Electronic Supplementary Information

A. Spectroscopic and elemental analysis data of compounds 1-12

1: ^{1}H NMR (400.1 MHz, [D_6]DMSO): δ 0.84 (t, 6 H; CH_3), 1.23 (s, 32 H; CH_2), 1.39 (m, 4 H; CH_2), 1.71 (m, 4 H; CH_2), 4.04 (t, 4 H; O-CH_2), 7.37 (s, 2 H; ArH), 7.48 (s, 2 H; ArH), 7.68 (s, 4 H; ArH, spacer), 7.70 (s, 2 H; ArH); ^{13}C NMR (100.6 MHz, [D_6]DMSO): δ 14.0 (CH_3), 22.2, 25.4, 28.54, 28.8, 28.8, 29.0, 29.1, 31.4 (CH_2), 68.1 (Ar-O-*C*H_2), 89.4, 90.5 (C≡C), 116.0 (C_{ar}H), 121.0 (C_{ar}, spacer), 122.4 (C_{ar}), 123.5, 124.4 (C_{ar}H), 131.9 (C_{ar}H, spacer), 132.9, 158.8 (C_{ar}), 166.4 (COOH); IR (KBr): $\tilde{\nu}$ 3250, 3079, 2956, 2929, 2868, 2852, 2205 (C≡C), 1698 (C=O), 1589, 1509 (C=C), 1455, 1378, 1233, 1050 (C-O), 863, 837, 674, 722; MS (EI-MS, 70 eV): *m/z* 734 [M^+]; elemental analysis calcd (%) for $C_{48}H_{62}O_6$ (734.97): C 78.44 H 8.55; found: C 78.28, H 8.64.

2: ^{1}H NMR (400.1 MHz, [D_6]DMSO): δ 0.85 (t, 6 H; CH_3), 1.24 (s, 32 H; CH_2), 1.41 (m, 4 H; CH_2), 1.71 (m, 4 H; CH_2), 4.06 (t, 4 H; O-CH_2), 7.35 (s, 2 H; ArH), 7.45 (s, 2 H; ArH), 7.64 (s, 8 H; ArH, spacer), 7.66 (s, 2 H; ArH); ^{13}C NMR (100.6 MHz, [D_6]DMSO): δ 14.0 (CH_3), 22.1, 25.4, 28.51, 28. 7, 28.7, 29.0, 29.0, 31.3(CH_2), 68.5 (O-CH_2), 89.4, 90.6, 91.1 (C≡C), 116.1 (C_{ar}H), 121.0 (C_{ar}, spacer), 122.5 (C_{ar}), 123.5, 124.4 (C_{ar}H), 131.8 (C_{ar}), 131.9 (C_{ar}H, spacer), 158.9 (C_{ar}), 166.4 (COO); IR (KBr): $\tilde{\nu}$ 3426, 3079, 2959, 2929, 2874, 2857, 2210 (C≡C), 1696 (C=O), 1588, 1516 (C=C), 1457, 1380, 1229, 1051 (C-O), 861, 837, 675, 721; MS (EI-MS, 70 eV): *m/z* 834 [M^+]; elemental analysis calcd (%) for $C_{56}H_{66}O_6 \cdot H_2O$ (852.49): C 78.84 H 8.30; found: C 79.20, H 8.20.

3: ^{1}H NMR (400.1 MHz, [D_8]THF): δ 0.84 (t, 9 H; CH_3), 1.27 (s, 36 H; CH_2), 1.37 (m, 9 H; CH_3), 1.75 (m, 6 H; CH_2), 4.02 (t, 6 H; O-CH_2), 7.30 (s, 3 H; ArH), 7.57 (s, 3 H; ArH), 7.73 (s, 3 H; ArH, spacer), 7.78 (s, 3 H; ArH); ^{13}C NMR (100.6 MHz, [D_8]THF): δ 14.0 (CH_3),

23.2, 26.5, 29.9, 30.2, 32.5 (CH_2), 68.7 (Ar-O-*C*H_2), 88.1, 90.4 (C≡C), 116.8 ($C_{ar}H$), 121.5 (C_{ar}, spacer), 124.2 (C_{ar}), 124.6, 125.5 ($C_{ar}H$), 133.4 (C_{ar}), 135.6 ($C_{ar}H$, spacer), 159.8 (C_{ar}), 166.4 (COOH); IR (KBr): $\tilde{\nu}$ 3436, 3079, 2952, 2929, 2871, 2857, 2216 (C≡C), 1698 (C=O), 1603, 1588 (C=C), 1458, 1381, 1202, 1052 (C-O), 879, 676, 721; MS (ESI-TOF): *m/z* 1061.7 [[*M*-1H$^-$]; 530.1 [*M*-2H^{2-}]; 353.3 [*M*-3H^{3-}]]; elemental analysis calcd (%) for $C_{69}H_{90}O_9 \cdot H_2O$ (1081.42): C 76.63 H 8.58; found: C 76.58, H 8.57.

4: ^{1}H NMR (400.1 MHz, [D_8]THF): δ 0.85 (t, 12 H; CH_3), 1.24 (s, 64 H; CH_2), 1.39 (m, 8 H; CH_2), 1.74 (m, 8 H; CH_2), 3.94 (t, 8 H; O-CH_2) 7.28 (s, 4 H; ArH), 7.50 (s, 4 H; ArH, spacer), 7.73 (s, 2 H; ArH), 7.95 (s, 4 H; ArH); ^{13}C NMR (100.6 MHz, [D_8]THF): δ 13.8 (CH_3), 22.3, 24. 7, 28.7, 28.9, 29.2, 29.2, 31.5 (CH_2), 68.0 (Ar-O-*C*H_2), 87.2, 95.1 (C≡C), 116.8, 121.6 ($C_{ar}H$), 123.2 (C_{ar}), 124.4 ($C_{ar}H$), 125.1 (C_{ar}, spacer), 133.3 (C_{ar}), 135.6 ($C_{ar}H$, spacer), 159.0 (C_{ar}), 166.2 (COO); IR (KBr): $\tilde{\nu}$ 3441, 3079, 2953, 2924, 2874, 2857, 2210 (C≡C), 1697 (C=O), 1587 (C=C), 1455, 1379, 1208, 1048 (C-O), 865, 677, 721; MS (ESI-TOF): *m/z* 1390.4 [*M*-1H$^-$] ; 694.1 [*M*-2H^{2-}] ; 462.7 [*M*-3H^{3-}]; 346.5 [*M*-4H^{4-}]; elemental analysis calcd (%) for $C_{90}H_{118}O_{12}$ (1391.83): C 77.66 H 8.54; found: C 77.64, H 8.87.

5a: ^{1}H NMR (400.1 MHz, [D_6]DMSO): δ 1.35 (t, ^3J(H,H) = 7.20 Hz, 6 H; CH_3), 4.32 (q, ^3J(H,H) = 7.20 Hz, 4 H; CH_2), 7.18 (s, 2 H; ArH), 7.44 (s, 2 H; ArH), 7.55 (s, 2 H; ArH), 7.67 (d, ^3J(H,H) = 3.20 Hz, 4 H; ArH (spacer)); ^{13}C NMR (100.6 MHz, [D_6]DMSO): δ 13.6 (CH_3), 60.5 (CH_2), 88.6, 89.9 (C≡C), 116.1 (C_{ar}), 121.7 (C_{ar}, spacer), 122.2, 122.9, 123.3 (C_{ar}), 131.3 ($C_{ar}H$, spacer), 131.7, 157.2 (C_{ar}), 164.4 (COO); IR (KBr): $\tilde{\nu}$ 3255, 3074, 2981, 2945, 2908, 2877, 2215 (C≡C), 1715 (C=O), 1607, 1595 (C=C), 1476, 1440, 1397, 1375, 1262, 1233, 1025 (C-O), 875, 837, 675; MS (MALDI-TOF, DHB/THF): *m/z* 454.2 [M^+]; elemental analysis calcd (%) for $C_{28}H_{22}O_6$ (454.14): C 74.00, H 4.88; found: C 73.86, H 4.96.

5b: ^{1}H NMR (400.1 MHz, $CDCl_3$): δ 0.88 (t, 6 H; CH_3), 1.27 (s, 36 H; CH_2), 1.41 (t, ^{3}J(H,H) = 7.20 Hz, 6 H; CH_3), 1.80 (m, 4 H; CH_2), 4.01 (t, 4 H; O-CH_2), 4.39 (q, ^{3}J(H,H) = 7.20 Hz, 4 H; O-*CH_2*-CH_3), 7.22 (s, 2 H; ArH), 7.53 (s, 4 H; ArH, spacer), 7.54 (s, 2 H; ArH), 7.79 (s, 2 H; ArH); ^{13}C NMR (100.6 MHz, $CDCl_3$): δ 14.1, 14.3 (CH_3), 22.7, 26.0, 29.1, 29.3, 29. 6, 29.6, 29.6, 29.7, 31.9 (CH_2), 61.3 (O-*C*H_2), 68.5 (Ar-O-*C*H_2), 89.5, 90.5 (C≡C), 115.8, 121.7 (C_{ar}), 123.0 (C_{ar}, spacer), 124.2, 125.1 (C_{ar}), 131.6 (C_{ar}H, spacer), 132.0, 159.0 (C_{ar}), 165.8 (COO); IR (KBr): $\tilde{\nu}$ 3084, 2951, 2929, 2872, 2857, 2210 (C≡C), 1722 (C=O), 1589, 1510 (C=C), 1467, 1455, 1369, 1257, 1218, 1049, 1030 (C-O), 865, 834, 675, 722; MS (MALDI-TOF, DHB/THF): *m/z* 792 [*M* H^+]; elemental analysis calcd (%) for $C_{52}H_{70}O_6$ (791.07): C 78.95, H 8.92; found: C 78.95, H 8.95.

6a: ^{1}H NMR (400.1 MHz, [D_6]DMSO): δ 1.37 (t, ^{3}J(H,H) = 7.20 Hz, 6 H; CH_3), 4.36 (q, ^{3}J(H,H) = 7.20 Hz 4 H; CH_2), 7.18 (s, 2 H; ArH), 7.49 (s, 2 H; ArH), 7.52 (s, 8 H; ArH, spacer), 7.66 (s, 2 H; ArH), 9.52 (s, 2 H; OH); ^{13}C NMR (100.6 MHz, [D_6]DMSO): δ 13.9 (CH_3), 61.2 (CH_2), 89.3, 90.5, 91.0 (C≡C), 117.0 (C_{ar}), 122.4 (C_{ar}, spacer), 123.4, 123.9, 124.5, 132.0 (C_{ar}), 132.8 (C_{ar}H spacer), 158.0 (C_{ar}), 165.3 (COO); IR (KBr): $\tilde{\nu}$ 3260, 3079, 2982, 2937, 2906, 2875, 2210 (C≡C), 1719 (C=O), 1611, 1594, 1516 (C=C), 1476, 1438, 1397, 1374, 1263, 1230, 1024 (C-O), 877, 837, 676; MS (EI, 70 eV): *m/z* 554 [M^+]; elemental analysis calcd (%) for $C_{36}H_{26}O_6 \cdot H_2O$ (554.56): C 75.51, H 4.93; found: C 75.26, H 5.01.

6b: ^{1}H NMR (400.1 MHz, [D_6]DMSO): δ 0.88 (t, 6 H; CH_3), 1.26 (s, 36 H; CH_2), 1.37 (t, ^{3}J(H,H) = 7.20 Hz, 6 H; CH_3), 1.80 (m, 4 H; CH_2), 4.01 (t, 4 H; O-CH_2), 4.39 (q, ^{3}J(H,H) = 7.20 Hz, 4 H; O-*C*H_2-CH_3), 7.23 (s, 2 H; ArH), 7.52 (s, 8 H; ArH, spacer), 7.55 (s, 2 H; ArH), 7.79 (s, 2 H; ArH); ^{13}C NMR (100.6 MHz, [D_6]DMSO): δ 14.1, 14.3 (CH_3), 22.7, 26.0, 29.2, 29.4, 29.6, 29.6, 29.6, 29.7, 31.9 (CH_2), 61.3 (O-CH_2), 68.5 (Ar-O-*C*H_2), 89.5, 90.5, 91.0

(C≡C), 115.8 (C12), 121.8 (C_{ar}, spacer), 123.0, 124.2, 125.1, 131.6 (C_{ar}), 132.1 (C_{ar}H, spacer), 159.1 (C_{ar}), 165.9 (COO); IR (KBr): ṽ 3084, 2956, 2924, 2870, 2852, 2210 (C≡C), 1722 (C=O), 1588, 1517 (C=C), 1466, 1454, 1371, 1257, 1221, 1050, 1032 (C-O), 865, 835, 674, 721; MS (FAB, NBA): *m/z* 890 [M^+]; elemental analysis calcd (%) for $C_{60}H_{74}O_6$ (890.55): C 80.86 H 8.37; found: C 80.20, H 8.46.

7a: ^{1}H NMR (400.1 MHz, [D$_6$]DMSO): δ 1.34 (t, ^3J(H,H) = 6.80 Hz, 9 H; CH_3), 4.32 (q, ^3J(H,H) = 6.80 Hz, 6 H; CH_2), 7.19 (s, 3 H; ArH), 7.41 (s, 3 H; ArH), 7.59 (s, 3 H; ArH, spacer), 7.85 (s, 2 H; ArH); ^{13}C NMR (100.6 MHz, [D$_6$]DMSO): δ 14.2 (CH_3), 61.1 (CH_2), 87.7, 89.9 (C≡C), 116.9 (C_{ar}H), 122.3 (C_{ar}, spacer), 123.0, 123.3, 123.4, 131.9 (C_{ar}), 134.4 (C_{ar}H, spacer), 157.8 (C_{ar}), 165.0 (COO); IR (KBr): ṽ 3255, 3069, 2981, 2934, 2903, 2872, 2210 (C≡C), 1717 (C=O), 1608, 1591 (C=C), 1475, 1437, 1396, 1371, 1250, 1025 (C-O), 877, 677; MS (MALDI-TOF, POPOP, 1-aminopyrene): *m/z* 642 [M^+]; elemental analysis calcd (%) for $C_{39}H_{30}O_9$ (642.66): C 72.89, H 4.71; found: C 72.60, H 4.85.

7b: ^{1}H NMR (400.1 MHz, $CDCl_3$): δ 0.84 (t, 9 H; CH_3), 1.27 (s, 36 H; CH_2), 1.42 (m, 9 H; CH_3), 1.80 (m, 6 H; CH_2), 4.02 (t, 6 H; O-CH_2), 4.41 (m, 6 H; O-*CH_2*-CH_3), 7.23 (s, 3 H; ArH), 7.56 (s, 3 H; ArH), 7.68 (s, 3 H; ArH, spacer), 7.79 (s, 3 H; ArH); ^{13}C NMR (100.6 MHz, $CDCl_3$): δ 14.1, 14.3 (CH_3), 22.7, 26.0, 29.1, 29.3, 29.6, 29.6, 29.6, 29.6, 31.9 (CH_2), 61.3 (O-CH_2), 68.5 (Ar-O-*C*H_2), 88.0, 89.8 (C≡C), 116.0 (C_{ar}), 121.8 (C_{ar}, spacer), 123.8, 123.9, 125.1, 132.1 (C_{ar}), 134.4 (C_{ar}H, spacer), 159.1 (C_{ar}), 165.8 (COO); IR (KBr): ṽ 3090, 2957, 2925, 2872, 2855, 2218 (C≡C), 1725 (C=O), 1601, 1592 (C=C), 1466, 1456, 1370, 1237, 1203, 1052, 1032 (C-O), 879, 678, 722; MS (MALDI-TOF, DHB/THF): *m/z* 1147.1 [M^+]; elemental analysis calcd (%) for $C_{75}H_{102}O_9$ (1147.63): C 78.49 H 8.96; found: C 78.20, H 9.09.

8a: ^{1}H NMR (400.1 MHz, [D_6]DMSO): δ 1.23 (t, ^{3}J(H,H) = 6.80 Hz, 12 H; CH_3), 4.24 (q, ^{3}J(H,H) = 6.80 Hz, 8 H; O-CH_2), 7.19 (s, 4 H; ArH), 7.44 (s, 4 H; ArH), 7.58 (s, 4 H; ArH), 8.03 (s, 2 H; ArH, spacer); ^{13}C NMR (100.6 MHz, [D_6]DMSO): δ 14.0 (CH_3), 61.1 (O-CH_2), 87.2, 95.1 (C≡C), 117.1, 122.0, 123.0 (C_{ar}), 123.1 (C_{ar}, spacer), 124.9, 132.1 (C_{ar}), 135.1 (C_{ar}H, spacer), 158.0 (C_{ar}), 164.9 (COO); IR (KBr): $\tilde{\nu}$ 3252, 3084, 2986, 2945, 2908, 2872, 2215 (C≡C), 1714 (C=O), 1611, 1594 (C=C), 1474, 1441, 1373, 1252, 1024 (C-O), 875, 674; MS (MALDI-TOF, POPOP): *m/z* 831.0 [M^+]; elemental analysis calcd (%) for $C_{50}H_{38}O_{12}$ (830.79): C 72.28, H 4.61; found: C 71.99, H 4.73.

8b: ^{1}H NMR (400.1 MHz, $CDCl_3$): δ 0.88 (t, 12 H; CH_3), 1.26 (s, 64 H; CH_2), 1.36 (m, 12 H; CH_3), 1.40 (m, 8 H; CH_2), 1.74 (m, 8 H; CH_2), 3.92 (t, 8 H; O-CH_2), 4.34 (q, 8 H; O-*CH_2*-CH_3), 7.24 (s, 4 H; ArH), 7.57 (s, 4 H; ArH), 7.78 (s, 2 H; ArH, spacer), 7.83 (s, 3 H; ArH); ^{13}C NMR (100.6 MHz, $CDCl_3$): δ 14.1, 14.2 (CH_3), 22.7, 26.0, 29.1, 29.4, 29.4, 29.6, 29.6, 29.6, 29.7, 31.9 (CH_2), 61.3 (O-CH_2), 68.4 (Ar-O-*C*H_2), 87.6, 95.0 (C≡C), 116.5 (C_{ar}H), 121.4 (C_{ar}H), 123.9 (C_{ar}), 125.1 (C_{ar}H), 125.4 (C_{ar}, spacer), 132.2 (C_{ar}), 134.9 (C_{ar}H, spacer), 159.1 (C_{ar}), 165.7 (COO); IR (KBr): $\tilde{\nu}$ 3090, 2955, 2924, 2873, 2852, 2216 (C≡C), 1723 (C=O), 1607, 1588 (C=C), 1467, 1432, 1367, 1242, 1209, 1049, 1035 (C-O), 867, 677, 722; MS (MALDI-TOF, DHB/THF): *m/z* 1503.5 [M^+]; elemental analysis calcd (%) for $C_{98}H_{134}O_{12}$ (1504.04): C 78.26 H 8.98; found: C 77.91, H 9.09.

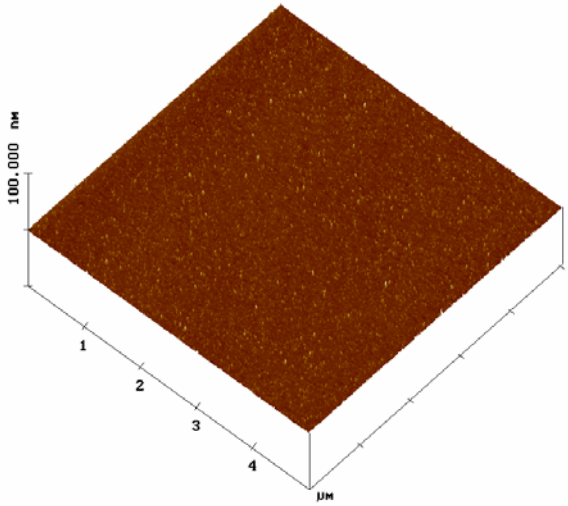
9: ^{1}H NMR (400.1 MHz, $CDCl_3$): δ 7.16 (s, 1 H; ArH), 7.42 (s, 1 H; ArH), 7.59 (s, 1 H; ArH); ^{13}C NMR (100.6 MHz, $CDCl_3$): δ 115.1, 121.5, 122.1, 122.7, 133.0 (C_{ar}), 157.7 (*C*-Br), 166.3 (COOH).

10: ^{1}H NMR (400.1 MHz, $CDCl_3$): δ 1.39 (t, ^{3}J(H,H) = 7.20 Hz, 3 H; CH_3), 4.38 (q, ^{3}J(H,H) = 7.20 Hz, 2 H; CH_2), 7.24 (s, 1 H; ArH), 7.55 (s, 1 H; ArH), 7.71 (s, 1 H; ArH); ^{13}C NMR (100.6 MHz, $CDCl_3$): δ 14.2 (CH_3), 62.0 (CH_2), 115.1, 122.8, 123.5, 124.7, 132.7, 156.8(C_{ar}), 166.0 (C=O); IR (KBr): $\tilde{\nu}$ 3244, 3074, 2981, 2934, 2903, 2874, 1716 (C=O), 1604, 1590 (C=C), 1468, 1441, 1397, 1372, 1242, 1096, 1029 (C-O), 849, 677 (C-Br); MS (GC-MS): *m/z* 244/246 [M^+]; elemental analysis calcd (%) for $C_9H_9BrO_3$ (245.06): C 44.11, H 3.70; found: C 44.17, H 3.74.

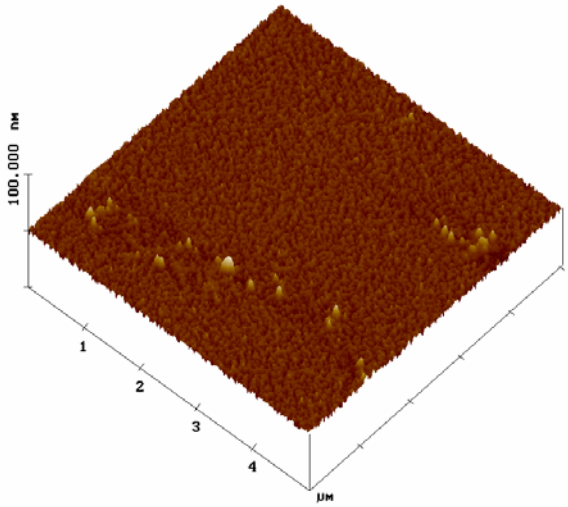
11: ^{1}H NMR (400.1 MHz, $CDCl_3$): δ 0.25 (s, 9 H; $SiCH_3$), 1.41 (t, ^{3}J(H,H) = 7.20 Hz, 3 H; CH_3), 4.37 (q, ^{3}J(H,H) = 7.20 Hz, 2 H; CH_2), 7.13 (s, 1 H; ArH), 7.55 (s, 1 H; ArH), 7.70 (s, 1 H; ArH); ^{13}C NMR (100.6 MHz, $CDCl_3$): δ -0.2 (Si*C*H_3), 14.2 (CH_3), 61.6 (CH_2), 95.3 (C≡*C*-Si), 103.6 (*C*≡C-Si), 116.1, 123.0, 124.7, 125.6, 131.8, 155.6 (C_{ar}), 166.1 (C=O); IR (KBr): $\tilde{\nu}$ 3074, 2987, 2960, 2898, 2164 (C≡C), 1721 (C=O), 1606, 1594 (C=C), 1477, 1438, 1395, 1373, 1248 (C-Si), 1029 (C-O), 859, 677, 842, 761; MS (GC-MS): *m/z* 262 [M^+]; elemental analysis calcd (%) for $C_{14}H_{18}SiO_3$ (262.36): C 64.09, H 6.92; found: C 64.25, H 6.98.

12: ^{1}H NMR (400.1 MHz, $CDCl_3$): δ 1.41 (t, ^{3}J(H,H)= 7.20 Hz, 3 H; CH_3), 3.09 (s, 1 H; C≡CH), 4.38 (q, ^{3}J(H,H)= 7.20 Hz, 2 H; CH_2), 7.17 (s, 1 H; ArH), 7.60 (s, 1 H; ArH), 7.73 (s, 1 H; ArH); ^{13}C NMR (100.6 MHz, $CDCl_3$) δ 14.2 (CH_3), 61.7 (CH_2), 78.0(C≡*C*H), 82.4 (*C*≡CH), 117.2, 123.4, 123.7, 131.9, 155.8 (C_{ar}), 166.2 (C=O); IR (KBr): $\tilde{\nu}$ 3255 (C≡C-H), 3079, 2986, 2945, 2914, 2867, 2112 (C≡C), 1715 (C=O), 1611, 1595 (C=C), 1475, 1441, 1400, 1371, 1254, 1025 (C-O), 875, 671; MS (GC-MS): *m/z* 190 [M^+]; elemental analysis calcd (%) for $C_{11}H_{10}O_3$ (190.18): C 69.46, H 5.30; found: C 69.56, H 5.32.

a)

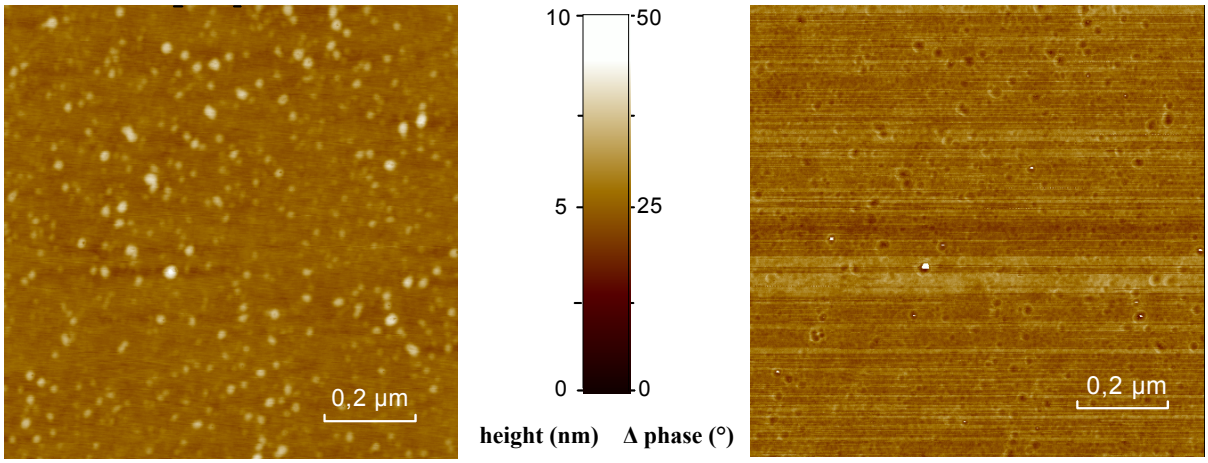


b)



B. 1. AFM tapping-mode surface topography of the LB monofilms of **1** (a) and **3** (b) transferred from an aqueous 10^{-4} M $CaCl_2$ subphase to a mica plate at surface pressure of 25 mN m^{-1}.

a)



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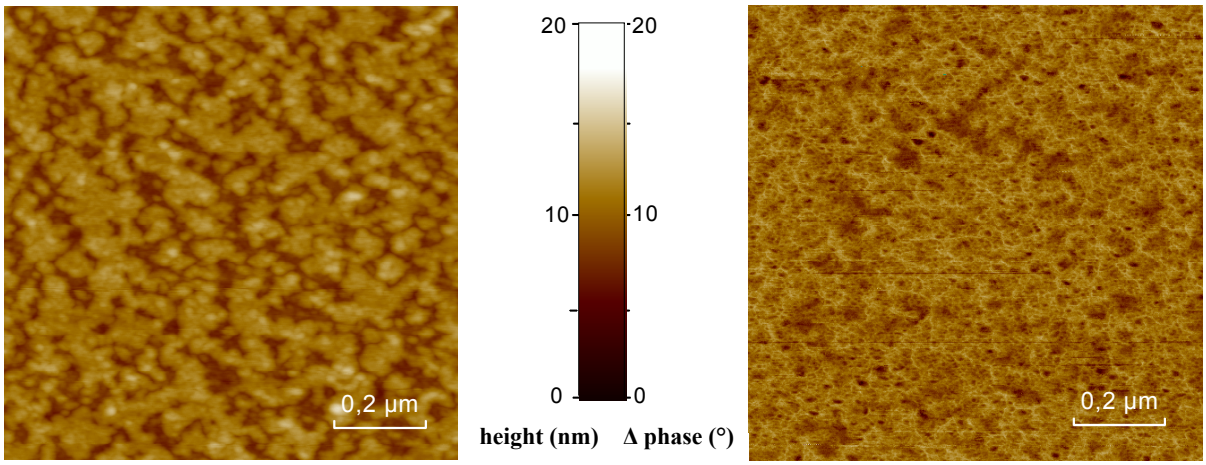

B.2. Relief and AFM images of the LB monofilms of **1** (a) and **3** (b) on mica deposited from an aqueous 10^{-4} M $CaCl_2$ subphase at surface pressure of 25 mN m^{-1}