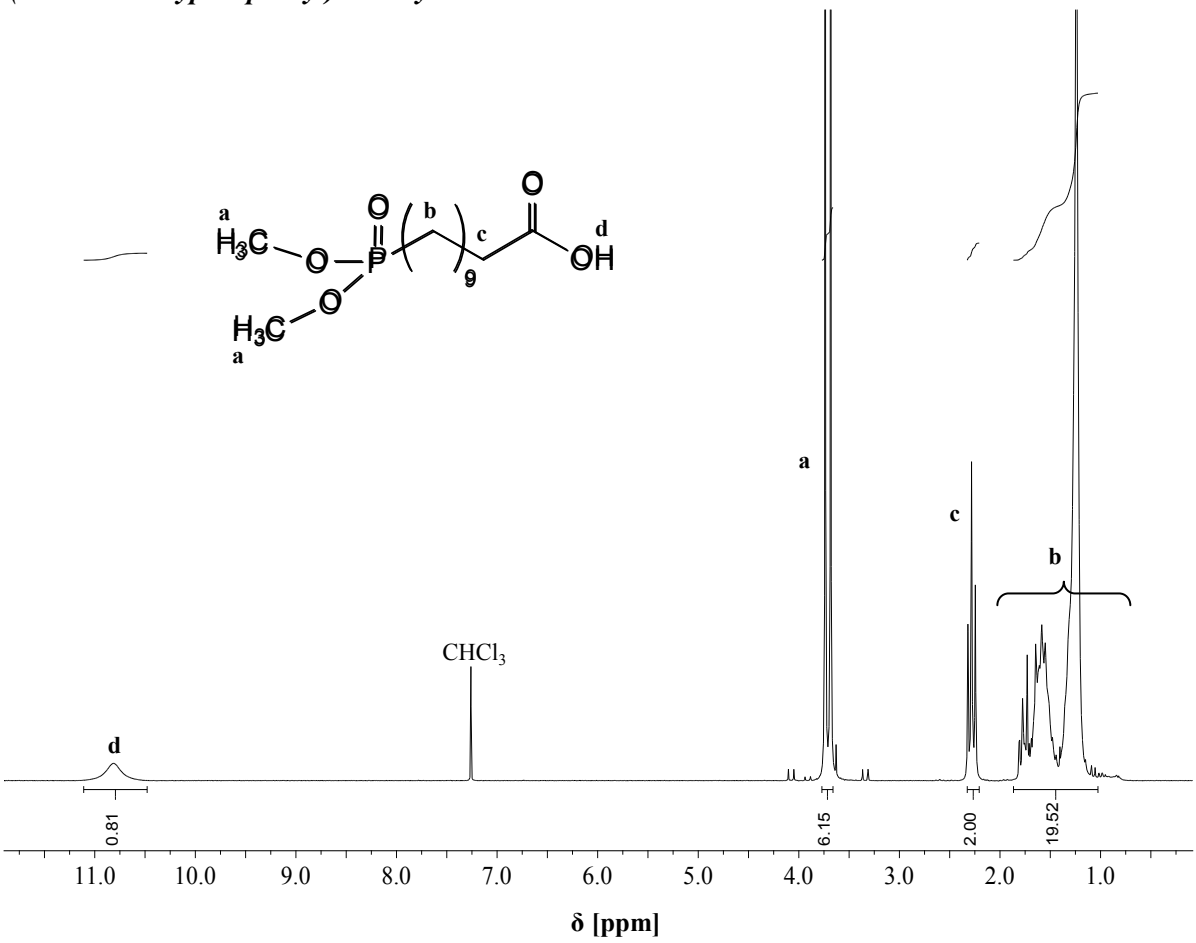

Fig. S2 ^{1}H NMR spectrum (200 MHz; $CDCl_3$) of (11-dimethoxyphosphoryl)undecylenic acid (a).

^{1}H NMR ($CDCl_3$, 200 MHz) δ (ppm): 10.8 (1H, br s, -COO*H*), 3.75-3.55 (6H, 2s, -P=O(OCH_3)$_2$), 2.3 (2H, t, -CH_2-COOH), 1.9-1.0 (18H, br m, -(CH_2)$_9$-).

Dimethyl (10-amino-decylphosphonate)

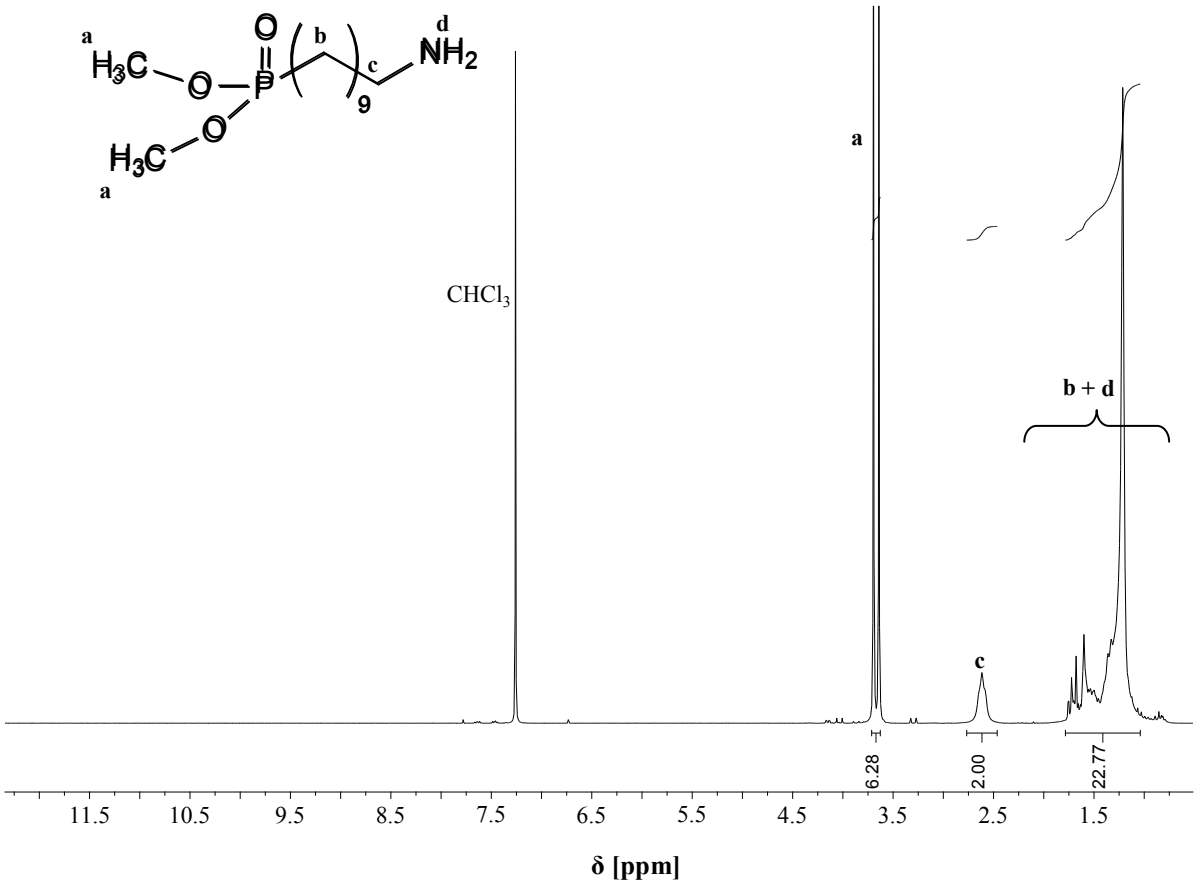

Fig. S3 ^{1}H NMR spectrum (200 MHz; $CDCl_3$) of dimethyl(10-amino-decylphosphonate) (b).

^{1}H NMR ($CDCl_3$, 200 MHz) δ (ppm): 3.75-3.55 (6H, 2s, -P=O(OCH_3)$_2$), 2.6 (2H, m, -CH_2-NH_2), 1.8-1.0 (18H, br m, -(CH_2)$_9$-).

Reversible Addition-Fragmentation chain-Transfert (RAFT) polymerization of dimethy(methacrylamido)decylphosphonate (DMADP-(OMe_2))

RAFT polymerization of DMADP-(OMe_2) using 2-cyano-2-propyl benzodithioate (CTA-1) as chain transfer agent

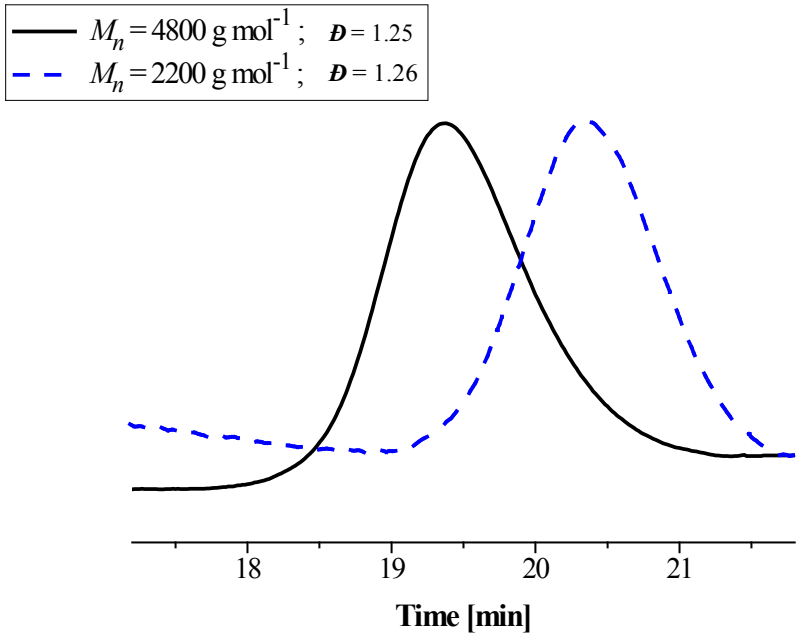

Fig. S4 SEC traces of poly(dimethyl(methacrylamido)decylphosphonate) (P(DMADP-$(OMe)_2$)) synthesized by RAFT polymerization using CTA-1 in DMSO at 80 °C.

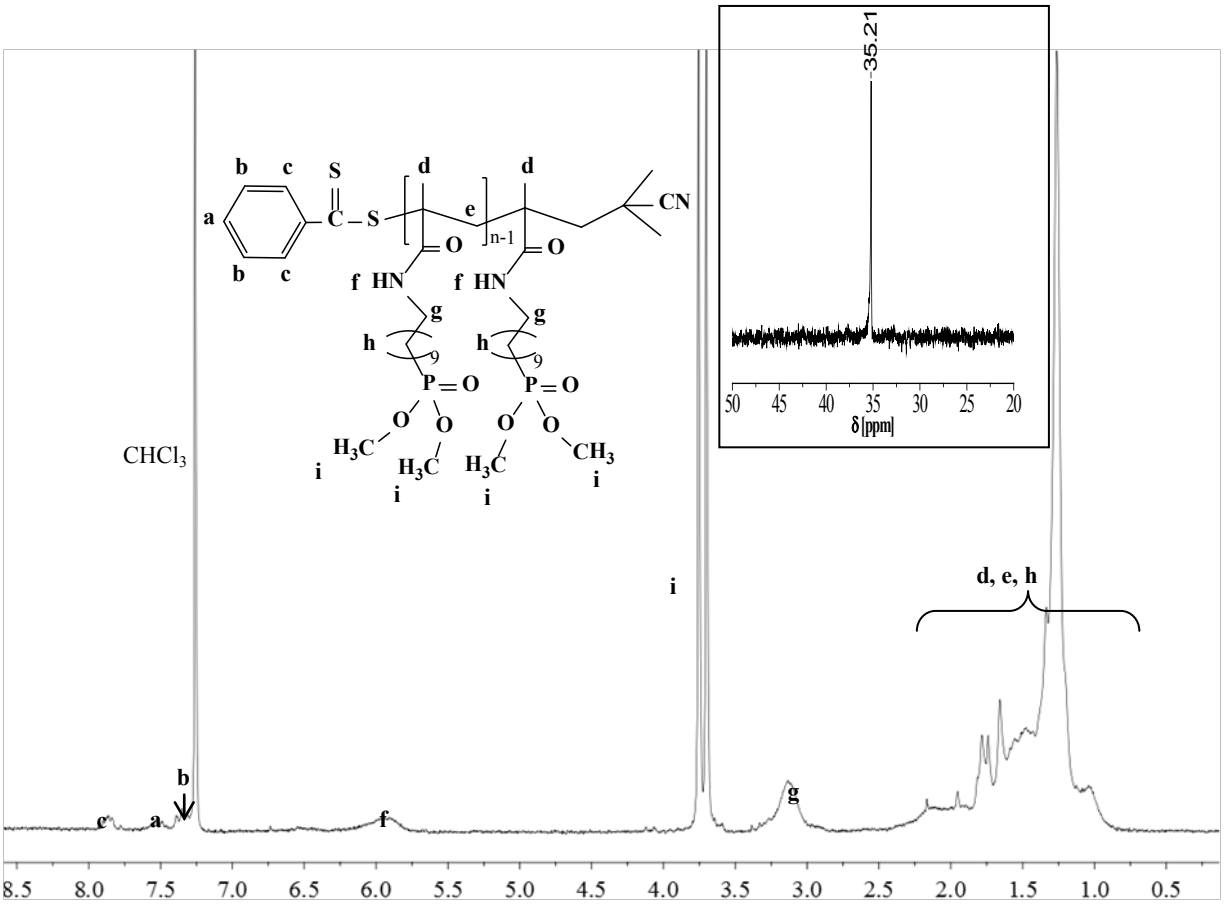

Fig. S5 ^{1}H NMR spectrum (200 MHz; $CDCl_3$) and ^{31}P NMR spectrum (inset) (81 MHz; $CDCl_3$) of P(DMADP-$(OMe)_2$) synthesized by RAFT polymerization using CTA-1 in DMSO at 80 °C.

^{1}H NMR ($CDCl_3$, 200 MHz) δ (ppm): 7.9-7.3 (5H, br m, $C_6H_5CS_2$-), 5.9 (br s, -N*H*-), 3.75-3.55 (2s, -P=O(OCH_3)$_2$), 3.1 (br, -CH_2-NH-), 2.2-1.0 (br m, -CH_2-, -CH_3).

^{31}P NMR ($CDCl_3$, 81 MHz) δ (ppm): 35.2.

RAFT polymerization of DMADP-(OMe_2) using 2-(dodecylthiocarbonothioyl thio)-2-methylpropionic acid (CTA-2) as chain transfer agent

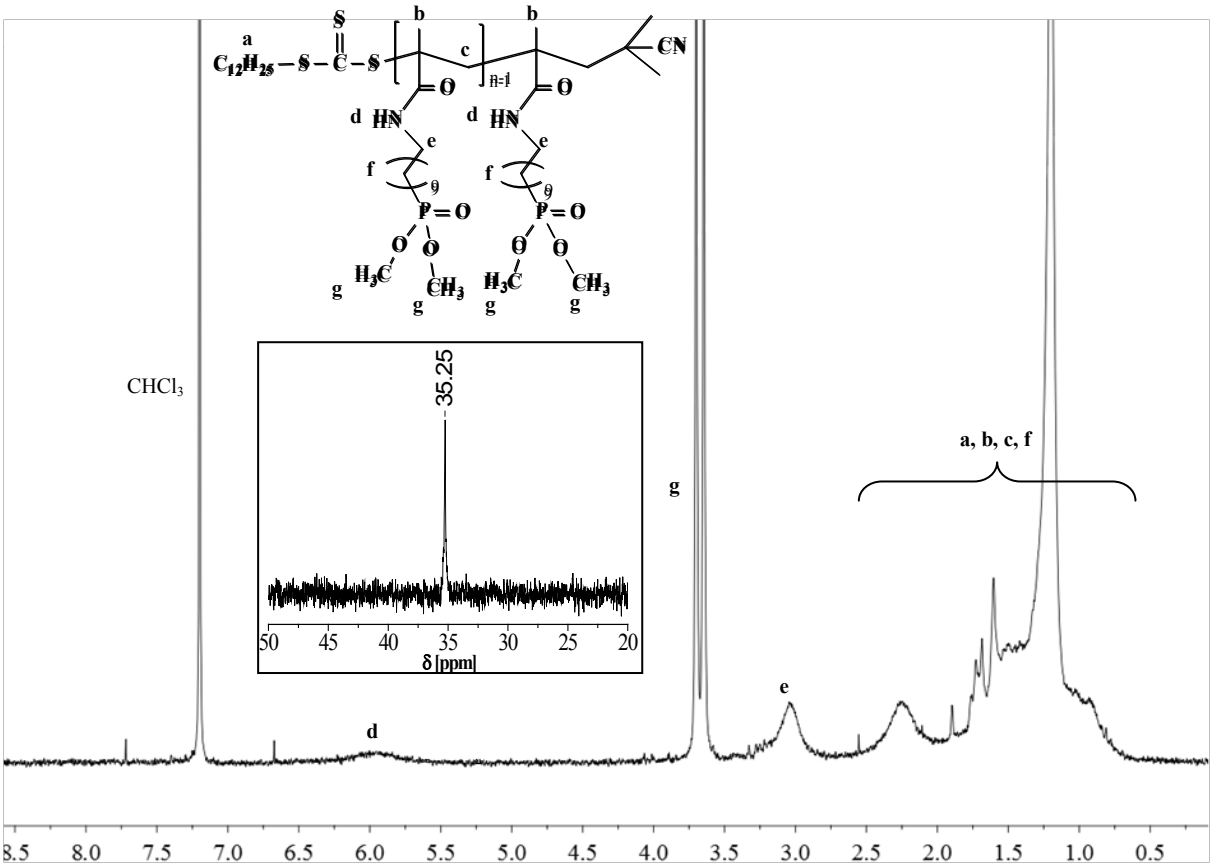

Fig. S6 ^{1}H NMR spectrum (200 MHz; $CDCl_3$) and ^{31}P NMR spectrum (inset) (81 MHz; $CDCl_3$) of P(DMADP-(OMe_2)) synthesized by RAFT polymerization using CTA-2 in DMSO at 80 °C.

^{1}H NMR ($CDCl_3$, 200 MHz) δ (ppm): 6.0 (br s, -N*H*-), 3.75-3.55 (2s, -P=O(OCH_3)$_2$), 3.1 (br, -CH_2-NH-), 2.5-0.6 (m, -CH_2-, -CH_3).

^{31}P NMR ($CDCl_3$, 81 MHz) δ (ppm): 35.3.