# Supplementary information

**Preparation and properties of 1-methyl-*1H*-benzimidazole-based mesogenic compounds incorporating ethynyl moiety**

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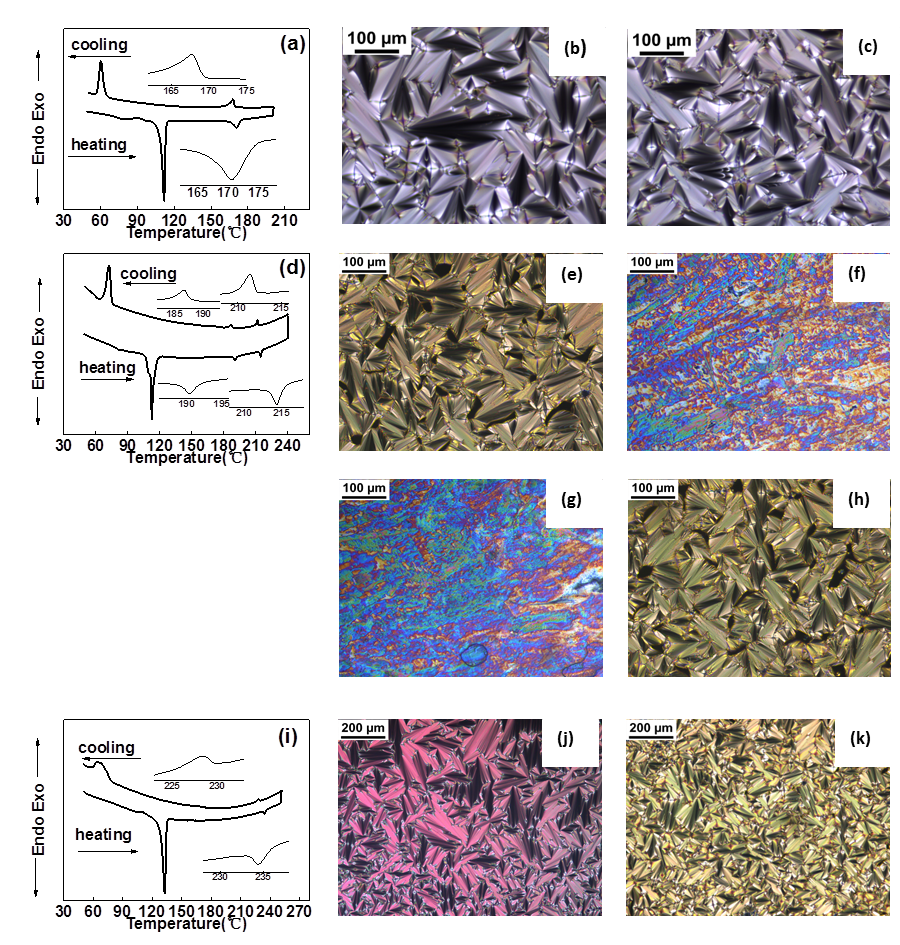
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Figure 1s. Differential scanning calorimetry (DSC) traces at scanning rate 5°C/min and photomicrographs (×100). (a) DSC trace of 11PEPMH; (b) a focal conic texture of 11PEPMH at 158.0 °C on heating; (c) a focal conic texture of 11PEPMH at 143.0 °C on cooling; (d) DSC trace of 9PEPMM; (e) a focal conic texture of 9PEPMM at 161.0 °C on heating; (f) a marble texture of 9PEPMM at 194.0 °C on heating; (g) a marble texture of 9PEPMM at 203.0 °C on cooling; (h) a focal conic texture of 9PEPMM at 153.0 °C on cooling; (i) DSC trace of 10PEPMN; (g) a focal conic texture of 10PEPMN at 169.0 °C on heating; (k) a broken focal conic texture of 10PEPMN at 177.0 °C on cooling.

***Spectroscopic data for 2-(4-bromophenyl)-1,3-dioxolane***

White oily matter, yield 85%. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 7.85-7.76 (d, *J* = 7.7 Hz, 2H), 7.34-7.27 (d, *J* = 7.8 Hz, 2H), 5.78 (s, 1H), 4.06-4.01 (m, 2H), 3.95-3.91 (m, 2H). IR (KBr, pellet, cm-1): 2987, 2884, 2042, 1603, 1479, 1412, 1224, 1072, 938, 868, 807, 578, 531. EI-MS m/z (rel, int): 227.19 (M+, 13), 183.82 (100), 143.41 (22), 94.37 (40), 73.25 (56).

***Spectroscopic data for 4-(4-(1,3-dioxolan-2-yl)phenyl)-2-methylbut-3-yn-ol***

Yellow oily matter, yield 60%. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 7.48-7.43 (d, *J* = 7.7 Hz, 2H), 7.23-7.16 (d, *J* = 7.9 Hz, 2H), 5.78 (s, 1H), 5.21 (s, 1H), 4.09-3.99 (m, 2H), 3.97-3.93 (m, 2H), 1.60 (s, 6H). IR (KBr, pellet, cm-1): 3456, 2985, 2893, 2237, 1607, 1573, 1417, 1284, 1072, 941, 832, 727, 586, 529. EI-MS m/z (rel, int): 232.09 (M+, 21), 217.16 (24), 141.25 (100), 73.08 (51).

***Spectroscopic data for 2-(4-((4-(pentyloxy)phenyl)ethynyl)phenyl)-1,3-dioxolane***

white crystal, yield 85%; m.p. 93.2 °C. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 7.88-7.81 (d, *J* = 7.8 Hz, 2H), 7.64-7.62 (d, *J* = 7.7 Hz, 2H), 7.48-7.44 (d, *J* = 7.9 Hz, 2H), 6.89-6.87 (d, *J* = 7.6 Hz, 2H), 6.06 (s, 1H), 4.20-4.01 (m, 4H), 3.99-3.96 (t, *J* = 6.9 Hz, 2H), 1.86-1.74 (m, 2H), 1.45-1.37 (m, 4H), 0.95-0.86 (t, *J* = 7.1Hz, 3H). IR (KBr, pellet, cm-1): 3032, 2950, 2850, 2356, 2226, 1689, 1603, 1518, 1389, 1257, 1086, 828, 780, 526. EI-MS m/z (rel, int): 336.74 (M+, 8), 321.41 (100), 281.21 (19), 207.13 (16), 83.13 (13) .

***Spectroscopic data for 4-((4-(pentyloxy)phenyl)ethynyl)benzaldehyde***

White crystal, yield 89%; m.p. 98.4 °C. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 10.11 (s, 1H), 7.87-7.81 (d, *J* = 8.3 Hz, 2H), 7.66-7.61 (d, *J* = 9.8 Hz, 2H), 7.49-7.43 (d, *J* = 8.7 Hz, 2H), 6.97-6.85 (d, *J* = 9.6 Hz, 2H), 3.99-3.93 (t, *J* = 5.4 Hz, 2H), 1.86-1.74 (m, 2H), 1.34-1.22 (m, 4H), 0.95-0.86 (t, *J* = 7.91 Hz, 3H). IR (KBr, pellet, cm-1): 3032, 2956, 2864, 2363, 2211, 1694, 1603, 1511, 1389, 1237, 1086, 842, 795, 538. EI-MS m/z (rel, int): 291.41 (M+, 31), 207.17 (100), 84.05 (59), 63.98 (19).

***Spectroscopic data for 2-(4-((4-(alkoxy)phenyl)ethynyl)phenyl)-1H-benzimidazole (nPEPx)***

**5PEPH:** White crystal, yield 16%; m.p. 258.9 °C. 1H-NMR (400 MHz, DMSO-d6, TMS) δ (ppm) 12.91 (s, 1H), 7.87-7.81 (m, 1H), 7.77-7.73 (d, *J* = 7.78 Hz, 2H), 7.66-7.61 (d, *J* = 10.3 Hz, 2H), 7.49-7.43 (d, *J* = 7.47 Hz, 2H), 7.41-7.37 (m, 1H), 7.35-7.30 (m, 2H), 6.97-6.85 (d, *J* = 9.37 Hz, 2H), 3.99-3.93 (t, *J* = 5.84 Hz, 2H), 1.86-1.74 (m, 2H), 1.45-1.37 (m, 4H), 0.95-0.86 (t, *J* = 7.91 Hz, 3H). IR (KBr, pellet, cm-1): 3408, 3057, 2946, 2808, 2224, 1742, 1591, 1522, 1454, 1380, 1284, 1177, 1108, 1008, 923，849, 745, 597, 529. MALDI-TOF-MS m/z (rel. int): calc 380.19. Found: 381.32[M+H]+.

**6PEPH:** White crystal, yield 16%; m.p. 248.8 °C. 1H-NMR (400 MHz, DMSO-*d6*, TMS) δ (ppm) 12.82 (s, 1H), 7.84-7.82 (m, 1H), 7.78-7.73 (d, *J* = 7.30 Hz, 2H), 7.67-7.64 (d, *J* = 8.72 Hz, 2H), 7.53-7.44 (m, 2H), 7.41-7.32 (m, 1H), 7.35-7.26 (m, 2H), 6.94-6.86 (d, *J* = 9.47 Hz, 2H), 3.99-3.95 (t, *J* = 7.06 Hz, 2H), 1.80-1.74 (m, 2H), 1.34-1.25 (m, 6H), 0.93-0.86 (t, *J* = 65.21 Hz, 3H).IR (KBr, pellet, cm-1): 3418, 3029, 2909, 2862, 2207, 1603, 1537, 1465, 1373, 1242, 1184, 1017, 928, 833, 735, 601,532. MALDI-TOF-MS m/z (rel. int): calc 394.20. Found: 394.62.

**7PEPH:** White crystal, yield 16%; m.p. 255.2 °C. 1H-NMR (400 MHz, DMSO-*d6*, TMS) δ (ppm) 12.95 (s, 1H), 7.89-7.81 (m, 1H), 7.80-7.72 (d, *J* = 7.32 Hz, 2H), 7.70-7.62 (d, *J* = 6.52 Hz, 2H), 7.56-7.47 (m, 2H), 7.37-7.33 (m, 2H), 7.29-7.25 (m, 1H), 6.95-6.87 (d, *J* = 8.84 Hz, 2H), 3.99-3.94 (t, *J* = 6.52 Hz, 2H), 1.89-1.74 (m, 2H), 1.32-1.23 (m, 8H), 0.89-0.84 (t, *J* = 7.88 Hz, 3H).IR (KBr, pellet, cm-1): 3449, 3051, 2926, 2848, 2217, 1600, 1502, 1464, 1240, 1174, 1120, 1005, 843, 737, 609, 529. MALDI-TOF-MS m/z (rel. int): calc 408.22. Found: 409.03 [M+H]+.

**8PEPH:** White crystal, yield 16%; m.p. 242.0 °C. 1H-NMR (400 MHz, DMSO-*d6*, TMS) δ (ppm) 12.90 (s, 1H), 7.87-7.83 (m, 1H), 7.78-7.72 (m, 2H), 7.72-7.69 (m, 2H), 7.50-7.45 (m, 2H), 7.43-7.37 (m, 1H), 7.36-7.32 (m, 2H), 6.94-6.84 (d, *J* = 7.8 Hz, 2H), 3.97-3.93 (t, *J* = 8.5 Hz, 2H), 1.88-1.74 (m, 2H), 1.53-1.38 (m, 10H), 0.94-0.92 (t, *J* = 7.03 Hz, 3H). IR (KBr, pellet, cm-1): 3418, 3046, 2934, 2862, 2214, 1600, 1504, 1464, 1376, 1240, 1105, 1008, 833, 745, 601, 537. MALDI-TOF-MS m/z (rel. int): calc 422.24. Found: 423.53 [M+H]+.

**9PEPH:** White crystal, yield 16%; m.p. 240.8 °C. 1H-NMR (400 MHz, DMSO-*d6*, TMS) δ (ppm) 12.91 (s, 1H), 7.81-7.79 (m, 1H), 7.78-7.74 (m, 2H), 7.72-7.67 (m, 2H), 7.54-7.46 (m, 2H), 7.41-7.37 (m, 2H), 7.36-7.32 (m, 1H), 6.90-6.86 (d, *J* = 7.14 Hz, 2H), 3.98-3.94 (t, *J* = 8.25 Hz, 2H), 1.86-1.75 (m, 2H), 1.53-1.31 (m, 12H), 0.94-0.92 (t, *J* = 7.32 Hz, 3H). IR (KBr, pellet, cm-1): 3418, 3037, 2932, 2858, 2215, 1600, 1512, 1483, 1376, 1261, 1112, 1008, 833, 745, 593, 531. MALDI-TOF-MS m/z (rel. int): calc 436.25. Found: 437.67 [M+H]+.

**10PEPH**: White crystal, yield 16%; m.p. 194.8 °C. 1H-NMR (400 MHz, DMSO-*d6*, TMS) δ (ppm) 12.27 (s, 1H), 7.86-7.81 (m, 1H), 7.80-7.74 (d, *J* = 7.3 Hz, 2H), 7.72-7.67 (m, 2H), 7.50-7.47 (m, 2H), 7.41-7.37 (m, 2H), 7.32-7.29 (m, 1H), 6.90-6.87 (d, *J* = 7.88 Hz, 2H), 3.97-3.94 (t, *J* = 8.25 Hz, 2H), 1.88-1.74 (m, 2H), 1.53-1.30 (m, 14H), 0.94-0.89 (t, *J* = 7.23 Hz, 3H). IR (KBr, pellet, cm-1): 3460, 3022, 2931, 2854, 2207, 1603, 1504, 1464, 1367, 1249, 1108, 1001, 841, 746, 593, 537. MALDI-TOF-MS m/z (rel. int): calc 450.27. Found: 451.32 [M+H]+.

**11PEPH:** White crystal, yield 16%; m.p. 175.4 °C. 1H-NMR (400 MHz, DMSO-*d6*, TMS) δ (ppm) 12.97 (s, 1H), 7.99-7.93 (m, 1H), 7.86-7.83 (m, 2H), 7.64-7.60 (d, *J* = 6.52 Hz, 2H), 7.54-7.48 (m, 2H), 7.43-7.35 (m, 2H), 7.29-7.26 (m, 1H), 6.97-6.83 (d, *J* = 8.64 Hz, 2H), 4.03-3.92 (t, *J* = 6.65 Hz, 2H), 1.89-1.72 (m, 2H), 1.51-1.32 (m, 16H), 0.88-0.84 (t, *J* = 6.88Hz, 3H). IR (KBr, pellet, cm-1): 3428, 3038, 2927, 2855, 2206, 1601, 1512, 1474, 1384, 1247, 1113, 1017, 841, 729, 570, 522. MALDI-TOF-MS m/z (rel. int): calc 464.28. Found: 464.57.

**12PEPH:** White crystal, yield 16%; m.p. 156.3 °C. 1H-NMR (400 MHz, DMSO-*d6*, TMS) δ (ppm) 12,75(s, 1H), 7.98-7.92 (m, 1H), 7.86-7.83 (m, 1H), 7.65-7.59 (m, 2H), 7.54-7.49 (m, 2H), 7.47-7.41 (m, 2H), 7.15-7.12 (m, 1H), 6.92-6.89 (d, *J* = 10.60 Hz, 2H), 4.02-3.96 (t, *J* = 7.57 Hz, 2H), 1.84-1.76 (m, 2H), 1.43-1.36 (m, 18H), 0.94-0.92 (t, *J* = 6.09 Hz, 3H). IR (KBr, pellet, cm-1): 3447, 3027, 2926, 2865, 2217, 1601, 1529, 1477, 1384, 1243, 1105, 1008, 841, 737, 596, 532. MALDI-TOF-MS m/z (rel. int): calc 478.30. Found: 479.54 [M+H]+.

**5PEPM:** Yellow crystal, yield 14%; m.p. 220.7 °C. 1H-NMR (400 MHz, DMSO-*d6*, TMS) δ (ppm) 12.84 (s, 1H), 7.75-7.68 (m, 2H), 7.66-7.61 (m, 2H), 7.49-7.38 (m, 3H), 7.29-7.23 (m, 1H), 7.21-7.17 (m, 1H), 6.89-6.81 (d, *J* = 8.54 Hz, 2H), 3.98-3.89 (t, *J* = 4.16 Hz, 2H), 2.50 (s, 3H), 1.84-1.76 (m, 2H), 1.46-1.28 (m, 4H), 0.97-0.86 (t, *J* = 5.81 Hz, 3H). IR (KBr, pellet, cm-1): 3414, 3027, 2929, 2862, 2326, 1598, 1502，1458, 1386, 1242, 1117, 1026, 837,741, 598, 528. MALDI-TOF-MS m/z (rel. int): calc 394.20. Found: 395.39 [M+H]+.

**6PEPM:** Yellow crystal, yield 14%; m.p. 218.2 °C. 1H-NMR (400 MHz, DMSO-*d6*,TMS) δ (ppm) 12.78 (s, 1H), 7.77-7.69 (m, 2H), 7.67-7.61 (m, 2H), 7.49-7.44 (d, *J* = 8.36 Hz, 2H),7.29-7.24 (m, 1H), 7.17-7.11 (m, 2H), 6.94-6.88 (d, *J* = 9.86 Hz, 2H), 3.99-3.94 (t, *J* = 6.70 Hz, 2H), 2.53 (s, 3H), 1.80-1.73 (m, 2H), 1.38-1.25 (m, 6H), 0.92-0.86 (t, *J* = 6.36 Hz, 3H). IR (KBr, pellet, cm-1): 3423, 3029, 2928, 2862, 2357, 1601, 1513, 1459, 1374, 1237, 1177, 1120, 1024, 841, 724,593, 529. MALDI-TOF-MS m/z (rel. int): calc 408.22. Found: 409.13 [M+H]+.

**7PEPM:** Yellow crystal, yield 14%; m.p. 218.8 °C. 1H-NMR (400 MHz, DMSO-*d6*, TMS) δ (ppm) 12.72 (s, 1H), 7.75-7.72 (m, 2H), 7.70-7.68 (m, 1H), 7.64-7.56 (m, 2H), 7.48-7.46 (m, 2H), 7.17-7.11 (m, 2H), 6.88-6.87 (d, *J* = 9.24 Hz, 2H), 3.97-3.95 (t, *J* = 7.83 Hz, 2H), 2.52 (s, 3H), 1.86-1.74 (m, 2H), 1.49-1.31 (m, 8H), 0.94-0.92 (t, *J* = 7.73 Hz, 3H). IR (KBr, pellet, cm-1): 3410, 3028, 2962, 2857, 2207, 1603, 1514, 1464, 1384, 1267, 1177, 1011, 841, 797, 587, 529. MALDI-TOF-MS m/z (rel. int): calc 422.24. Found: 422.49 [M+H]+.

**8PEPM:** Yellow crystal, yield 14%;m.p. 202.6 °C. 1H-NMR (400 MHz, DMSO-*d6*, TMS) δ (ppm) 12.75 (s, 1H), 7.82 (m, 2H), 7.66-7.62 (m, 1H), 7.56-7.54 (m, 2H), 7.51-7.49 (m, 2H), 7.41-7.30 (m, 2H), 6.89-6.87 (d, *J* = 8.60 Hz, 2H), 3.99-3.95 (t, *J* = 6.20 Hz, 2H), 2.52-2.50 (s, 3H), 1.83-1.76 (m, 2H), 1.48-1.34 (m, 10H), 0.93-0.91 (t, *J* = 6.06 Hz, 3H). IR (KBr, pellet, cm-1): 3428, 3027, 2926, 2872, 2218, 1600, 1508, 1458, 1378, 1251, 1117, 1009, 833, 727, 593, 537. MALDI-TOF-MS m/z (rel. int): calc 436.25. Found: 437.37 [M+H]+.

**9PEPM:** Yellow crystal, yield 14%; m.p. 195.0 °C. 1H-NMR (400 MHz, DMSO-*d6*, TMS) δ (ppm) 12.72 (s, 1H), 7.71-7.68 (m, 2H), 7.66-7.63 (m, 1H), 7.55-7.52 (m, 2H), 7.51-7.47 (m, 2H), 7.18-7.13 (m, 2H), 6.88-6.85 (d, *J* = 9.6 Hz, 2H), 3.98-3.94 (t, *J* = 6.71 Hz, 2H), 2.52 (s, 3H), 1.83-1.74 (m, 2H), 1.49-1.35 (m, 12H), 0.94-0.92 (t, *J* = 6.1 Hz, 3H). IR (KBr, pellet, cm-1): 3029, 2928, 2865, 2227, 1600, 1512, 1469, 1374, 1251, 1105, 1021, 840, 713, 596, 529. MALDI-TOF-MS m/z (rel. int): calc 450.27. Found: 451.52 [M+H]+.

**10PEPM:** Yellow crystal, yield 14%; m.p. 186.7 °C. 1H-NMR (400 MHz, DMSO-*d6*, TMS) δ (ppm) 12.58 (s, 1H), 7.79-7.70 (m, 2H), 7.66-7.63 (m, 1H), 7.57-7.52 (m, 2H), 7.51-7.45 (m, 2H), 7.42-7.30 (m, 2H), 6.89-6.85 (d, *J* = 9.62 Hz, 2H), 3.98-3.95 (t, *J* = 6.8 Hz, 2H), 2.49 (s, 3H), 1.82-1.76 (m, 2H), 1.49-1.32 (m, 14H), 0.89-0.82 (t, *J* = 9.5 Hz, 3H). IR (KBr, pellet, cm-1): 3449, 3025, 2921, 2851, 2203, 1601, 1504, 1472, 1371, 1249, 1177, 1024, 841, 736, 598, 537. MALDI-TOF-MS m/z (rel. Int): calc 464.28. Found: 463.53 [M+H]+.

**11PEPM:** Yellow crystal, yield 14%; m.p. 179.2 °C. 1H-NMR (400 MHz, DMSO-*d6*, TMS) δ (ppm) 12.76 (s, 1H), 7.77-7.72 (m, 2H), 7.62-7.59 (m, 1H), 7.57-7.53 (m, 2H), 7.52-7.49 (m, 2H), 7.28-7.23 (m, 2H), 7.19-7.11(m, 2H), 6.89-6.87 (d, *J* = 10.9 Hz, 2H), 3.98-3.95 (t, *J* = 5.4 Hz, 2H), 2.53-2.50 (s, 3H), 1.81-1.76 (m, 2H), 1.48-1.27 (m, 16H), 0.93-0.90 (t, *J* = 7.3 Hz, 3H). IR (KBr, pellet, cm-1): 3416, 3097, 2932, 2855, 2221, 1606, 1519, 1469, 1354, 1244, 1113, 1025, 837, 726, 592, 528. MALDI-TOF-MS m/z (rel. Int): calc 478.30. Found: 479.45 [M+H]+.

**12PEPM:** Yellow crystal, yield 14%; m.p. 169.3 °C. 1H-NMR (400 MHz, DMSO-*d6*, TMS) δ (ppm) 12.61 (s, 1H), 7.98-7.89 (m, 2H), 7.62-7.59 (m, 1H), 7.64-7.60 (m, 2H), 7.53-7.48 (m, 2H), 7.39-7.34 (m, 2H), 7.23-7.19 (m, 2H), 6.96-6.88 (d, *J* = 8.27 Hz, 2H), 4.07-3.95 (t, *J* = 6.81 Hz, 2H), 2.52 (s, 3H), 1.86-1.73 (m, 2H), 1.51-1.32 (m, 18H), 0.99-0.92 (t, *J* = 6.98 Hz, 3H). IR (KBr, pellet, cm-1): 3428, 3038, 2926, 2855, 2215, 1600, 1504, 1456, 1372, 1242, 1145, 1021, 834, 726, 585, 532. MALDI-TOF-MS m/z (rel. int): calc 492.31. Found: 493.13 [M+H]+.

**5PEPN:** Yellow crystal, yield 11%; m.p. 259.4 °C. 1H-NMR (400 MHz, DMSO-*d6*, TMS) δ (ppm) 13.61 (s, 1H), 8.71-8.67 (m, 1H)，8.37-8.34 (m, 1H), 8.26-8.21 (m, 1H), 7.86-7.83 (d, *J* = 8.59, 1H), 7.81-7.75 (m, 2H), 7.70-7.66 (d, *J* = 7.32 Hz, 2H), 7.49-7.46 ( d, *J* = 8.64 Hz, 2H), 6.90-6.86 (d, *J* = 9.27 Hz, 2H), 4.02-3.97 (t, *J* = 6.76 Hz, 2H), 1.81-1.76 (m, 2 H), 1.45-1.38 (m, 4H), 0.95-0.91 (t, *J* = 7.64 Hz, 3H). IR (KBr, pellet, cm-1): 3418, 3084, 2933, 2864, 2302, 1599, 1516, 1461, 1342, 1176, 1013, 823, 734, 598, 536. MALDI-TOF-MS m/z (rel. int): calc 425.17. Found: 426.53 [M+H]+.

**6PEPN:** Yellow crystal, yield 11%; m.p. 234.2 °C. 1H-NMR (400 MHz, DMSO-*d6*, TMS) δ (ppm) 13.46 (s, 1H), 8.34 (m, 1H), 8.20-8.16 (m, 2H), 7.91-7.83 (m, 3H), 7.71-7.68 (m, 1H), 7.50-7.46 (d, *J* = 7.45 Hz, 2H), 6.96-6.89 (d, *J* = 10.35 Hz, 2H), 4.05-3.98 (t, *J* = 5.54 Hz, 2H), 1.81-1.78 (m, 2H), 1.35-1.27 (m, 6H), 0.91-0.86 (t, *J* = 7.81 Hz, 3H). IR (KBr, pellet, cm-1): 3380, 3097, 2941, 2870, 2214, 1602, 1512, 1464, 1332, 1248, 1177, 1132, 1034, 815, 732, 594, 527. MALDI-TOF-MS m/z (rel. int): calc 439.19. Found: 440.32 [M+H]+.

**7PEPN:** Yellow crystal, yield 11%; m.p. 232.5 °C. 1H-NMR (400 MHz, DMSO-*d6*, TMS) δ (ppm) 13.52 (s, 1H), 8.43-8.34 (m, 1H)，8.29-8.23 (m, 1H), 7.85-7.82 (m, 2H), 7.71-7.65 (m, 2H), 7.52-7.43 (m, 2H), 7.16-7.08 (m, 1H), 6.88-6.83 (d, *J* = 8.53 Hz, 2H), 4.07-3.97 (t, *J* = 8.46 Hz, 2H), 1.81-1.77 (m, 2 H), 1.47-1.36 (m, 8H), 0.94-0.89 (t, *J* = 7.83 Hz, 3H). IR (KBr, pellet, cm-1): 3407, 3094, 2934, 2862, 2366, 2194, 1598, 1520, 1471, 1337, 1237, 1138, 1048, 819, 743, 597, 528. MALDI-TOF-MS m/z (rel. int): calc 453.21. Found: 453.09 [M+H]+.

**8PEPN:** Yellow crystal, yield 11%; m.p. 231.3 °C. 1H-NMR (400 MHz, DMSO-*d6*, TMS) δ (ppm) 13.58 (s, 1H), 8.40-8.36 (m, 1H)，7.84-7.82 (m, 1H), 7.69-7.67 (m, 2H), 7.59-7.52 (m, 2H), 7.49-7.47 (m, 2H), 7.15-7.12 (m, 1H), 6.87-6.85 (d, *J* = 10.1 Hz, 2H), 3.99-3.97 (t, *J* = 6.22 Hz, 2H), 1.81-1.77 (m, 2H), 1.47-1.36 (m, 10H), 0.94-0.92 (t, *J* = 8.1 Hz, 3H). IR (KBr, pellet, cm-1): 3398, 3078, 2929, 2864, 2213, 1600, 1504, 1464, 1332, 1249, 1128, 1031, 829, 737, 602, 534. MALDI-TOF-MS m/z (rel. int): calc 467.22. Found: 468.53 [M+H]+.

**9PEPN:** Yellow crystal, yield 11%; m.p. 226.9 °C. 1H-NMR (400 MHz, DMSO-*d6*, TMS) δ (ppm) 13.4 (s, 1H), 8.40-8.34 (m, 1H)，8.26-8.23 (m, 2H), 7.85-7.83 (m, 3H), 7.81-7.73 (m, 1H), 7.68-7.65 (d, *J* = 7.90 Hz ,2H), 7.48-7.43 (m, 2H), 6.88-6.85 (d, *J* = 8.60 Hz, 2H), 4.05-3.98 (t, *J* = 8.50 Hz, 2H), 1.81-1.74 (m, 2H), 1.36-1.27 (m, 12H), 0.94-0.88 (t, *J* = 8.61 Hz, 3H). IR (KBr, pellet, cm-1): 3396, 3054, 2926, 2846, 2214, 1600, 1512, 1472, 1336, 1249, 1177, 1008, 833, 737, 609, 529. MALDI-TOF-MS m/z (rel. int): calc 481.24. Found: 482.37 [M+H]+.

**10PEPN:** Yellow crystal, yield 11%; m.p. 218.6 °C. 1H-NMR (400 MHz, DMSO-*d6*, TMS) δ (ppm) 13.39 (s, 1H), 8.73-8.69 (m, 1H)，8.06-7.95 (m, 1H), 7.77-7.70 (m, 2H), 7.59-7.54 (m, 2H),7.45-7.30 (m, 2H), 7.19-7.13 (m, 1H), 6.93-6.88 (d, *J* = 8.76 Hz, 2H), 4.07-3.93 (t, *J* = 7.2 Hz, 2H), 1.86-1.77 (m, 2H), 1.51-1.43 (m, 14H), 0.97-0.89 (t, *J* = 8.98 Hz, 3H). IR (KBr, pellet, cm-1): 3386, 3101, 2927, 2862, 2207, 1600, 1512, 1464, 1337, 1240, 1128, 1008, 826, 737, 593, 530. MALDI-TOF-MS m/z (rel. int): calc 495.25. Found: 496.13 [M+H]+.

**11PEPN:** Yellow crystal, yield 11%; m.p. 134.9 °C. 1H-NMR (400 MHz, DMSO-*d6*, TMS) δ (ppm) 13.45 (s, 1H), 8.39-8.28 (m, 1H)，8.26-8.22 (m, 1H), 7.87-7.78 (m, 2H), 7.65-7.57 (m, 2H), 7.52-7.40 (m, 2H), 7.16-7.12 (m, 1H), 6.91-6.86 (d, *J* = 7.26 Hz, 2H), 4.06-3.95 (t, *J* = 8.4 Hz, 2H), 1.88-1.77 (m, 2H), 1.43-1.36 (m, 16H), 0.98-0.92 (t, *J* = 7.6 Hz, 3H). IR (KBr, pellet, cm-1): 3395, 3054, 2910, 2847, 2367, 2207, 1601, 1504, 1464, 1337, 1249, 1169, 1009, 833, 737, 594, 530. MALDI-TOF-MS m/z (rel. int): calc 509.27. Found: 509.57 [M+H]+.

**12PEPN:** Yellow crystal, yield 11%; m.p. 131.3 °C. 1H-NMR (400 MHz, DMSO-*d6*, TMS) δ (ppm) 13.04 (s, 1H), 8.73-8.34 (m, 1H)，8.01-7.95 (m, 1H), 7.77-7.71 (m, 2H), 7.54-7.48 (m, 2H), 7.45-7.38 (m, 2H), 7.16-7.12 (m, 1H), 6.93-6.86 (d, *J* = 8.61 Hz, 2H), 4.07-3.94 (t, *J* = 7.65 Hz, 2H), 1.86-1.77 (m, 2 H), 1.51-1.36 (m, 18H), 0.99-0.92 (t, *J* = 8.98 Hz, 3H). IR (KBr, pellet, cm-1): 3396, 3094, 2927, 2855, 2359, 2207, 1601, 1512, 1337, 1240, 1128, 1033, 826, 737, 594, 530. MALDI-TOF-MS m/z (rel. int): calc 523.28. Found: 524.49 [M+H]+.

***Spectroscopic data for 2-[4-[2-​[4-​(*alkoxy*)​phenyl]​ethynyl]phenyl]-1-methyl-1H-1,3 -benzimidazole (nPEPMx)***

**5PEPMH:** White crystal, yield 53%; m.p. 145.4 °C. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 7.84-7.81 (m, 1H), 7.77-7.75 (d, *J* = 7.18 Hz, 2H), 7.66-7.64 (d, *J* = 9.3 Hz, 2H), 7.49-7.46 (d, *J* = 7.18 Hz, 2H), 7.41-7.38 (m, 1H), 7.34-7.30 (m, 2H), 6.90-6.85 (d, *J* = 9.3 Hz, 2H), 3.99-3.95 (t, *J* = 5.88 Hz, 2H), 3.88 (s, 3H), 1.82-1.74 (m, 2H), 1.45-1.34 (m, 4H), 0.95-0.90 (t, *J*= 7.91 Hz, 3H). IR (KBr, pellet, cm-1): 3046, 2934, 2854, 2214, 1768, 1591, 1512，1464, 1384, 1240, 1177, 1120, 1008, 921，841, 745, 601, 529. MALDI-TOF-MS m/z (rel. int): calc 394.20. Found: 395.39 [M+ H]+. EA: Calc. for C27H26N2O: C: 82.19, H: 6.60, N: 7.10; Found: C: 82.29, H: 6.36, N: 6.98.

**6PEPMH:** White crystal, yield 53%; m.p. 126.0 °C. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 7.84-7.80 (m, 1H), 7.78-7.73 (d, *J* = 7.56, 2H), 7.67-7.62 (d, *J* = 9.02, 2H), 7.50-7.44 (m, 2H), 7.41-7.37 (m, 1H), 7.35-7.27 (m, 2H), 6.94-6.86 (d, *J* = 10.47 Hz, 2H), 3.99-3.95 (t, *J* = 6.66 Hz, 2H), 3.88 (s, 3H), 1.80-1.73 (m, 2H), 1.38-1.25 (m, 6H), 0.91-0.86 (t, *J* = 5.21 Hz, 3H). IR (KBr, pellet, cm-1): 3046, 2942, 2862, 2207, 1608, 1504, 1464, 1392, 1240, 1184, 1008, 928, 833, 745, 601, 529. MALDI-TOF-MS m/z (rel. int): calc 408.22. Found: 409.70 [M+H]+. EA: Calc. for C28H28N2O: C: 82.31, H: 6.86, N: 6.86; Found: C: 83.10, H: 7.12, N: 6.85.

**7PEPMH:** White crystal, yield 53%; m.p. 118.2 °C. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 7.87-7.81 (m, 1H), 7.80-7.75 (d, *J* = 7.3 Hz, 2H), 7.70-7.63 (d, *J* = 6.52 Hz, 2H), 7.54-7.46 (m, 2H), 7.36-7.32 (m, 2H), 7.29-7.26 (m, 1H), 6.95-6.86 (d, *J* = 8.64 Hz, 2H), 3.99-3.95 (t, *J* = 6.56 Hz, 2H), 3.88 (s, 3H), 1.83-1.74 (m, 2H), 1.32-1.23 (m, 8H), 0.91-0.84 (t, *J* = 7.83 Hz, 3H). IR (KBr, pellet, cm-1): 3061, 2926, 2854, 2207, 1600, 1512, 1440, 1240, 1177, 1120, 1025, 833, 737, 609, 529. EA: Calc. for C29H30N2O: C: 82.42, H: 7.10, N: 6.63; Found: C: 82.56, H: 6.94, N: 6.50.

**8PEPMH:** White crystal, yield 53%; m.p. 120.0 °C. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 7.85-7.79 (m, 1H), 7.78-7.72 (m, 2H), 7.68-7.72 (m, 2H), 7.50-7.45 (m, 2H), 7.41-7.37 (m, 1H), 7.36-7.28 (m, 2H), 6.90-6.84 (d, *J* = 7.81 Hz, 2H), 3.97-3.95 (t, *J* = 8.25 Hz, 2H), 3.89-3.86 (s, 3H), 1.87-1.74 (m, 2H), 1.53-1.30 (m, 10H), 0.94-0.92 (t, *J* = 7.23 Hz, 3H). IR (KBr, pellet, cm-1): 3046, 2934, 2862, 2214, 1600, 1504, 1464, 1376, 1240, 1105, 1008, 833, 745, 601, 537. MALDI-TOF-MS m/z (rel. int): calc 436.25. Found: 437.06 [M+H]+. EA: Calc. for C30H32N2O: C: 82.52, H: 7.34, N: 6.42; Found: C: 81.84, H: 7.32, N: 6.23.

**9PEPMH:** White crystal, yield 53%; m.p. 112.7 °C. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 7.87-7.79 (m, 1H), 7.78-7.75 (m, 2H), 7.72-7.67 (m, 2H), 7.50-7.46 (m, 2H), 7.41-7.36 (m, 2H), 7.36-7.29 (m, 1H), 6.90-6.86 (d, *J* = 7.10 Hz, 2H), 3.98-3.95 (t, *J* = 8.25 Hz, 2H), 3.90-3.88 (s, 3H), 1.86-1.74 (m, 2H), 1.53-1.30 (m, 12H), 0.94-0.92 (t, *J* = 7.23Hz, 3H). IR (KBr, pellet, cm-1): 3061, 2926, 2854, 2215, 1600, 1512, 1456, 1376, 1249, 1112, 1008, 833, 745, 593, 529. MALDI-TOF-MS m/z (rel. int): calc 450.27. Found: 451.78 [M+H]+. EA: Calc. for C31H34N2O: C: 82.62, H: 7.55, N: 6.22; Found: C: 83.43, H: 7.38, N: 6.17.

**10PEPMH:** White crystal, yield 53%; m.p. 117.0 °C. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 7.85-7.81 (m, 1H), 7.80-7.76 (d, *J*= 7.3 Hz, 2H), 7.72-7.67 (m, 2H), 7.50-7.46 (m, 2H), 7.41-7.37 (m, 2H), 7.36-7.29 (m, 1H), 6.90-6.86 (d, *J* = 7.81 Hz, 2H), 3.97-3.95 (t, *J* = 8.25 Hz, 2H), 3.88-3.86 (s, 3H), 1.88-1.74 (m, 2H), 1.53-1.30 (m, 14H), 0.94-0.87 (t, *J* = 7.23 Hz, 3H). IR (KBr, pellet, cm-1): 3054, 2926, 2854, 2207, 1601, 1504, 1464, 1384, 1249, 1113, 1001, 841, 746, 593, 537. EA: Calc. for C32H36N2O: C: 82.71, H: 7.75, N: 6.03; Found: C: 82.66, H: 7.56, N: 5.92.

**11PEPMH:** White crystal, yield 53%; m.p. 111.6 °C. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 7.99-7.93 (m, 1H), 7.86-7.83 (m, 2H), 7.64-7.60 (d, *J* = 6.52 Hz, 2H), 7.54-7.48 (m, 2H), 7.43-7.35 (m, 2H), 7.29-7.26 (m, 1H), 6.97-6.83 (d, *J* = 8.64 Hz, 2H), 4.03-3.92 (t, *J* = 6.65 Hz, 2H), 3.88-3.86 (s, 3H), 1.89-1.72 (m, 2H), 1.51-1.32 (m, 16H), 0.88-0.84 (t, *J* = 6.88 Hz, 3H). IR (KBr, pellet, cm-1): 3046, 2927, 2855, 2215, 1601, 1512, 1464, 1384, 1249, 1113, 1017, 841, 729, 570, 522. MALDI-TOF-MS m/z (rel. int): calc 478.30. Found: 479.54 [M+H]+. EA: Calc. for C33H38N2O: C: 87.79, H: 7.94, N: 5.85; Found: C: 87.36, H: 7.85, N: 5.93.

**12PEPMH:** White crystal, yield 53%; m.p. 109.8 °C. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 8.00-7.92 (m, 1H)，7.86-7.82 (m, 1H), 7.66-7.59 (m, 2H), 7.53-7.49 (m, 2H), 7.47-7.44 (m, 2H), 7.15-7.12 (m, 1H), 6.92-6.85 (d, *J* = 10.1 Hz, 2H), 4.02-3.97 (t, *J* = 6.58 Hz, 2H), 3.96-3.93 (s, 3H), 1.84-1.77(m, 2 H), 1.41-1.36 (m, 18H), 0.94-0.92 (t, *J* = 6.85 Hz, 3H). IR (KBr, pellet, cm-1): 3054, 2927, 2855, 2215, 1601, 1504, 1457, 1384, 1240, 1105, 1008, 841, 737, 593, 529. EA: Calc. for C34H40N2O: C: 82.87, H: 8.12, N: 5.69; Found: C: 82.79, H: 8.12, N: 5.61.

**5PEPMM:** Yellow crystal, yield 53%; m.p. 128.5 °C. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 7.77-7.68 (m, 2H), 7.66-7.59 (m, 2H), 7.49-7.35 (m, 3H), 7.29-7.21 (m,1H), 7.19-7.17 (m, 1H), 6.89-6.79 (d, *J* = 8.45 Hz, 2H), 4.00-3.89 (t, *J* = 4.1 Hz, 2H), 3.85 (s, 3H), 2.50 (s, 3H), 1.84-1.70 (m, 2H), 1.46-1.28 (m, 4H), 0.97-0.86 (t, *J* = 5.8 Hz, 3H). IR (KBr, pellet, cm-1): 3026, 2927, 2862, 2326, 1598, 1502, 1458, 1386, 1242, 1117, 1026, 837, 742, 588, 528. MALDI-TOF-MS m/z (rel. int): calc 408.22. Found: 409.84 [M+H]+. EA: Calc. for C28H28N2O: C: 82.31, H: 6.86, N: 6.86; Found: C: 82.53, H: 6.60, N: 6.76.

**6PEPMM:** Yellow crystal, yield 53%; m.p. 103.5 °C. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 7.77-7.68 (m, 2H), 7.66-7.59 (m, 2H), 7.49-7.44 (d, *J* = 8.39 Hz, 2H), 7.29-7.24 (m, 1H), 7.19-7.11 (m, 2H), 6.94-6.85 (d, *J* = 9.34 Hz, 2H), 3.99-3.94 (t, *J* = 6.43 Hz, 2H), 3.85 (s, 3H), 2.53 (s, 3H), 1.80-1.73 (m, 2H), 1.38-1.25 (m, 6H), 0.92-0.86 (t, *J* = 5.66 Hz, 3H). IR (KBr, pellet, cm-1): 3029, 2918, 2862, 2359, 1608, 1504, 1456, 1384, 1240, 1177, 1120, 1034, 841, 593, 529. MALDI-TOF-MS m/z (rel. int): calc 422.24. Found: 422.13. EA: Calc. for C29H30N2O: C: 82.42, H: 7.10, N: 6.63; Found: C: 81.50, H: 7.44, N: 6.40.

**7PEPMM:** Yellow crystal, yield 53%; m.p. 118.9 °C. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 7.75-7.72 (m, 2H), 7.70-7.68 (m, 1H), 7.64-7.59 (m, 2H), 7.48-7.46 (m, 2H), 7.17-7.12 (m, 2H), 6.88-6.86 (d, *J* = 9.24 Hz, 2H), 3.97-3.95 (t, *J* = 7.83 Hz, 2H), 3.88-3.81 (s, 3H), 2.52-2.50 (s, 3H), 1.86-1.74 (m, 2H), 1.49-1.32 (m, 8H), 0.94-0.92 (t, *J* = 7.70 Hz, 3H). IR (KBr, pellet, cm-1): 3038, 2926, 2862, 2207, 1600, 1504, 1464, 1384, 1249, 1177, 1008, 841, 793, 593, 529. MALDI-TOF-MS m/z (rel. int): calc 436.25. Found: 437.28 [M+H]+. EA: Calc. for C30H32N2O: C: 82.52, H: 7.34, N: 6.42; Found: C: 83.85, H: 7.49, N: 6.43.

**8PEPMM:** Yellow crystal, yield 53%; m.p. 116.1 °C. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 7.82 (m, 2H), 7.66-7.62 (m, 1H), 7.56-7.54 (m, 2H), 7.51-7.49 (m, 2H), 7.41-7.30 (m, 2H), 6.89-6.87 (d, *J* = 8.60 Hz, 2H), 3.99-3.95 (t, *J* = 6.20 Hz, 2H), 3.90-3.88 (s, 3H), 2.52-2.50 (s, 3H),1.83-1.76 (m, 2H), 1.48-1.34 (m, 10H), 0.93-0.91 (t, *J* = 6.06 Hz, 3H). IR (KBr, pellet, cm-1): 3029, 2926, 2862, 2214, 1600, 1504, 1456, 1376, 1249, 1112, 1017, 833, 737, 593, 537. MALDI-TOF-MS m/z (rel. int): calc 450.27. Found: 451.40 [M+H]+. EA: Calc. for C31H34N2O: C: 82.61, H: 7.55, N: 6.22; Found: C: 80.84, H: 7.56, N: 6.26.

**9PEPMM:** Yellow crystal, yield 53%; m.p. 112.5 °C. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 7.68-7.62 (m, 2H), 7.66-7.62 (m, 1H), 7.55-7.53 (m, 2H), 7.51-7.48 (m, 2H), 7.18-7.13 (m, 2H), 6.88-6.86 (d, *J* = 8.7 Hz, 2H), 3.98-3.95 (t, *J* = 6.7 Hz, 2H), 3.88-3.86 (s, 3H), 2.52 (s, 3H), 1.83-1.76 (m, 2H), 1.49-1.35 (m, 12H), 0.94-0.92 (t, *J* = 6.1 Hz, 3H). IR (KBr, pellet, cm-1): 3029, 2926, 2862, 2207, 1600, 1512, 1464, 1384, 1249, 1105, 1017, 841, 713, 593, 529. EA: Calc. for C32H36N2O: C: 82.71, H: 7.75, N: 6.03; Found: C: 82.83, H: 7.72, N: 5.93.

**10PEPMM:** Yellow crystal, yield 53%; m.p. 110.9 °C. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 7.81-7.77 (m, 2H), 7.66-7.62 (m, 1H), 7.57-7.55 (m, 2H), 7.51-7.49 (m, 2H), 7.42-7.30 (m, 2H), 6.89-6.87 (d, *J* = 10.6 Hz, 2H), 3.98-3.95 (t, *J* = 5.7 Hz, 2H), 3.90-3.88 (s, 3H), 2.52 (s, 3H), 1.82-1.76 (m, 2H), 1.49-1.34 (m, 14H), 0.89-0.80 (t, *J* = 10.15 Hz, 3H) IR (KBr, pellet, cm-1): 3030, 2927, 2855, 2207, 1601, 1504, 1472, 1377, 1249, 1177, 1017, 841, 737, 594, 537. MALDI-TOF-MS m/z (rel. int): calc 478.30. Found: 479.75 [M+H]+. EA: Calc. for C33H38N2O: C: 82.79, H: 7.94, N: 5.85; Found: C: 82.81, H: 7.88, N: 5.96.

**11PEPMM:** Yellow crystal, yield 53%; m.p. 95.6 °C. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 7.77-7.70 (m, 2H), 7.62-7.60 (m, 1H), 7.55-7.53 (m, 2H), 7.51-7.49 (m, 2H), 7.28-7.26 (m, 2H),7.19-7.13 (m, 2H), 6.89-6.87 (d, *J* = 10.7 Hz, 2H), 3.98-3.95 (t, *J* = 5.4 Hz, 2H), 3.88-3.86 (s, 3H), 2.53-2.50 (s, 3H), 1.81-1.76 (m, 2H), 1.48-1.27 (m, 16H), 0.93-0.90 (t, *J* = 6.9 Hz, 3H). IR (KBr, pellet, cm-1): 3039, 2927, 2855, 2215, 1606, 1512, 1472, 1384, 1254, 1105, 1025, 833, 729, 585, 530. EA: Calc. for C34H40N2O: C: 82.87, H: 8.12, N: 5.69; Found: C: 82.91, H: 7.80, N: 5.36.

**12PEPMM:** Yellow crystal, yield 53%; m.p. 94.4 °C. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 7.98-7.89 (m, 2H), 7.62-7.59 (m, 1H), 7.64-7.60 (m, 2H), 7.53-7.48 (m, 2H), 7.39-7.34 (m, 2H), 7.23-7.19 (m, 2H), 6.96-6.88 (d, *J* = 8.27 Hz, 2H), 4.07-3.95 (t, *J* = 6.81 Hz, 2H), 3.88 (s, 3H), 2.52 (s, 3H), 1.86-1.73 (m, 2H), 1.49-1.32 (m, 18H), 0.99-0.92 (t, *J* = 6.98 Hz, 3H). IR (KBr, pellet, cm-1): 3038, 2926, 2855, 2215, 1600, 1504, 1456, 1377, 1249, 1105, 1017, 841, 705, 585, 530. MALDI-TOF-MS m/z (rel. int): calc 506.33. Found: 507.53 [M+H]+. EA: Calc. for C35H42N2O: C: 82.95, H: 8.29, N: 5.53; Found: C: 82.87, H: 8.21, N: 5.27.

**5PEPMN:** Yellow crystal, yield 48%; m.p. 155.8 °C. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 8.71-8.69 (m, 1H)，8.37-8.36 (m, 1H), 8.28-8.21 (m, 1H), 7.86-7.82 (d, *J* = 8.61, 1H), 7.85-7.75 (m, 2H), 7.70-7.66 (d, *J* = 7.22 Hz, 2H), 7.49-7.44 (d, *J* = 8.61 Hz, 2H), 6.90-6.84 (d, *J* = 9.27 Hz, 2H), 3.99-3.97 (t, *J* = 5.69 Hz, 2H), 3.94 (s, 3H), 1.81-1.74 (m, 2 H), 1.45-1.36 (m, 4H), 0.95-0.90 (t, *J* = 7.66 Hz, 3H). IR (KBr, pellet, cm-1): 3076, 2933, 2862, 2306, 1596, 1512，1456, 1342, 1174, 1016, 823, 738, 598, 526. MALDI-TOF-MS m/z (rel. int): calc 439.19. Found: 440.33 [M+H]+. EA: Calc. for C27H25N3O3: C: 73.77, H: 5.69, N: 9.56; Found: C: 73.63, H: 5.49, N: 9.39.

**6PEPMN:** Yellow crystal, yield 48%; m.p. 132.3 °C. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 8.30 (m, 1H)，8.20-8.13 (m, 2H), 7.91-7.77 (m, 3H), 7.74-7.68 (m, 1H), 7.50-7.44 (d, *J* = 8.40 Hz, 2H), 6.96-6.87 (d, *J* = 10.27 Hz, 2H), 4.03-3.98 (t, *J* = 5.90 Hz, 2H), 3.94 (s, 3H), 1.81-1.74 (m, 2H), 1.35-1.27 (m, 6H), 0.91-0.88 (t, *J* = 7.79 Hz, 3H). IR (KBr, pellet, cm-1): 3094, 2934, 2870, 2207, 1600, 1512, 1464, 1336, 1249, 1177, 1128, 1032, 825, 729, 601, 521. MALDI-TOF-MS m/z (rel. int): calc 453.21. Found: 453.48. EA: Calc. for C28H27N3O3: C: 74.14, H: 5.96, N: 9.27; Found: C: 73.31, H: 5.87, N: 9.21.

**7PEPMN:** Yellow crystal, yield 48%; m.p. 131.2 °C. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 8.40-8.34 (m, 1H)，8.26-8.23 (m, 1H), 7.85-7.83 (m, 2H), 7.68-7.65 (m, 2H), 7.48-7.43 (m, 2H), 7.16-7.12 (m, 1H), 6.88-6.86 (d, *J* = 8.61 Hz, 2H), 4.05-3.97 (t, *J* = 7.58 Hz, 2H), 3.97-3.95 (s, 3H), 1.81-1.77 (m, 2H), 1.47-1.36 (m, 8H), 0.94-0.92 (t, *J* = 8.61 Hz, 3H). IR (KBr, pellet, cm-1): 3094, 2934, 2862, 2366, 2199, 1600, 1520, 1464, 1336, 1240, 1128, 1048, 816, 737, 593, 521. MALDI-TOF-MS m/z (rel. int): calc 467.22. Found: 468.55 [M+ H]+. EA: Calc. for C29H29N3O3: C: 74.48, H: 6.21, N: 8.99; Found: C: 74.32, H: 6.18, N: 8.89.

**8PEPMN:** Yellow crystal, yield 48%; m.p. 123.9 °C. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 8.40-8.36 (m, 1H)，7.84-7.82 (m, 1H), 7.69-7.67 (m, 2H), 7.59-7.52 (m, 2H), 7.49-7.47 (m, 2H), 7.15-7.12 (m, 1H), 6.87-6.85 (d, *J* = 10.1 Hz, 2H), 3.99-3.97 (t, *J* = 6.22 Hz, 2H), 3.98-3.95 (s, 3H), 1.81-1.77 (m, 2 H), 1.47-1.36 (m, 10H), 0.94-0.92 (t, *J* = 8.1 Hz, 3H). IR (KBr, pellet, cm-1): 3078, 2926, 2854, 2207, 1600, 1504, 1464, 1336, 1240, 1128, 1025, 825, 737, 593, 529. MALDI-TOF-MS m/z (rel. int): calc 481.24. Found: 482.96 [M+H]+. EA: Calc. for C30H31N3O3: C: 74.81, H: 6.44, N: 8.73; Found: C: 74.74, H: 6.39, N: 8.66.

**9PEPMN:** Yellow crystal, yield 48%; m.p. 108.9 °C. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 8.40-8.34 (m, 1H)，8.26-8.23 (m, 2H), 7.85-7.83 (m, 3H), 7.81-7.73 (m, 1H), 7.68-7.65 (d, *J* = 7.90 Hz, 2H), 7.48-7.43 (m, 2H), 6.88-6.85 (d, *J* = 8.60 Hz, 2H), 4.05-3.98 (t, *J* = 8.50 Hz, 2H), 3.97-3.94 (s, 3H), 1.81-1.74 (m, 2H), 1.36-1.27 (m, 12H), 0.94-0.88 (t, *J* = 8.61 Hz, 3H). IR (KBr, pellet, cm-1): 3054, 2926, 2846, 2214, 1600, 1512, 1472, 1336, 1249, 1177, 1008, 833, 737, 609, 529. MALDI-TOF-MS m/z (rel. int): calc 495.25. Found: 496.60 [M+H]+. EA: Calc. for C31H33N3O3: C: 75.11, H: 6.66, N: 8.48; Found: C: 75.29, H: 6.65, N: 8.34.

**10PEPMN:** Yellow crystal, yield 48%; m.p. 132.7 °C. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 8.73-8.69 (m, 1H), 8.06-7.95 (m, 1H), 7.77-7.70 (m, 2H), 7.59-7.54 (m, 2H), 7.45-7.30 (m, 2H), 7.19-7.13 (m, 1H), 6.93-6.88 (d, *J* = 8.76 Hz, 2H), 4.07-3.93 (t, *J* = 7.2 Hz, 2H), 3.95 (s, 3H), 1.86-1.77 (m, 2H), 1.51-1.43 (m, 14H), 0.97-0.89 (t, *J* = 8.98 Hz, 3H). IR (KBr, pellet, cm-1): 3101, 2927, 2862, 2207, 1600, 1512, 1464, 1337, 1240, 1128, 1008, 826, 737, 593, 530. MALDI-TOF-MS m/z (rel. int): calc 509.27. Found: 510.62 [M+H]+. EA: Calc. for C32H35N3O3: C: 75.40, H: 6.87, N: 8.25; Found: C: 75.61, H: 6.92, N: 8.16.

**11PEPMN:** Yellow crystal, yield 48%; m.p. 109.8 °C. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 8.39-8.28 (m, 1H)，8.26-8.22 (m, 1H), 7.87-7.78 (m, 2H), 7.65-7.57 (m, 2H), 7.50-7.40 (m, 2H), 7.16-7.12 (m, 1H), 6.91-6.86 (d, *J* = 7.26 Hz, 2H), 4.06-3.95 (t, *J* = 8.4 Hz, 2H), 3.92 (s, 3H), 1.88-1.77 (m, 2H), 1.43-1.36 (m, 16H), 0.98-0.92 (t, *J* = 7.6 Hz, 3H). IR (KBr, pellet, cm-1): 3054, 2910, 2847, 2367, 2207, 1601, 1504, 1464, 1337, 1249, 1169, 1009, 833, 737, 594, 530. EA: Calc. for C33H37N3O3: C: 75.67, H: 7.07, N: 8.03; Found: C: 75.70, H: 7.12, N: 7.96.

**12PEPMN:** Yellow crystal, yield 48%; m.p. 108.8 °C. 1H-NMR (400 MHz, CDCl3, TMS) δ (ppm) 8.73-8.34 (m, 1H)，8.01-7.95 (m, 1H), 7.77-7.71 (m, 2H), 7.54-7.48 (m, 2H), 7.45-7.38 (m, 2H), 7.16-7.12 (m, 1H), 6.93-6.86 (d, *J* = 8.61 Hz, 2H), 4.07-3.94 (t, *J* = 7.65 Hz, 2H), 3.95 (s, 3H), 1.86-1.77 (m, 2H), 1.51-1.36 (m, 18H), 0.99-0.92 (t, *J* = 8.98 Hz, 3H). IR (KBr, pellet, cm-1): 3094, 2927, 2855, 2359, 2207, 1601, 1512, 1337, 1240, 1128, 1033, 826, 737, 594, 530. MALDI-TOF-MS m/z (rel. int): calc 527.30. Found: 528.57 [M+H]+. EA: Calc. for C34H39N3O3: C: 75.94, H: 7.26, N: 7.82; Found: C: 75.87, H: 7.31, N: 7.91.