Supplementary information

**Mesomorphic properties impro*v*ed *v*ia lateral fluorine substituent on benzoxazole-terminated mesogenic compounds**

Mengting Zhang, Yiming Sun, Shenghua Du, Diao Yuan, Pei Chen\*, Guoqing Liu, Jiazhen Dang, Xinbing Chen\*, Zhongwei An

*Key Laboratory of Applied Surface and Colloid Chemistry (MOE); Shaanxi Key Laboratory for Advanced Energy Devices; Shaanxi Engineering Laboratory for Advanced Energy Technology, School of Materials Science and Engineering, Shaanxi Normal University, Xi'an 710119, PR China*

Summary

Table s1. Comparison of *Δn*calc. values among the nPEFPBx, reference compounds I and II.

Table s2. Birefringence (Δ*n*) of the Schiff base compounds nPEFPSx.

Table s3. Comparison of absorption and photoluminescence emission bands among the nPEFPBx, reference compounds I and II.

Figure s1. UV spectra of compounds 7PEFPSx in CH2Cl2 (1.0×10-5 mol/L).

Spectroscopic data for Schiff base compounds (nPEFPSx).

Spectroscopic data for benzoxazole-terminated compounds (nPEFPBx).

Table s1. Comparison of *Δn*calc. values among the nPEFPBx, reference compounds I and II.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| n | nPEFPBx | | |  | Ref. Ⅰ | | |  | Ref. Ⅱ | | |
| H | CH3 | NO2 |  | H | CH3 | NO2 |  | H | CH3 | NO2 |
| 5 | 0.611 | 0.650 | 0.629 |  | 0.585 | 0.624 | 0.601 |  | 0.641 | 0.680 | 0.658 |
| 8 | 0.572 | 0.604 | 0.616 |  | 0.552 | 0.579 | 0.589 |  | 0.602 | 0.652 | 0.639 |
| 11 | 0.533 | 0.561 | 0.586 |  | 0.517 | 0.542 | 0.557 |  | 0.561 | 0.586 | 0.602 |

Table s2. Birefringence (Δ*n*) of the Schiff base compounds nPEFPSx.

|  |  |  |  |
| --- | --- | --- | --- |
| n | nPEFPSH | nPEFPSM | nPEFPSN |
| Δ*n*calc. | Δ*n*calc. | Δ*n*calc. |
| 5 | 0.595 | 0.550 | 0.578 |
| 6 | 0.590 | 0.524 | 0.558 |
| 7 | 0.572 | 0.512 | 0.555 |
| 8 | 0.538 | 0.511 | 0.546 |
| 9 | — | 0.495 | 0.536 |
| 10 | 0.512 | 0.466 | — |
| 11 | 0.520 | 0.481 | 0.518 |
| 12 | — | 0.473 | 0.500 |

Table s3. Comparison of absorption and photoluminescence emission bands among the nPEFPBx, reference compounds I and II.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Compounds | H | |  | CH3 | |  | NO2 | |
| UV | FL |  | UV | FL |  | UV | FL |
| 7PEFPBx | 343 | 406.2 |  | 346 | 407.4 |  | 351 | -- |
| Ref. Ⅰ | 342 | 405.6 |  | 345 | 406.8 |  | 350 | -- |
| Ref. Ⅱ | 338 | 396 |  | 340 | 396 |  | 345 | -- |

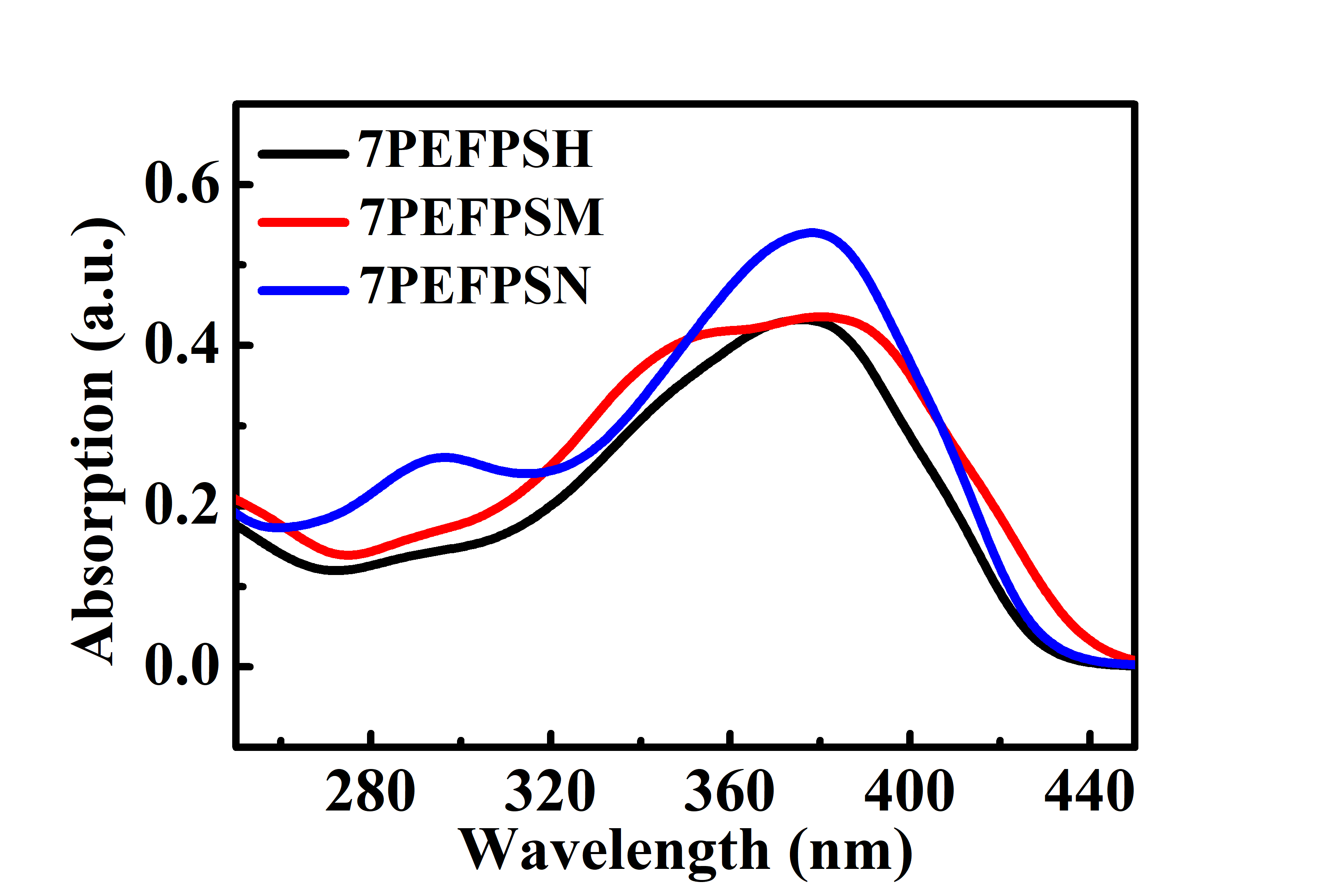


Figure s1. UV spectra of compounds 7PEFPSx in CH2Cl2 (1.0×10-5 mol/L).

***Spectroscopic data for Schiff base compounds (nPEFPSx):***

**5PEFPSH:** Yellow solid, Yield: 92%. m. p.: 152.23 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.64 (s, 1H), 7.70-7.65 (dd, 3*J*H-F = 9.81 Hz, 4*J*H-H = 1.32 Hz, 1H), 7.65-7.55 (dd, 3*J*H-H = 8.89 Hz, 4*J*H-H = 2.72 Hz, 2H), 7.52-7.47 (m, 2H), 7.32-7.27 (dd, 3*J*H-H = 8.17 Hz, 4*J*H-H = 1.28 Hz, 1H), 7.24-7.17 (m, 1H), 7.04-6.99 (dd, 3*J*H-H = 8.23 Hz, 4*J*H-H = 1.12 Hz, 1H), 6.94-6.90 (dd, 3*J*H-H = 7.45 Hz, 4*J*H-H = 1.46 Hz, 1H), 6.90-6.85 (dd, 3*J*H-H = 8.63 Hz, 4*J*H-H = 2.48 Hz, 2H), 4.00-3.93 (t, 3*J*H-H = 6.65 Hz, 2H), 1.86-1.68 (m, 2H), 1.51-1.30 (m, 4H), 0.94-0.86 (t, 3*J*H-H = 6.91 Hz, 3H). IR (KBr) *v* (cm-1): 3320, 2925, 2862, 2211 (-C≡C-), 1592, 1511, 1423, 1367, 1286, 1238, 1166, 1093, 820, 748. EI-MS m/z (rel. int.): 400.33 (M+, 10), 329.22 (100), 281.24 (16), 207.10 (58), 190.78 (9).

**6PEFPSH:** Yellow solid, Yield: 90%. m. p.: 120.53 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.64 (s, 1H), 7.70-7.66 (dd, 3*J*H-F = 9.91 Hz, 4*J*H-H = 1.02 Hz, 1H), 7.63-7.55 (m, 2H), 7.52-7.47 (dd, 3*J*H-H = 8.90 Hz, 4*J*H-H = 2.91 Hz, 2H), 7.32-7.27 (dd, 3*J*H-H = 8.07 Hz, 4*J*H-H = 1.39 Hz, 1H), 7.24-7.17 (m, 1H), 7.04-7.00 (dd, 3*J*H-H = 8.09 Hz, 4*J*H-H = 1.25 Hz, 1H), 6.94-6.90 (dd, 3*J*H-H = 7.80 Hz, 4*J*H-H = 1.45 Hz, 1H), 6.90-6.86 (dd, 3*J*H-H = 8.86 Hz, 4*J*H-H = 2.82 Hz, 2H), 4.00-3.93 (t, 3*J*H-H = 6.74 Hz, 2H), 1.86-1.68 (m, 2H), 1.51-1.41 (m, 2H), 1.39-1.30 (m, 4H), 0.94-0.86 (t, 3*J*H-H = 7.16 Hz, 3H). IR (KBr) *v* (cm-1): 3319, 2928, 2846, 2211 (-C≡C-), 1598, 1502, 1475, 1368, 1286, 1242, 1168, 1102, 820, 742. EI-MS m/z (rel. int.): 414.22 (M+, 7), 329.11 (100), 281.07 (12), 207.04 (30).

**7PEFPSH:** Yellow solid, Yield: 89%. m. p.: 114.63 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.64 (s, 1H), 7.71-7.66 (dd, 3*J*H-F = 9.81 Hz, 4*J*H-H = 1.26 Hz, 1H), 7.64-7.55 (m, 2H), 7.52-7.48 (dd, 3*J*H-H = 8.81 Hz, 4*J*H-H = 2.77 Hz, 2H), 7.32-7.29 (dd, 3*J*H-H = 8.16 Hz, 4*J*H-H = 1.42 Hz, 1H), 7.24-7.17 (m, 1H), 7.04-7.00 (dd, 3*J*H-H = 8.11 Hz, 4*J*H-H = 1.31 Hz, 1H), 6.93-6.90 (dd, 3*J*H-H = 7.77 Hz, 4*J*H-H = 1.39 Hz, 1H), 6.90-6.86 (dd, 3*J*H-H = 8.97Hz, 4*J*H-H = 2.76 Hz, 2H), 4.05-3.85 (t, 3*J*H-H = 6.53 Hz, 2H), 1.83-1.74 (m, 2H), 1.50-1.40 (m, 2H), 1.40-1.26 (m, 6H), 0.94-0.86 (t, 3*J*H-H = 6.84 Hz, 3H). IR (KBr) *v* (cm-1): 3329, 2929, 2845, 2220 (-C≡C-), 1609, 1503, 1476, 1377, 1286, 1251, 1167, 1104, 830, 745. EI-MS m/z (rel. int.): 428.23 (M+, 6), 329.22 (55), 281.06 (30), 207.03 (100).

**8PEFPSH:** Yellow solid, Yield: 95%. m. p.: 107.01 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.65 (s, 1H), 7.70-7.66 (dd, 3*J*H-F = 9.85 Hz, 4*J*H-H = 1.35 Hz, 1H), 7.64-7.56 (m, 2H), 7.52-7.48 (dd, 3*J*H-H = 8.83 Hz, 4*J*H-H = 2.77 Hz, 2H), 7.32-7.27 (dd, 3*J*H-H = 8.11 Hz, 4*J*H-H = 1.59 Hz, 1H), 7.24-7.17 (m, 1H), 7.04-7.00 (dd, 3*J*H-H = 8.19 Hz, 4*J*H-H = 1.38 Hz, 1H), 6.94-6.90 (dd, 3*J*H-H = 7.60 Hz, 4*J*H-H = 1.40 Hz, 1H), 6.90-6.85 (dd, 3*J*H-H = 8.93 Hz, 4*J*H-H = 2.51 Hz, 2H), 4.02-3.93 (t, 3*J*H-H = 6.55 Hz, 2H), 1.83-1.74 (m, 2H), 1.49-1.40 (m, 2H), 1.36-1.25 (m, 8H), 0.94-0.86 (t, 3*J*H-H = 7.10 Hz, 3H). IR (KBr) *v* (cm-1): 3326, 2918, 2862, 2211 (-C≡C-), 1607, 1523, 1431, 1378, 1286, 1245, 1170, 1105, 826, 752. EI-MS m/z (rel. int.): 442.30 (M+, 9), 329.14 (55), 300.14 (6), 207.07 (100).

**9PEFPSH:** Yellow solid, Yield: 88%. m. p.: 97.16 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.64 (s, 1H), 7.71-7.66 (dd, 3*J*H-F = 9.86 Hz, 4*J*H-H = 1.42 Hz, 1H), 7.64-7.56 (m, 2H), 7.52-7.48 (dd, 3*J*H-H = 8.79 Hz, 4*J*H-H = 2.69 Hz, 2H), 7.32-7.28 (dd, 3*J*H-H = 8.07 Hz, 4*J*H-H = 1.42 Hz, 1H), 7.24-7.17 (m, 1H), 7.04-7.00 (dd, 3*J*H-H = 8.17 Hz, 4*J*H-H = 1.44 Hz, 1H), 6.94-6.90 (dd, 3*J*H-H = 7.63 Hz, 4*J*H-H = 1.39 Hz, 1H), 6.90-6.85 (dd, 3*J*H-H = 8.91 Hz, 4*J*H-H = 2.72 Hz, 2H), 4.03-3.93 (t, 3*J*H-H = 6.55 Hz, 2H), 1.83-1.74 (m, 2H), 1.51-1.40 (m, 2H), 1.38-1.25 (m, 10H), 0.92-0.80 (t, 3*J*H-H = 6.97 Hz, 3H). IR (KBr) *v* (cm-1): 3341, 2918, 2854, 2217 (-C≡C-), 1596, 1516, 1473, 1382, 1285, 1243, 1168, 1104, 825, 745. EI-MS m/z (rel. int.): 456.24 (M+, 13), 329.10 (100), 281.02 (14), 207.02 (39).

**10PEFPSH:** Yellow solid, Yield: 91%. m. p.: 62.16oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.64 (s, 1H), 7.70-7.66 (dd, 3*J*H-F = 9.97 Hz, 4*J*H-H = 1.54 Hz, 1H), 7.63-7.55 (m, 2H), 7.52-7.47 (dd, 3*J*H-H = 8.98 Hz, 4*J*H-H = 2.75 Hz, 2H), 7.32-7.27 (dd, 3*J*H-H = 8.12 Hz, 4*J*H-H = 1.50 Hz, 1H), 7.24-7.19 (m, 1H), 7.04-7.00 (dd, 3*J*H-H = 8.24 Hz, 4*J*H-H = 1.36 Hz, 1H), 6.94-6.85 (m, 3H), 6.94-6.90 (dd, 3*J*H-H = 7.52 Hz, 4*J*H-H = 1.39 Hz, 1H), 6.90-6.85 (dd, 3*J*H-H = 8.99 Hz, 4*J*H-H = 2.47 Hz, 2H), 4.00-3.93 (t, 3*J*H-H = 5.94 Hz, 2H), 1.86-1.68 (m, 2H), 1.51-1.41 (m, 2H), 1.39-1.30 (m, 12H), 0.94-0.86 (t, 3*J*H-H = 6.10 Hz, 3H). IR (KBr) *v* (cm-1): 3303, 2918, 2860, 2217 (-C≡C-), 1596, 1511, 1473, 1393, 1285, 1238, 11168, 1104, 825, 745. EI-MS m/z (rel. int.): 470.33 (M+, 8), 329.14 (100), 281.09 (8), 207.03 (56).

**11PEFPSH:**Yellow solid, Yield: 92%. m. p.: 99.92 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.64 (s, 1H), 7.70-7.65 (dd, 3*J*H-F = 9.91 Hz, 4*J*H-H = 1.02 Hz, 1H), 7.63-7.55 (m, 2H), 7.52-7.47 (dd, 3*J*H-H = 8.82 Hz, 4*J*H-H = 2.71 Hz, 2H), 7.32-7.27 (dd, 3*J*H-H = 8.07 Hz, 4*J*H-H = 1.39 Hz, 1H), 7.24-7.17 (m, 1H), 7.04-7.00 (dd, 3*J*H-H = 8.09 Hz, 4*J*H-H = 1.25 Hz, 1H), 6.94-6.90 (dd, 3*J*H-H = 7.45 Hz, 4*J*H-H = 1.45 Hz, 1H), 6.90-6.85 (dd, 3*J*H-H = 8.76 Hz, 4*J*H-H = 2.76 Hz, 2H), 4.00-3.93 (t, 3*J*H-H = 6.74 Hz, 2H), 1.86-1.68 (m, 2H), 1.51-1.41 (m, 2H), 1.39-1.30 (m, 14H), 0.94-0.86 (t, 3*J*H-H = 7.16 Hz, 3H). IR (KBr) *v* (cm-1): 3317, 2920, 2856, 2219 (-C≡C-), 1593, 1510, 1481, 1390, 1292, 1250, 1173, 1102, 832, 743. EI-MS m/z (rel. int.): 484.35 (M+,8), 329.12 (100), 281.08 (8), 207.07 (29).

**12PEFPSH:** Yellow solid, Yield: 91%. m. p.: 94.25 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.64 (s, 1H), 7.72-7.65 (dd, 3*J*H-F = 9.76 Hz, 4*J*H-H = 1.54 Hz, 1H), 7.64-7.55 (m, 2H), 7.53-7.47 (dd, 3*J*H-H = 8.94 Hz, 4*J*H-H = 2.76 Hz, 2H), 7.32-7.29 (dd, 3*J*H-H = 8.14 Hz, 4*J*H-H = 1.54 Hz, 1H), 7.24-7.16 (m, 2H), 7.04-7.00 (dd, 3*J*H-H = 8.11 Hz, 4*J*H-H = 1.14 Hz, 1H), 6.96-6.85 (m, 3H), 6.93-6.90 (dd, 3*J*H-H = 7.59 Hz, 4*J*H-H = 1.43 Hz, 1H), 6.90-6.85 (dd, 3*J*H-H = 8.94 Hz, 4*J*H-H = 2.92 Hz, 2H), 4.05-3.94 (t, 3*J*H-H = 6.54 Hz, 2H), 1.85-1.70 (m, 2H), 1.52-1.39 (m, 2H), 1.39-1.19 (m, 16H), 0.94-0.86 (t, 3*J*H-H = 6.39 Hz, 3H). IR (KBr) *v* (cm-1): 3335, 2918, 2854, 2212 (-C≡C-), 1596, 1511, 1473, 1382, 1291, 1243, 1158, 1104, 831, 740. EI-MS m/z (rel. int.): 498.37 (M+,9), 329.22 (55), 289.27 (58), 207.03 (100).

**5PEFPSM:** Yellow solid, Yield: 89%. m. p.: 117.24 oC.1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.62 (s, 1H), 8.01-7.97 (dd, 3*J*H-F = 9.88 Hz, 4*J*H-H = 1.26 Hz, 1H), 7.63-7.55 (m, 2H), 7.52-7.47 (dd, 3*J*H-H = 8.81 Hz, 4*J*H-H = 2.72 Hz, 2H), 7.13-7.09 (d, 4*J*H-H = 1.75 Hz, 1H), 7.05-6.99 (m, 2H), 6.93-6.90 (d, 3*J*H-H = 8.44 Hz, 1H), 6.90-6.85 (dd, 3*J*H-H = 8.78 Hz, 4*J*H-H = 2.69 Hz, 2H), 4.07-3.83 (t, 3*J*H-H = 6.56 Hz, 2H), 2.31 (s, 3H), 1.84-1.72 (m, 2H), 1.51-1.28 (m, 4H), 0.94-0.86 (t, 3*J*H-H = 6.71 Hz, 3H). IR (KBr) *v* (cm-1): 3344, 2942, 2869, 2211 (-C≡C-), 1600, 1511, 1431, 1382, 1238, 1173, 1102, 1013, 820, 731. EI-MS m/z (rel. int.): 414.32 (M+, 6), 343.25 (35), 281.24 (23), 207.07 (100).

**6PEFPSM:** Yellow solid, Yield: 87%. m. p.: 90.17 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.62 (s, 1H), 8.01-7.97 (dd, 3*J*H-F = 9.79 Hz, 4*J*H-H = 1.29 Hz, 1H), 7.63-7.55 (m, 2H), 7.52-7.47 (dd, 3*J*H-H = 8.86 Hz, 4*J*H-H = 2.68 Hz, 2H), 7.13-7.09 (d, 4*J*H-H = 1.62 Hz, 1H), 7.05-6.99 (m, 2H), 6.93-6.90 (d, 3*J*H-H = 8.24 Hz, 1H), 6.90-6.85 (dd, 3*J*H-H = 8.84 Hz, 4*J*H-H = 2.70 Hz, 2H), 4.07-3.83 (t, 3*J*H-H = 6.60 Hz, 2H), 2.31 (s, 3H), 1.84-1.72 (m, 2H), 1.51-1.40 (m, 2H), 1.40-1.28 (m, 4H), 0.94-0.86 (t, 3*J*H-H = 6.81 Hz, 3H). IR (KBr) *v* (cm-1): 3456, 2936, 2852, 2211 (-C≡C-), 1588, 1514, 1421, 1391, 1245, 1170, 1105, 1012, 817, 715. EI-MS m/z (rel. int.): 428.21 (M+, 16), 343.11 (100), 281.05 (24), 207.02 (11).

**7PEFPSM:** Yellow solid, Yield: 85%. m. p.: 79.75 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.62 (s, 1H), 8.01-7.97 (dd, 3*J*H-F = 9.92 Hz, 4*J*H-H = 1.22 Hz, 1H), 7.63-7.55 (m, 2H), 7.52-7.48 (dd, 3*J*H-H = 8.95 Hz, 4*J*H-H = 2.71 Hz, 2H), 7.12-7.10 (d, 4*J*H-H = 1.63 Hz, 1H), 7.04-6.99 (m, 2H), 6.93-6.90 (d, 3*J*H-H = 8.12 Hz, 1H), 6.90-6.85 (dd, 3*J*H-H = 8.88 Hz, 4*J*H-H = 2.42 Hz, 2H), 4.05-3.94 (t, 3*J*H-H = 6.61 Hz, 2H), 2.31 (s, 3H), 1.83-1.74 (m, 2H), 1.50-1.41 (m, 2H), 1.38-1.26 (m, 6H), 0.93-0.85 (t, 3*J*H-H = 6.59 Hz, 3H). IR (KBr) *v* (cm-1): 3363, 2922, 2852, 2199 (-C≡C-), 1602, 1518, 1468, 1379, 1237, 1167, 1096, 1034, 830, 682. EI-MS m/z (rel. int.): 442.22 (M+, 6), 343.12 (49), 281.06 (30), 207.04 (100).

**8PEFPSM:** Yellow solid, Yield: 79%. m. p.: 79.52 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.62 (s, 1H), 8.01-7.97 (dd, 3*J*H-F = 9.83 Hz, 4*J*H-H = 1.37 Hz, 1H), 7.63-7.55 (m, 2H), 7.52-7.48 (dd, 3*J*H-H = 8.95 Hz, 4*J*H-H = 2.70 Hz, 2H), 7.13-7.09 (d, 4*J*H-H = 1.86 Hz, 1H), 7.04-6.99 (m, 2H), 6.93-6.90 (d, 3*J*H-H = 8.39 Hz, 1H), 6.90-6.85 (dd, 3*J*H-H = 8.91 Hz, 4*J*H-H = 2.80 Hz, 2H), 4.10-3.86 (t, 3*J*H-H = 6.50 Hz, 2H), 2.31 (s, 3H), 1.83-1.74 (m, 2H), 1.49-1.41 (m, 2H), 1.36-1.25 (m, 8H), 0.91-0.85 (t, 3*J*H-H = 6.92 Hz, 3H). IR (KBr) *v* (cm-1): 3317, 2926, 2862, 2211 (-C≡C-), 1598, 1514, 1430, 1382, 1245, 1170, 1096, 1040, 826, 735. EI-MS m/z (rel. int.): 456.31 (M+, 13), 343.17 (100), 237.10 (7), 207.06 (22).

**9PEFPSM:** Yellow solid, Yield: 83%. m. p.: 85.38 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.62 (s, 1H), 8.01-7.97 (dd, 3*J*H-F = 9.88 Hz, 4*J*H-H = 1.29 Hz, 1H), 7.62-7.55 (m, 2H), 7.52-7.47 (dd, 3*J*H-H = 8.90 Hz, 4*J*H-H = 2.80 Hz, 2H), 7.12-7.10 (d, 4*J*H-H = 1.77 Hz, 1H), 7.04-6.99 (m, 2H), 6.94-6.90 (d, 3*J*H-H = 8.27 Hz, 1H), 6.90-6.85 (dd, 3*J*H-H = 8.96 Hz, 4*J*H-H = 2.73 Hz, 2H), 4.07-3.83 (t, 3*J*H-H = 6.63 Hz, 2H), 2.31 (s, 3H), 1.83-1.74 (m, 2H), 1.48-1.41 (m, 2H), 1.36-1.24 (m, 10H), 0.91-0.85 (t, 3*J*H-H = 6.75 Hz, 3H). IR (KBr) *v* (cm-1): 3322, 2928, 2860, 2217 (-C≡C-), 1596, 1511, 1431, 1382, 1243, 1168, 1104, 1022, 820, 740. EI-MS m/z (rel. int.): 470.27 (M+, 16), 343.11 (100), 281.05 (16), 207.03 (42).

**10PEFPSM:** Yellow solid, Yield: 90%. m. p.: 64.56 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.62 (s, 1H), 8.01-7.97 (dd, 3*J*H-F = 9.89 Hz, 4*J*H-H = 1.31 Hz, 1H), 7.63-7.55 (m, 2H), 7.52-7.48 (dd, 3*J*H-H = 8.89 Hz, 4*J*H-H = 2.78 Hz, 2H), 7.13-7.09 (d, 4*J*H-H = 1.84 Hz, 1H), 7.04-6.99 (m, 2H), 6.93-6.90 (d, 3*J*H-H = 8.20 Hz, 1H), 6.90-6.85 (dd, 3*J*H-H = 8.79 Hz, 4*J*H-H = 2.75 Hz, 2H), 4.07-3.83 (t, 3*J*H-H = 6.63 Hz, 2H), 2.31 (s, 3H), 1.84-1.72 (m, 2H), 1.51-1.40 (m, 2H), 1.40-1.28 (m, 12H), 0.94-0.86 (t, 3*J*H-H = 6.36 Hz, 3H). IR (KBr) *v* (cm-1): 3335, 2923, 2854, 2217 (-C≡C-), 1602, 1511, 1431, 1376, 1238, 1163, 1104, 1023, 825, 730. EI-MS m/z (rel. int.): 484.39 (M+, 11), 343.17 (100), 281.12 (16), 207.06 (29).

**11PEFPSM:** Yellow solid, Yield: 88%. m. p.: 80.37 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.62 (s, 1H), 8.01-7.97 (dd, 3*J*H-F = 9.70 Hz, 4*J*H-H = 1.16 Hz, 1H), 7.63-7.55 (m, 2H), 7.52-7.48 (dd, 3*J*H-H = 8.78 Hz, 4*J*H-H = 2.64 Hz, 2H), 7.13-7.09 (d, 4*J*H-H= 1.99 Hz, 1H), 7.05-6.99 (m, 2H), 6.93-6.90 (d, 3*J*H-H = 8.33 Hz, 1H), 6.90-6.85 (dd, 3*J*H-H = 8.83 Hz, 4*J*H-H = 2.79 Hz, 2H), 4.07-3.83 (t, 3*J*H-H = 6.65 Hz, 2H), 2.31 (s, 3H), 1.84-1.72 (m, 2H), 1.51-1.40 (m, 2H), 1.40-1.28 (m, 14H), 0.94-0.86 (t, 3*J*H-H = 6.76 Hz, 3H). IR (KBr) *v* (cm-1): 3411, 2920, 2850, 2206 (-C≡C-), 1596, 1510, 1422, 1374, 1245, 1168, 1097, 1020, 825, 725. EI-MS m/z (rel. int.): 498.37 (M+, 12), 343.16 (100), 281.13 (8), 207.02 (62).

**12PEFPSM:** Yellow solid, Yield: 90%. m. p.: 92.34 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.62 (s, 1H), 8.01-7.97 (dd, 3*J*H-F = 9.99 Hz, 4*J*H-H = 1.32 Hz, 1H), 7.64-7.56 (m, 2H), 7.52-7.48 (dd, 3*J*H-H = 8.77 Hz, 4*J*H-H = 2.69 Hz, 2H), 7.13-7.08 (d, 4*J*H-H = 1.68 Hz, 1H), 7.05-6.99 (m, 2H), 6.93-6.90 (d, 3*J*H-H = 8.34 Hz, 1H), 6.90-6.85 (dd, 3*J*H-H = 8.72 Hz, 4*J*H-H = 2.60 Hz, 2H), 4.07-3.83 (t, 3*J*H-H = 6.54 Hz, 2H), 2.31 (s, 3H), 1.84-1.72 (m, 2H), 1.51-1.40 (m, 2H), 1.40-1.28 (m, 16H), 0.94-0.86 (t, 3*J*H-H = 6.75 Hz, 3H). IR (KBr) *v* (cm-1): 3400, 2923, 2848, 2206 (-C≡C-), 1602, 1511, 1420, 1376, 1249, 1179, 1110, 1023, 820, 724. EI-MS m/z (rel. int.): 512.35 (M+, 7), 343.14 (50.17), 281.12 (27), 207.08 (100).

**5PEFPSN:** Yellow solid, Yield: 78%. m. p.: 188.44 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.75 (s, 1H), 8.26-8.21 (d, 4*J*H-H = 2.64 Hz, 1H), 8.18-8.12 (dd, 3*J*H-H = 8.95 Hz, 4*J*H-H = 2.56Hz, 1H), 7.75-7.69 (m, 2H), 7.67-7.58 (m, 2H), 7.52-7.47 (dd, 3*J*H-H = 8.61 Hz, 4*J*H-H = 2.50 Hz, 2H), 7.17-7.08 (d, 3*J*H-H = 8.95 Hz, 1H), 6.93-6.80 (dd, 3*J*H-H = 8.78 Hz, 4*J*H-H = 2.87 Hz, 2H), 4.01-3.94 (t, 3*J*H-H = 6.54 Hz, 2H), 1.88-1.71 (m, 2H), 1.51-1.30 (m, 4H), 0.97-0.81 (t, 3*J*H-H = 6.93 Hz, 3H). IR (KBr) *v* (cm-1): 3328, 2942, 2862, 2202 (-C≡C-),1592, 1503, 1335,1420, 1246, 1149, 1085, 1005, 820, 731. EI-MS m/z (rel. int.): 445.08 (M+, 18), 374.11 (35), 344.12 (13), 281.12 (25), 207.07 (100).

**6PEFPSN:**Yellow solid, Yield: 85%. m. p.: 169.67 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.75 (s, 1H), 8.26-8.23 (d, 4*J* H-H = 2.64 Hz, 1H), 8.18-8.12 (dd, 3*J*H-H = 8.95 Hz, 4*J*H-H = 2.56Hz, 1H), 7.75-7.69 (m, 2H), 7.67-7.58 (m, 2H), 7.52-7.47 (dd, 3*J*H-H = 8.93 Hz, 4*J*H-H = 2.63 Hz, 2H), 7.17-7.08 (d, 3*J*H-H = 8.95 Hz, 1H), 6.93-6.80 (dd, 3*J*H-H = 8.92 Hz, 4*J*H-H = 2.55 Hz, 2H), 4.01-3.94 (t, 3*J*H-H = 6.54 Hz, 2H), 1.88-1.71 (m, 2H), 1.51-1.41 (m,2H), 1.38-1.30 (m, 4H), 0.97-0.81 (t, 3*J*H-H = 6.93 Hz, 3H). IR (KBr) *v* (cm-1): 3320, 2925, 2862, 2211 (-C≡C-), 1592, 1511, 1423, 1382, 1246, 1166, 1102, 1021, 828, 748. EI-MS m/z (rel. int.): 459.36 (M+, 8), 374.14 (31), 344.12 (12), 281.11 (28), 207.10 (100).

**7PEFPSN:**Yellow solid, Yield: 80%. m. p.: 181.42 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.75 (s, 1H), 8.26-8.23 (d, 4*J*H-H = 2.69 Hz, 1H), 8.18-8.12 (dd, 3*J*H-H = 8.68 Hz, 4*J*H-H = 2.61Hz, 1H), 7.75-7.68 (m, 2H), 7.68-7.60 (m, 2H), 7.53-7.47 (dd, 3*J*H-H = 8.75 Hz, 4*J*H-H = 2.72 Hz, 2H), 7.13-7.08 (d, 3*J*H-H = 8.67 Hz, 1H), 6.91-6.86 (dd, 3*J*H-H = 8.86 Hz, 4*J*H-H = 2.71 Hz, 2H), 4.01-3.96 (t, 3*J*H-H = 6.69 Hz, 2H), 1.84-1.71 (m, 2H), 1.49-1.40 (m,2H), 1.39-1.27 (m, 6H), 0.92-0.85 (t, 3*J*H-H = 6.58 Hz, 3H). IR (KBr) *v* (cm-1): 3323, 2929, 2852, 2206 (-C≡C-), 1595, 1511, 1433, 1342, 1251, 1167, 1104, 1005, 836, 745. EI-MS m/z (rel. int.): 473.34 (M+, 9), 374.12 (25), 341.02 (8), 281.09 (30), 207.07 (100).

**8PEFPSN:**Yellow solid, Yield: 84%. m. p.: 179.84 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.75 (s, 1H), 8.26-8.24 (d, 4*J*H-H = 2.56 Hz, 1H), 8.18-8.12 (dd, 3*J*H-H = 8.86 Hz, 4*J*H-H = 2.49Hz, 1H), 7.75-7.69 (m, 2H), 7.66-7.59 (m, 2H), 7.53-7.48 (dd, 3*J*H-H = 8.83 Hz, 4*J*H-H = 2.64 Hz, 2H), 7.17-7.08 (d, 3*J*H-H = 9.00 Hz, 1H), 6.91-6.84 (dd, 3*J*H-H = 8.83 Hz, 4*J*H-H = 2.72 Hz, 2H), 4.10-3.84 (t, 3*J*H-H = 6.59 Hz, 2H), 1.83-1.73 (m, 2H), 1.49-1.40 (m,2H), 1.38-1.30 (m, 8H), 0.91-0.84 (t, 3*J*H-H = 6.86 Hz, 3H). IR (KBr) *v* (cm-1): 3317, 2916, 2843, 2211 (-C≡C-), 1579, 1505, 1439, 1338, 1245, 1161, 1096, 1001, 826, 733. MS (MALDI-TOF) m/z called for C29H29FN2O4: 488.56. Found: 489.60 [M + H]+.

**9PEFPSN:** Yellow solid, Yield: 75%. m. p.: 176.67 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.75 (s, 1H), 8.26-8.24 (d, 4*J*H-H = 2.50 Hz, 1H), 8.18-8.13 (dd, 3*J*H-H = 8.94 Hz, 4*J*H-H = 2.64Hz, 1H), 7.74-7.66 (m, 2H), 7.65-7.59 (m, 2H), 7.52-7.48 (dd, 3*J*H-H = 8.62 Hz, 4*J*H-H = 2.46 Hz, 2H), 7.13-7.08 (d, 3*J*H-H = 8.66 Hz, 1H), 6.91-6.86 (dd, 3*J*H-H = 8.63 Hz, 4*J*H-H = 2.46 Hz, 2H), 4.07-3.88 (t, 3*J*H-H = 6.70 Hz, 2H), 1.85-1.72 (m, 2H), 1.49-1.41 (m,2H), 1.37-1.25 (m, 10H), 0.97-0.77 (t, 3*J*H-H = 7.01 Hz, 3H). IR (KBr) *v* (cm-1): 3319, 2923, 2854, 2212 (-C≡C-), 1591, 1516, 1441, 1344, 1254, 1158, 1110, 1019, 825, 740. MS (MALDI-TOF) m/z called for C30H31FN2O4: 502.59. Found: 503.90 [M + H]+.

**10PEFPSN:** Yellow solid, Yield: 84%. m. p.: 153.85 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.75 (s, 1H), 8.26-8.22 (d, 4*J*H-H = 2.61 Hz, 1H), 8.18-8.11 (dd, 3*J*H-H = 8.99 Hz, 4*J*H-H = 2.61Hz, 1H), 7.75-7.65 (m, 2H), 7.68-7.58 (m, 2H), 7.52-7.46 (dd, 3*J*H-H = 8.76 Hz, 4*J*H-H = 2.7 Hz, 2H), 7.18-7.07 (d, 3*J*H-H = 8.99 Hz, 1H), 6.93-6.80 (dd, 3*J*H-H = 8.95 Hz, 4*J*H-H = 2.68 Hz, 2H), 4.01-3.94 (t, 3*J*H-H = 6.73 Hz, 2H), 1.88-1.71 (m, 2H), 1.51-1.41 (m,2H), 1.38-1.30 (m, 12H), 0.97-0.81 (t, 3*J*H-H = 6.76 Hz, 3H). IR (KBr) *v* (cm-1): 3319, 2928, 2848, 2212 (-C≡C-), 1596, 1511, 1441, 1350, 1254, 1163, 1104, 1019, 825, 724. MS (MALDI-TOF) m/z called for C31H33FN2O4: 516.62. Found: 517.50 [M + H]+.

**11PEFPSN:** Yellow solid, Yield: 78%. m. p.: 173.44 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.75 (s, 1H), 8.26-8.23 (d, 4*J*H-H = 2.70 Hz, 1H), 8.18-8.12 (dd, 3*J*H-H = 9.04 Hz, 4*J*H-H = 2.55Hz, 1H), 7.76-7.69 (m, 2H), 7.67-7.58 (m, 2H), 7.52-7.47 (dd, 3*J*H-H = 8.71 Hz, 4*J*H-H = 2.60 Hz, 2H), 7.17-7.08 (d, 3*J*H-H = 8.89 Hz, 1H), 6.93-6.80 (dd, 3*J*H-H = 8.71 Hz, 4*J*H-H = 2.60 Hz, 2H), 4.01-3.94 (t, 3*J*H-H = 6.60 Hz, 2H), 1.88-1.71 (m, 2H), 1.51-1.41 (m,2H), 1.38-1.30 (m, 14H), 0.97-0.81 (t, 3*J*H-H = 6.46 Hz, 3H). IR (KBr) *v* (cm-1): 3317, 2927, 2856, 2219 (-C≡C-), 1593, 1516, 1428, 1387, 1250, 1179, 1102, 1027, 825, 743. MS (MALDI-TOF) m/z called for C32H35FN2O4: 530.66. Found: 531.50 [M + H]+.

**12PEFPSN:**Yellow solid, Yield: 85%. m. p.: 162.90 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.75 (s, 1H), 8.26-8.23 (d, 4*J*H-H = 2.56 Hz, 1H), 8.18-8.12 (dd, 3*J*H-H = 8.89 Hz, 4*J*H-H = 2.75Hz, 1H), 7.75-7.69 (m, 2H), 7.67-7.58 (m, 2H), 7.52-7.47 (dd, 3*J*H-H = 8.80 Hz, 4*J*H-H = 2.52 Hz, 2H), 7.17-7.08 (d, 3*J*H-H = 8.89 Hz, 1H), 6.93-6.80 (dd, 3*J*H-H = 8.61 Hz, 4*J*H-H = 2.62 Hz, 2H), 4.01-3.94 (t, 3*J*H-H = 6.64 Hz, 2H), 1.88-1.71 (m, 2H), 1.51-1.41 (m,2H), 1.38-1.30 (m, 16H), 0.97-0.81 (t, 3*J*H-H = 6.71 Hz, 3H). IR (KBr) *v* (cm-1): 3325, 2923, 2848, 2206 (-C≡C-), 1591, 1516, 1435, 1344, 1254, 1158, 1099, 1023, 831, 740. MS (MALDI-TOF) m/z called for C33H37FN2O4: 544.67. Found: 545.60 [M + H]+.

***Spectroscopic data for benzoxazole-terminated Schiff basecompounds (nPEFPBx):***

**5PEFPBH:**White solid, Yield: 89%. m. p.: 147.16 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.03-8.00 (dd, 3*J*H-H = 8.15 Hz, 4*J*H-H = 1.75 Hz, 1H), 7.99-7.95 (dd, 3*J*H-F = 9.78 Hz, 4*J*H-H = 1.41 Hz, 1H), 7.79-7.76 (m, 1H), 7.66-7.60 (m, 1H), 7.60-7.57 (m, 1H), 7.53-7.47 (dd, 3*J*H-H = 8.81 Hz, 4*J*H-H = 2.72 Hz, 2H), 7.42-7.33 (m, 2H), 6.92-6.83 (dd, 3*J*H-H = 8.85 Hz, 4*J*H-H = 2.62 Hz, 2H), 4.05-3.90 (t, 3*J*H-H = 6.53 Hz, 2H), 1.86-1.72 (m, 2H), 1.51-1.30 (m, 4H), 0.99-0.85 (t, 3*J*H-H = 7.39 Hz, 3H). IR (KBr) *v* (cm-1): 2944, 2861, 2211 (-C≡C-), 1601, 1511, 1434, 1245, 1170, 1112, 1028, 939, 837, 733. EI-MS m/z (rel. int.): 399.24 (M+, 26), 329.17 (100), 300.03 (5), 207.10 (22). EA: Calc. for C26H22FNO2: C: 78.18, H: 5.55, N: 3.51; Found: C: 78.84, H: 5.23, N: 3.45.

**6PEFPBH:** White solid, Yield: 91%. m. p.: 146.75 oC.1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.03-7.99 (dd, 3*J*H-H = 8.11 Hz, 4*J*H-H = 1.52 Hz, 1H), 7.99-7.95 (dd, 3*J*H-F = 9.78 Hz, 4*J*H-H = 1.52 Hz, 1H), 7.81-7.74 (m, 1H), 7.66-7.60 (m, 1H), 7.60-7.57 (m, 1H), 7.52-7.47 (dd, 3*J*H-H= 8.89 Hz, 4*J*H-H= 2.94 Hz, 2H), 7.41-7.34 (m, 2H), 6.93-6.83 (dd, 3*J*H-H = 8.89 Hz, 4*J*H-H = 2.62 Hz, 2H), 4.05-3.97 (t, 3*J*H-H = 6.62 Hz, 2H), 1.85-1.72 (m, 2H), 1.53-1.40 (m, 2H), 1.39-1.28 (m, 4H), 0.96-0.86 (t, 3*J*H-H = 6.88 Hz, 3H). IR (KBr) *v* (cm-1): 2945, 2862, 2202 (-C≡C-), 1607, 1523, 1439, 1282, 1245, 1179, 1105, 1012, 937 , 826, 743. EI-MS m/z (rel. int.): 413.20 (M+, 42), 329.10 (100), 300.09 (5), 207.03 (15), 182.06 (5). EA: Calc. for C27H24FNO2: C: 78.43, H: 5.85, N: 3.39; Found: C: 79.15, H: 5.71, N: 3.32.

**7PEFPBH:** White solid, Yield: 90%. m. p.: 141.49 oC.1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.03-8.00 (dd, 3*J*H-H = 8.01 Hz, 4*J*H-H = 1.67 Hz, 1H), 7.99-7.95 (dd, 3*J*H-F = 9.84 Hz, 4*J*H-H = 1.51 Hz, 1H), 7.80-7.75 (m, 1H), 7.66-7.60 (m, 1H), 7.60-7.57 (m, 1H), 7.52-7.47 (dd, 3*J*H-H = 8.74 Hz, 4*J*H-H = 2.52 Hz, 2H), 7.42-7.33 (m, 2H), 6.94-6.83 (dd, 3*J*H-H = 8.74 Hz, 4*J*H-H = 2.89 Hz, 2H), 4.03-3.91 (t, 3*J*H-H = 6.59 Hz, 2H), 1.84-1.71 (m, 2H), 1.51-1.40 (m, 2H), 1.38-1.27 (m, 6H), 0.95-0.80 (t, 3*J*H-H = 6.98 Hz, 3H). IR (KBr) *v* (cm-1): 2925, 2862, 2202 (-C≡C-), 1600, 1503, 1446, 1292, 1246, 1173, 1110, 1005, 936, 828, 748. EI-MS m/z (rel. int.): 427.21 (M+, 21), 329.10 (100), 300.09 (6), 207.04 (15). EA: Calc. for C28H26FNO2: C: 79.35, H: 5.91, N: 3.24; Found: C: 78.66, H: 6.13, N: 3.28.

**8PEFPBH:** White solid, Yield: 91%. m. p.: 136.22 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.03-8.00 (dd, 3*J*H-H = 8.01 Hz, 4*J*H-H = 1.76 Hz, 1H), 7.99-7.95 (dd, 3*J*H-F = 9.77 Hz, 4*J*H-H = 1.67 Hz, 1H), 7.80-7.75 (m, 1H), 7.66-7.61 (m, 1H), 7.60-7.56 (m, 1H), 7.52-7.47 (dd, 3*J*H-H = 8.92 Hz, 4*J*H-H = 2.63 Hz, 2H), 7.40-7.37 (m, 2H), 6.95-6.82 (dd, 3*J*H-H = 8.92 Hz, 4*J*H-H = 2.55 Hz, 2H), 4.02-3.89 (t, 3*J*H-H = 6.66 Hz, 2H), 1.87-1.71 (m, 2H), 1.53-1.40 (m, 2H), 1.37-1.24 (m, 8H), 0.96-0.82 (t, 3*J*H-H = 6.81 Hz, 3H). IR (KBr) *v* (cm-1): 2918, 2852, 2220 (-C≡C-), 1598, 1449, 1293, 1245, 1170, 1096, 1001, 940, 836, 743. EI-MS m/z (rel. int.): 441.23 (M+, 33), 329.11 (100), 300.09 (5), 207.11 (20). EA: Calc. for C29H28FNO2: C: 78.89, H: 6.39, N: 3.17; Found: C: 79.44, H: 6.10, N: 3.09.

**9PEFPBH:** White solid, Yield: 90%. m. p.: 132.90 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.04-8.00 (dd, 3*J*H-H = 8.12 Hz, 4*J*H-H = 1.67 Hz, 1H), 7.99-7.95 (dd, 3*J*H-F = 9.83 Hz, 4*J*H-H = 1.56 Hz, 1H), 7.80-7.74 (m, 1H), 7.66-7.60 (m, 1H), 7.60-7.56 (m, 1H), 7.52-7.47 (dd, 3*J*H-H = 8.50 Hz, 4*J*H-H = 2.54 Hz, 2H), 7.42-7.30 (m, 2H), 6.95-6.84 (dd, 3*J*H-H = 8.90 Hz, 4*J*H-H = 2.62 Hz, 2H), 4.05-3.91 (t, 3*J*H-H = 7.37 Hz, 2H), 1.85-1.69 (m, 2H), 1.51-1.40 (m, 2H), 1.37-1.28 (m, 10H), 0.92-0.84 (t, 3*J*H-H = 6.75 Hz, 3H). IR (KBr) *v* (cm-1): 2928, 2860, 2212 (-C≡C-), 1607, 1553, 1441,1286, 1249, 1168, 1104, 1013, 938, 825, 740. EI-MS m/z (rel. int.): 455.34 (M+, 26), 329.12 (100), 281.14 (8), 207.09 (22). EA: Calc. for C30H30FNO2: C: 79.09, H: 6.64, N: 3.07; Found: C: 79.75, H: 6.40, N: 3.00.

**10PEFPBH:** White solid, Yield: 92%. m. p.: 134.50 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.04-7.99 (dd, 3*J*H-H = 8.01 Hz, 4*J*H-H = 1.61 Hz, 1H), 7.99-7.95 (dd, 3*J*H-F = 9.80 Hz, 4*J*H-H = 1.55 Hz, 1H), 7.81-7.75 (m, 1H), 7.66-7.60 (m, 1H), 7.60-7.56 (m, 1H), 7.52-7.47 (dd, 3*J*H-H = 8.80 Hz, 4*J*H-H = 2.91 Hz, 2H), 7.41-7.34 (m, 2H), 6.95-6.82 (dd, 3*J*H-H = 8.80 Hz, 4*J*H-H = 2.51 Hz, 2H), 4.00-3.94 (t, 3*J*H-H = 6.64 Hz, 2H), 1.90-1.67 (m, 2H), 1.50-1.39 (m, 2H), 1.35-1.24 (m, 12H), 0.90-0.84 (t, 3*J*H-H = 6.74 Hz, 3H). IR (KBr) *v* (cm-1): 2923, 2854, 2206 (-C≡C-), 1607, 1511, 1457, 1289, 1249, 1173, 1104, 1019, 933, 836, 734. EI-MS m/z (rel. int.): 469.35 (M+, 28), 329.17 (100), 281.10 (7), 207.10 (16). EA: Calc. for C31H32FNO2: C: 79.29, H: 6.87, N: 2.98; Found: C: 79.88, H: 6.58, N: 2.96.

**11PEFPBH:** White solid, Yield: 93%. m. p.: 131.98 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.03-8.00 (dd, 3*J*H-H = 8.04 Hz, 4*J*H-H = 1.63 Hz, 1H), 7.99-7.95 (dd, 3*J*H-F = 9.79 Hz, 4*J*H-H = 1.58 Hz, 1H), 7.80-7.75 (m, 1H), 7.66-7.60 (m, 1H), 7.60-7.57 (m, 1H), 7.52-7.47 (dd, 3*J*H-H = 8.93 Hz, 4*J*H-H = 2.63 Hz, 2H), 7.41-7.32 (m, 2H), 6.93-6.83 (dd, 3*J*H-H = 8.93 Hz, 4*J*H-H = 2.55 Hz, 2H), 4.05-3.90 (t, 3*J*H-H = 6.61 Hz, 2H), 1.86-1.69 (m, 2H), 1.50-1.39 (m, 2H), 1.31-1.23 (m, 14H), 0.96-0.86 (t, 3*J*H-H = 7.34 Hz, 3H). IR (KBr) *v* (cm-1): 2920, 2856, 2206 (-C≡C-), 1610, 1516, 1463, 1293, 1245, 1173, 1102, 1014, 885, 825, 727. EI-MS m/z (rel. int.): 483.37 (M+, 27), 329.17 (100), 281.17 (4), 207.10 (12). EA: Calc. for C32H34FNO2: C: 79.47, H: 7.09, N: 2.90; Found: C: 80.31, H: 6.76, N: 2.83.

**12PEFPBH:** White solid, Yield: 92%. m. p.: 111.90 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.03-8.00 (dd, 3*J*H-H = 8.04 Hz, 4*J*H-H = 1.51 Hz, 1H), 7.97-7.95 (dd, 3*J*H-F = 9.71 Hz, 4*J*H-H = 1.53 Hz, 1H), 7.81-7.71 (m, 1H), 7.66-7.60 (m, 1H), 7.60-7.57 (m, 1H), 7.52-7.47 (dd, 3*J*H-H = 8.63 Hz, 4*J*H-H = 2.66 Hz, 2H), 7.42-7.33 ( m, 2H), 6.91-6.85 (dd, 3*J*H-H = 8.95 Hz, 4*J*H-H = 2.66 Hz, 2H), 4.04-3.90 (t, 3*J*H-H =6.69 Hz, 2H), 1.86-1.72 (m, 2H), 1.53-1.40 (m, 2H), 1.39-1.27 (m, 16H), 0.96-0.86 (t, 3*J*H-H = 6.83 Hz, 3H). IR (KBr) *v* (cm-1): 2918, 2848, 2212 (-C≡C-), 1602, 1505, 1468, 1291, 1249, 1168, 1104, 1029, 895, 831, 734. EI-MS m/z (rel. int.): 497.37 (M+, 18), 329.19 (74), 281.11 (27), 207.09 (100). EA: Calc. for C33H36FNO2: C: 79.84, H: 6.97, N: 2.75; Found: C: 79.65, H: 7.29, N: 2.81.

**5PEFPBM:** White solid, Yield: 89%. m. p.: 149.08 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.01-7.97 (dd, 3*J*H-H = 7.99 Hz, 4*J*H-H = 1.67 Hz, 1H), 7.97-7.93 (dd, 3*J*H-F = 9.73 Hz, 4*J*H-H = 1.46 Hz, 1H), 7.64-7.59 (m, 1H), 7.56-7.53 (m, 1H), 7.52-7.47 (dd, 3*J*H-H = 8.88 Hz, 4*J*H-H = 2.69 Hz, 2H), 7.47-7.42 (d, 3*J*H-H = 8.27 Hz, 1H), 7.20-7.16 (dd, 3*J*H-H = 8.20 Hz, 4*J*H-H = 1.65 Hz, 1H), 6.93-6.84 (dd, 3*J*H-H = 8.72 Hz, 4*J*H-H = 2.70 Hz, 2H), 4.03-3.92 (t, 3*J*H-H = 6.56 Hz, 2H), 2.48 (s, 3H), 1.85-1.73 (m, 2H), 1.51-1.30 (m, 4H), 1.01-0.85 (t, 3*J*H-H = 7.16 Hz, 3H). IR (KBr) *v* (cm-1): 2931, 2861, 2211 (-C≡C-), 1601, 1510, 1427, 1240, 1174, 1106, 1028, 945, 887, 797. EI-MS m/z (rel. int.): 413.21 (M+, 21), 329.10 (100), 281.07 (11), 207.04 (15). EA: Calc. for C27H24FNO2: C: 78.43, H: 5.85, N: 3.39; Found: C: 77.70, H: 5.85, N: 3.31.

**6PEFPBM:** White solid, Yield: 90%. m. p.: 142.05 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.01-7.97 (dd, 3*J*H-H = 8.05 Hz, 4*J*H-H = 1.63 Hz, 1H), 7.97-7.93 (dd, 3*J*H-F = 9.88 Hz, 4*J*H-H = 1.5 Hz, 1H), 7.65-7.59 (m, 1H), 7.56-7.53 (m, 1H), 7.52-7.47 (dd, 3*J*H-H = 8.72 Hz, 4*J*H-H = 2.99 Hz, 2H), 7.47-7.42 (d, 3*J*H-H = 8.34 Hz, 1H), 7.20-7.16 (dd, 3*J*H-H = 8.49 Hz, 4*J*H-H = 1.72 Hz, 1H), 6.91-6.85 (dd, 3*J*H-H = 8.64 Hz, 4*J*H-H = 2.67 Hz, 2H), 4.00-3.94 (t, 3*J*H-H = 6.56 Hz, 2H), 2.48 (s, 3H), 1.84-1.73 (m, 2H), 1.51-1.40 (m, 2H), 1.39-1.27 (m, 4H), 0.95-0.85 (t, 3*J*H-H = 7.10 Hz, 3H). IR (KBr) *v* (cm-1): 2922, 2862, 2216 (-C≡C-), 1598, 1516, 1428, 1249, 1182, 1108, 1041, 944, 825, 728. EI-MS m/z (rel. int.): 427.19 (M+, 50), 343.11 (100), 281.04 (4), 207.03 (11). EA: Calc. for C28H26FNO2: C: 78.66, H: 6.13, N: 3.28; Found: C: 78.64, H: 6.09, N: 3.21.

**7PEFPBM:** White solid, Yield: 89%. m. p.: 136.54 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.01-7.97 (dd, 3*J*H-H = 8.09 Hz, 4*J*H-H = 1.72 Hz, 1H), 7.97-7.93 (dd, 3*J*H-F = 9.86 Hz, 4*J*H-H = 1.49 Hz, 1H), 7.64-7.59 (m, 1H), 7.56-7.53 (m, 1H), 7.52-7.47 (dd, 3*J*H-H = 8.89 Hz, 4*J*H-H = 2.54 Hz, 2H), 7.47-7.42 (d, 3*J*H-H = 8.39 Hz, 1H), 7.22-7.15 (dd, 3*J*H-H = 8.58 Hz, 4*J*H-H = 1.60 Hz, 1H), 6.94-6.82 (dd, 3*J*H-H = 8.89 Hz, 4*J*H-H = 2.94 Hz, 2H), 4.02-3.92 (t, 3*J*H-H = 6.61 Hz, 2H), 2.48 (s, 3H), 1.86-1.70 (m, 2H), 1.51-1.40 (m, 2H), 1.39-1.27 (m, 6H), 0.95-0.80 (t, 3*J*H-H = 6.67 Hz, 3H). IR (KBr) *v* (cm-1): 2922, 2852, 2206 (-C≡C-), 1602, 1567, 1518, 1468, 1237, 1167, 1096, 1034, 949, 830, 714. EI-MS m/z (rel. int.): 441.23 (M+, 21), 343.12 (46), 281.06 (31), 207.03 (11). EA: Calc. for C29H28FNO2: C: 78.89, H: 6.39, N: 3.17; Found: C: 78.84, H: 6.34, N: 3.13.

**8PEFPBM:** White solid, Yield: 89%. m. p.: 133.69 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.01-7.97 (dd, 3*J*H-H = 7.01 Hz, 4*J*H-H = 1.64 Hz, 1H), 7.97-7.93 (dd, 3*J*H-F = 9.75 Hz, 4*J*H-H = 1.61 Hz, 1H), 7.64-7.59 (m, 1H), 7.56-7.52 (m, 1H), 7.52-7.47 (dd, 3*J*H-H = 8.85 Hz, 4*J*H-H = 2.75 Hz, 2H), 7.47-7.42 (d, 3*J*H-H = 8.27 Hz, 1H), 7.20-7.16 (dd, 3*J*H-H = 8.35 Hz, 4*J*H-H = 1.67 Hz, 1H), 6.92-6.84 (dd, 3*J*H-H = 8.79 Hz, 4*J*H-H = 2.79 Hz, 2H), 4.00-3.94 (t, 3*J*H-H = 6.53 Hz, 2H), 2.49 (s, 3H), 1.84-1.73 (m, 2H), 1.51-1.40 (m, 2H), 1.39-1.28 (m, 8H), 0.95-0.85 (t, 3*J*H-H = 6.28 Hz, 3H). IR (KBr) *v* (cm-1): 2926, 2862, 2220 (-C≡C-), 1607, 1505, 1439, 1245, 1170, 1114, 1050, 947, 836, 715. EI-MS m/z (rel. int.): 455.34 (M+, 31), 343.19 (100), 237.14 (7), 207.03 (20). EA: Calc. for C30H30FNO2: C: 79.09, H: 6.64, N: 3.07; Found: C: 78.95, H: 6.59, N: 3.01.

**9PEFPBM:** White solid, Yield: 91%. m. p.: 130.77 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.01-7.97 (dd, 3*J*H-H = 8.02 Hz, 4*J*H-H = 1.61 Hz, 1H), 7.97-7.93 (dd, 3*J*H-F = 9.79 Hz, 4*J*H-H = 1.54 Hz, 1H), 7.65-7.59 (m, 1H), 7.56-7.54 (m, 1H), 7.52-7.47 (dd, 3*J*H-H = 8.68 Hz, 4*J*H-H = 2.68 Hz, 2H), 7.47-7.42 (d, 3*J*H-H = 8.57 Hz, 1H), 7.20-7.16 (dd, 3*J*H-H = 8.41 Hz, 4*J*H-H = 1.58 Hz, 1H), 6.93-6.80 (dd, 3*J*H-H = 8.68 Hz, 4*J*H-H = 2.69 Hz, 2H), 4.03-3.94 (t, 3*J*H-H = 6.69 Hz, 2H), 2.48 (s, 3H), 1.87-1.72 (m, 2H), 1.50-1.39 (m, 2H), 1.39-1.22 (m, 10H), 0.95-0.85 (t, 3*J*H-H = 6.23 Hz, 3H). IR (KBr) *v* (cm-1): 2918, 2854, 2212 (-C≡C-), 1602, 1511, 1473, 1425, 1243, 1173, 1114, 1040, 943, 825, 724. EI-MS m/z (rel. int.): 469.23 (M+, 50), 343.09 (98), 281.14 (8), 207.03 (100). EA: Calc. for C31H32FNO2: C: 79.29, H: 6.87, N: 2.98; Found: C: 79.13, H: 6.83, N: 2.88.

**10PEFPBM:** White solid, Yield: 92%. m. p.: 104.22 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.01-7.97 (dd, 3*J*H-H = 8.21 Hz, 4*J*H-H = 1.72 Hz, 1H), 7.97-7.93 (dd, 3*J*H-F = 9.77 Hz, 4*J*H-H = 1.51 Hz, 1H), 7.64-7.59 (m, 1H), 7.56-7.54 (m, 1H), 7.52-7.47 (dd, 3*J*H-H = 8.89 Hz, 4*J*H-H = 2.22 Hz, 2H), 7.47-7.42 (d, 3*J*H-H = 8.53 Hz, 1H), 7.20-7.16 (dd, 3*J*H-H = 8.27 Hz, 4*J*H-H = 1.53 Hz, 1H), 6.93-6.84 (dd, 3*J*H-H = 8.89 Hz, 4*J*H-H = 2.94 Hz, 2H), 4.00-3.94 (t, 3*J*H-H = 6.59 Hz, 2H), 2.48 (s, 3H), 1.84-1.71 (m, 2H), 1.52-1.41 (m, 2H), 1.39-1.22 (m, 12H), 0.92-0.80 (t, 3*J*H-H = 6.70 Hz, 3H). IR (KBr) *v* (cm-1): 2918, 2854, 2212 (-C≡C-), 1602, 1559, 1516, 1431, 1254, 1179, 1110, 1023, 943, 884, 730. EI-MS m/z (rel. int.): 483.31 (M+, 33), 343.15 (100), 281.05 (5), 207.07 (16). EA: Calc. for C32H34FNO2: C: 79.47, H: 7.09, N: 2.90; Found: C: 79.16, H: 7.06, N: 2.83.

**11PEFPBM:** White solid, Yield: 92%. m. p.: 125.40 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.01-7.97 (dd, 3*J*H-H = 7.99 Hz, 4*J*H-H = 1.67 Hz, 1H), 7.97-7.93 (dd, 3*J*H-F = 9.73 Hz, 4*J*H-H = 1.46 Hz, 1H), 7.64-7.59 (m, 1H), 7.56-7.53 (m, 1H), 7.52-7.47 (dd, 3*J*H-H = 8.90 Hz, 4*J*H-H = 2.79 Hz, 2H), 7.47-7.42 (d, 3*J*H-H = 8.27 Hz, 1H), 7.20-7.16 (dd, 3*J*H-H = 8.23 Hz, 4*J*H-H = 1.52 Hz, 1H), 6.93-6.84 (dd, 3*J*H-H = 8.40 Hz, 4*J*H- H= 2.59 Hz, 2H), 4.00-3.94 (t, 3*J*H-H = 6.56 Hz, 2H), 2.48 (s, 3H), 1.84-1.73 (m, 2H), 1.51-1.40 (m, 2H), 1.39-1.27 (m, 14H), 0.95-0.85 (t, 3*J*H-H = 6,89 Hz, 3H). IR (KBr) *v* (cm-1): 2927, 2856, 2213 (-C≡C-), 1599, 1510, 1422, 1250, 1179, 1115, 1044, 943, 890, 720. EI-MS m/z (rel. int.): 497.35 (M+, 28), 343.16 (100), 281.11 (13), 207.03 (50). EA: Calc. for C33H36FNO2: C: 79.65, H: 7.29, N: 2.81; Found: C: 78.67, H: 7.23, N: 2.62.

**12PEFPBM:** White solid, Yield: 93%. m. p.: 93.90 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.02-7.97 (dd, 3*J*H-H = 8.02 Hz, 4*J*H-H = 1.65 Hz, 1H), 7.99-7.92 (dd, 3*J*H-F = 9.54 Hz, 4*J*H-H = 1.46 Hz, 1H), 7.65-7.58 (m, 1H), 7.56-7.52 (m, 1H), 7.52-7.46 (dd, 3*J*H-H = 8.60 Hz, 4*J*H-H = 2.55 Hz, 2H), 7.48-7.42 (d, 3*J*H-H = 8.25 Hz, 1H), 7.20-7.15 (dd, 3*J*H-H = 8.27 Hz, 4*J*H-H = 1.68 Hz, 1H), 6.93-6.84 (dd, 3*J*H-H = 8.86 Hz, 4*J*H-H = 2.64 Hz, 2H), 4.00-3.94 (t, 3*J*H-H = 6.56 Hz, 2H), 2.48 (s, 3H), 1.84-1.73 (m, 2H), 1.51-1.40 (m, 2H), 1.39-1.27 (m, 16H), 0.95-0.85 (t, 3*J*H-H = 7.10 Hz, 3H). IR (KBr) *v* (cm-1): 2918, 2854, 2202 (-C≡C-), 1600, 1511, 1471, 1401, 1254, 1173, 1110, 1037, 940, 804, 716. EI-MS m/z (rel. int.): 511.37 (M+, 18), 343.16 (61), 281.11 (29), 207.08 (100). EA: Calc. for C34H38FNO2: C: 79.81, H: 7.49, N: 2.74; Found: C: 79.51, H: 7.45, N: 2.66.

**5PEFPBN:** White solid, Yield: 77%. m. p.: 186.62 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.68-8.63 (d, 4*J*H-H = 2.20 Hz, 1H), 8.37-8.30 (dd, 3*J*H-H = 8.99 Hz, 4*J*H-H = 2.30 Hz, 1H), 8.05-8.00 (dd, 3*J*H-H = 8.12 Hz, 4*J*H-H = 1.62 Hz, 1H), 7.99-7.95 (dd, 3*J*H-F = 9.51 Hz, 4*J*H-H = 1.51 Hz, 1H), 7.72-7.62 (m, 2H), 7.54-7.46 (dd, 3*J*H-H = 8.78 Hz, 4*J*H-H = 2.51 Hz, 2H), 6.93-6.84 (dd, 3*J*H-H = 8.88 Hz, 4*J*H-H = 2.62 Hz, 2H), 4.03-3.92 (t, 3*J*H-H = 6.72 Hz, 2H), 1.86-1.72 (m, 2H), 1.51-1.39 (m, 4H), 0.99-0.88 (t, 3*J*H-H = 7.17 Hz, 3H). IR (KBr) *v* (cm-1): 2942, 2869, 2194 (-C≡C-), 1607, 1519, 1343, 1246, 1158, 1110, 1021, 820, 731, 665. EI-MS m/z (rel. int.): 444.63 (M+, 20), 374.12 (73), 344.15 (18), 281.12 (20), 207.10 (100). EA: Calc. for C26H21FN2O4: C: 70.26, H: 4.76, N: 6.30; Found: C: 70.14, H: 4.81, N: 6.21.

**6PEFPBN:** White solid, Yield:73%. m. p.: 175.14 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.67-8.64 (d, 4*J*H-H = 2.38 Hz, 1H), 8.37-8.31 (dd, 3*J*H-H = 8.98 Hz, 4*J*H-H = 2.35 Hz, 1H), 8.05-8.00 (dd, 3*J*H-H = 8.12 Hz, 4*J*H-H = 1.73 Hz, 1H), 7.99-7.94 (dd, 3*J*H-F = 9.56 Hz, 4*J*H-H = 1.48Hz, 1H), 7.71-7.63 (m, 2H), 7.56-7.46 (dd, 3*J*H-H = 8.65 Hz, 4*J*H-H = 2.35 Hz, 2H), 6.94-6.76 (dd, 3*J*H-H = 8.65 Hz, 4*J*H-H = 2.35 Hz, 2H), 4.09-3.81 (t, 3*J*H-H = 6.70 Hz, 2H), 1.83-1.73 (m, 2H), 1.51-1.41(m, 2H), 1.39-1.29 (m, 4H), 0.99-0.88 (t, 3*J*H-H = 6.94 Hz, 3H). IR (KBr) *v* (cm-1): 2922, 2855, 2200 (-C≡C-), 1598, 1524, 1346, 1286, 1249, 1182, 1108, 1018, 929, 892, 818, 736. EI-MS m/z (rel. int.): 458.23 (M+, 18), 374.12 (76), 344.17 (15), 281.22 (24), 207.08 (100). EA: Calc. for C27H23FN2O4: C: 70.73, H: 5.06, N: 6.11; Found: C: 70.40, H: 5.09, N: 5.98.

**7PEFPBN:** White solid, Yield: 69%. m. p.: 173.74 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.67-8.65 (d, 4*J*H-H = 2.44 Hz, 1H), 8.37-8.32 (dd, 3*J*H-H = 8.88 Hz, 4*J*H-H = 2.27 Hz, 1H), 8.05-7.96 (dd, 3*J*H-H = 7.93 Hz, 4*J*H-H = 1.61 Hz, 1H), 7.99-7.94 (dd, 3*J*H-F = 9.41 Hz, 4*J*H-H = 1.42 Hz, 1H), 7.73-7.63 (m, 2H), 7.53-7.45 (dd, 3*J*H-H = 8.69 Hz, 4*J*H-H = 2.36 Hz, 2H), 6.92-6.85 (dd, 3*J*H-H = 8.60 Hz, 4*J*H-H = 2.78 Hz, 2H), 4.09-3.81 (t, 3*J*H-H = 6.53 Hz, 2H), 1.84-1.74 (m, 2H), 1.51-1.40(m, 2H), 1.40-1.24 (m, 6H), 0.93-0.82 (t, 3*J*H-H = 6.91 Hz, 3H). IR (KBr) *v* (cm-1): 2922, 2852, 2213 (-C≡C-), 1609, 1518, 1357, 1258, 1180, 1110, 1034, 886, 809, 731. EI-MS m/z (rel. int.): 472.25 (M+, 18), 374.11 (68), 344.14 (17), 281.08 (32), 207.07 (100).

**8PEFPBN:** White solid, Yield: 71%. m. p.: 176.52 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.67-8.65 (d, 4*J*H-H = 2.44 Hz, 1H), 8.37-8.32 (dd, 3*J*H-H = 8.88 Hz, 4*J*H-H = 2.27 Hz, 1H), 8.05-7.96 (dd, 3*J*H-H = 7.93 Hz, 4*J*H-H = 1.61 Hz, 1H), 7.99-7.94 (dd, 3*J*H-F = 9.41 Hz, 4*J*H-H = 1.42 Hz, 1H), 7.73-7.63 (m, 2H), 7.53-7.45 (dd, 3*J*H-H = 8.65 Hz, 4*J*H-H = 2.67 Hz, 2H), 6.92-6.85 (dd, 3*J*H-H = 8.99 Hz, 4*J*H-H = 2.57 Hz, 2H), 4.09-3.81 (t, 3*J*H-H = 6.53 Hz, 2H), 1.84-1.74 (m, 2H), 1.51-1.40(m, 2H), 1.40-1.24 (m, 8H), 0.93-0.82 (t, 3*J*H-H = 6.91 Hz, 3H). IR (KBr) *v* (cm-1): 2926, 2852, 2211 (-C≡C-), 1626, 1505, 1346, 1245, 1179, 1124, 1030, 882, 826, 733. MS (MALDI-TOF) m/z called for C29H27FN2O4: 486.54. Found: 487.80 [M + H]+. EA: Calc. for C29H27FN2O4: C: 71.59, H: 5.59, N: 5.76; Found: C: 71.53, H: 5.55, N: 5.65.

**9PEFPBN:**White solid, Yield: 77%. m. p.: 173.36 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.68-8.654 (d, 4*J*H-H = 2.44 Hz, 1H), 8.36-8.31 (dd, 3*J*H-H = 8.68 Hz, 4*J*H-H = 2.12 Hz, 1H), 8.06-7.96 (dd, 3*J*H- H= 8.01 Hz, 4*J*H-H = 1.61 Hz, 1H), 7.99-7.94 (dd, 3*J*H-F = 9.56 Hz, 4*J*H-H = 1.32 Hz, 1H), 7.73-7.63 (m, 1H), 7.54-7.44 (dd, 3*J*H-H = 8.51 Hz, 4*J*H-H = 2.31 Hz, 2H), 6.94-6.85 (dd, 3*J*H-H = 8.43 Hz, 4*J*H-H = 2.51 Hz, 2H), 4.09-3.81 (t, 3*J*H-H = 6.56 Hz, 2H), 1.86-1.74 (m, 2H), 1.51-1.39 (m, 2H), 1.37-1.24 (m, 10H), 0.93-0.82 (t, 3*J*H-H = 6.91 Hz, 3H). IR (KBr) *v* (cm-1): 2928, 2854, 2206 (-C≡C-), 1602, 1516, 1344, 1243, 1173, 1114, 1034, 890, 824, 734. MS (MALDI-TOF) m/z called for C30H29FN2O4: 500.57. Found: 501.40 [M + H]+. EA: Calc. for C30H29FN2O4: C: 71.98, H: 5.84, N: 5.60; Found: C: 71.67, H: 5.79, N: 5.45.

**10PEFPBN:**White solid, Yield: 81%. m. p.: 171.88 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.678-8.64 (d, 4*J*H-H = 2.38 Hz, 1H), 8.37-8.31 (dd, 4*J*H-H = 8.68 Hz, 4*J*H-H = 2.56 Hz, 1H), 8.05-8.01 (dd, 3*J*H-H = 8.16 Hz, 4*J*H-H = 1.63 Hz, 1H), 7.99-7.3(dd, 3*J*H-F = 9.66 Hz, 4*J*H-H = 1.50 Hz, 1H), 7.71-7.63 (m, 2H), 7.56-7.45 (dd, 3*J*H-H = 8.58 Hz, 4*J*H-H = 2.89 Hz, 2H), 6.95-6.75 (dd, 3*J*H-H = 8.89 Hz, 4*J*H-H = 2.93 Hz, 2H), 4.09-3.81 (t, 3*J*H-H = 6.62 Hz, 2H), 1.83-1.73 (m, 2H), 1.51-1.41(m, 2H), 1.39-1.29 (m, 12H), 0.99-0.88 (t, 3*J*H-H = 6.83 Hz, 3H). IR (KBr) *v* (cm-1): 2923, 2860, 2212 (-C≡C-), 1602, 1521, 1344, 1249, 1179, 1104, 943, 884, 734. MS (MALDI-TOF) m/z called for C31H31FN2O4: 514.60. Found: 515.50 [M + H]+. EA: Calc. for C31H31FN2O4: C: 72.36, H: 6.07, N: 5.44; Found: C: 71.99, H: 6.08, N: 5.30.

**11PEFPBN:**White solid, Yield: 75%. m. p.: 169.95 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.67-8.65 (d, 4*J*H-H = 2.59 Hz, 1H), 8.37-8.32 (dd, 3*J*H-H = 8.79 Hz, 4*J*H-H = 2.20 Hz, 1H), 8.06-8.01 (dd, 3*J*H-H = 8.01 Hz, 4*J*H-H = 1.56 Hz, 1H), 7.99-7.94 (dd, 3*J*H-F = 9.51 Hz, 4*J*H-H = 1.71 Hz, 1H), 7.72-7.64 (m, 2H), 7.52-7.48 (dd, 3*J*H-H = 8.73 Hz, 4*J*H-H = 2.28 Hz, 2H), 6.94-6.86 (dd, 3*J*H-H = 8.73 Hz, 4*J*H-H = 2.69 Hz, 2H), 4.04-3.92 (t, 3*J*H-H = 6.62 Hz, 2H), 1.86-1.73 (m, 2H), 1.50-1.39 (m, 2H), 1.35-1.21 (m, 14H), 0.99-0.88 (t, 3*J*H-H = 6.53 Hz, 3H). IR (KBr) *v* (cm-1): 2927, 2856, 2213 (-C≡C-), 1599, 1522, 1439, 1345, 1250, 1179, 1102, 890, 737. MS (MALDI-TOF) m/z called for C32H33FN2O4: 528.64. Found: 529.80 [M + H]+. EA: Calc. for C32H33FN2O4: C: 72.71, H: 6.29, N: 5.30; Found: C: 72.40, H: 6.25, N: 5.12.

**12PEFPBN:** White solid, Yield: 78%. m. p.: 168.78 oC. 1H-NMR (400 MHz, CDCl3, TMS): δ (ppm) 8.67-8.63 (d, 4*J*H-H = 2.36 Hz, 1H), 8.38-8.30 (dd, 3*J*H-H = 8.68 Hz, 4*J*H-H = 2.71 Hz, 1H), 8.05-8.01 (dd, 3*J*H-H = 8.02 Hz, 4*J*H-H = 1.56 Hz, 1H), 7.99-7.94 (dd, 3*J*H-F = 9.56 Hz, 4*J*H-H = 1.42 Hz, 1H), 7.72-7.63 (m, 2H), 7.56-7.46 (dd, 3*J*H-H = 8.71 Hz, 4*J*H-H = 2.58 Hz, 2H), 6.94-6.76 (dd, 3*J*H-H = 8.69 Hz, 4*J*H-H = 2.61 Hz, 2H), 4.09-3.80 (t, 3*J*H-H = 6.60 Hz, 2H), 1.83-1.73 (m, 2H), 1.51-1.41(m, 2H), 1.39-1.23 (m, 16H), 0.99-0.88 (t, 3*J*H-H = 6.98 Hz, 3H). IR (KBr) *v* (cm-1): 2928, 2848, 2206 (-C≡C-), 1607, 1521, 1435, 1344, 1249, 1173, 1110, 890, 734. MS (MALDI-TOF) m/z called for C33H35FN2O4: 542.65. Found: 543.60 [M + H]+. EA: Calc. for C33H35FN2O4: C: 73.04, H: 6.50, N: 5.16; Found: C: 73.04, H: 6.44, N: 5.11.