A Facile Synthesis of Amphiphilic N-glycosyl naphthalimides and Fabrication of Flexible Semiconductor using Molecular Self-Assembly

Arun Kumar Rachamalla,[a] Vara Prasad Rebaka,[a] Tohira Banoo,[a] Ravinder Pawar,[a] Mohammad Faizan,[a] Krishnamoorthy Lalitha,[b] Subbiah Nagarajan,[*a]

a. Department of Chemistry, National Institute of Technology Warangal, Warangal - 506004, Telangana, India.

b. School of Chemical and Biotechnology, SASTRA Deemed University, Thanjavur – 613401, Tamil Nadu, India.

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Characterization details

Compound 3a: Amorphous yellow solid; yield: 92% (0.770 g)[1]

Compound 3b: Amorphous yellow solid; yield: 93% (0.301g); mp: 105-107 °C. IR (neat): 3433, 3356, 2922, 2850, 1690 and 1650 cm^{-1}. ^{1}H NMR (400 MHz, DMSO-d_6): δ 8.07 (d, J = 6.0 Hz, 1H), 8.02 (d, J = 8.0 Hz, 1H), 7.97 (d, J = 2.4 Hz, 1H), 7.60 (t, J = 7.8 Hz, 1H), 7.28 (d, J = 2.4 Hz, 1H), 5.99 (s, 2H), 4.0 (t, J.= 7.4 Hz, 2H), 1.65 – 1.56 (m, 2H), 1.9-1.23 (m, 10H), 0.84 (t, J = 6.8 Hz, 3H). ^{13}C NMR (100 MHz, DMSO-d_6) δ 164.20, 164.02, 148.34, 134.01, 131.89, 127.38, 125.83, 123.03, 122.23, 122.17, 121.03, 112.14, 31.68, 29.17, 29.04, 27.96, 26.99, 22.52, 14.38.

Compound 3c: Amorphous yellow solid; yield: 92% (0.324 g); mp: 95-97 °C. IR (neat): 3471, 3371, 2918, 2849, 1682 and 1647 cm^{-1}. ^{1}H NMR (400 MHz, DMSO-d_6): δ 8.06 (d, J = 7.2 Hz, 1H), 8.03 (d, J = 8.0 Hz, 1H), 7.97 (d, J = 2.0 Hz, 1H), 7.60 (t, J = 7.8 Hz, 1H), 7.28 (d, J = 2.1 Hz, 1H), 5.98 (s, 2H), 3.99 (t, J.= 7.4 Hz, 2H), 1.65 – 1.55 (m, 2H), 1.34 - 1.28 (m, 4H), 1.25 – 1.19 (m, 10H), 0.83 (t, J = 6.8 Hz, 3H). ^{13}C NMR (101 MHz, DMSO-d_6) δ 164.20, 164.02, 148.35, 134.01, 131.89, 127.37, 125.83, 123.03, 122.23, 122.17, 121.03, 112.14, 31.73, 29.39, 29.37, 29.19, 29.13, 27.95, 26.97, 22.54, 14.39.

Compound 3d: Amorphous yellow solid; yield: 93% (0.353 g); mp: 89-91°C. IR (neat): 3470, 3367, 2918, 2848, 1702 and 1658 cm^{-1}. ^{1}H NMR (400 MHz, DMSO-d_6): δ 8.07 (d, J = 6.4 Hz, 1H), 8.02 (d, J = 8.4 Hz, 1H), 7.97 (d, J = 2.4 Hz, 1H), 7.60 (t, J = 7.8 HZ, 1H), 7.28 (d, J = 2.4 HZ, 1H), 5.98 (s, 2H), 4.0 (t, J = 7.4 Hz, 2H), 1.65 – 1.55 (m, 2H), 1.33 – 1.27 (m, 4H), 1.25 – 1.19 (m, 14H), 0.84 (t, J = 6.8 Hz, 3H). ^{13}C NMR (101 MHz, DMSO-d_6) δ 164.20, 164.02, 148.35, 134.02, 131.90, 127.37, 125.83, 123.03, 122.23, 122.18, 121.03, 112.14, 31.75, 29.47, 29.45, 29.42, 29.35, 29.19, 29.15, 27.95, 26.96, 22.55, 14.40.

Compound 3e: Amorphous yellow solid; Yield: 90%(0.367 g); mp: 91-93 °C. IR (neat): 3460, 3359, 2916, 2848, 1697 and 1651 cm^{-1}. ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.06 (d, J = 6.4 Hz, 1H), 8.02 (d, J = 8.0 Hz, 1H), 7.97 (d, J = 2.4 Hz, 1H), 7.60 (t, J = 7.8

Hz, 1H), 7.28 (d, *J* = 2.4 Hz, 1H), 5.98 (s, 2H), 3.99 (t, *J* = 7.4 Hz, 2H), 1.67-1.54 (m, 2H), 1.32-1.20 (m, 22H), 0.84 (t, *J* = 6.8 Hz, 3H). ^{13}C NMR (101 MHz, DMSO-d_6) δ 168.95, 168.77, 153.10, 138.77, 136.65, 132.12, 130.58, 127.78, 126.98, 125.79, 116.90, 36.50, 34.21, 34.16, 34.09, 33.94, 33.91, 32.71, 31.71, 31.04, 27.30, 19.14.

Compound 3f: Amorphous yellow solid; Yield: 91%(0.396 g); mp: 84-86 °C. IR (neat): 3459, 3358, 2916, 2848, 1696 and 1650 cm^{-1}. ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.06 (d, *J* = 6.4 Hz, 1H), 8.01 (d, *J* = 8.4 Hz, 1H), 7.96 (d, *J* = 2.4 Hz, 1H), 7.59 (t, *J* = 7.8 Hz, 1H), 7.27 (d, *J* = 2.4 Hz, 1H), 5.98 (s, 2H), 3.99 (t, *J* = 7.4 Hz, 2H), 1.65 – 1.55 (m, 2H), 1.30 – 1.18 (m, 26H), 0.83 (t, *J* = 6.8 Hz, 3H). ^{13}C NMR (101 MHz, DMSO-d_6) δ 164.19, 164.01, 148.35, 134.01, 131.88, 127.35, 125.81, 123.02, 122.23, 122.18, 121.03, 112.14, 31.75, 29.46, 29.35, 29.17, 27.96, 26.97, 22.55, 14.38.

Compound 3g: Amorphous yellow solid; Yield: 95% (0.440 g); mp: 76 - 78 °C. IR (neat): 3470, 3368, 2915, 2847, 1699 and1657 cm^{-1}. ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.06 (d, *J* = 7.2 Hz, 1H), 8.02 (d, *J* = 8.4 Hz, 1H), 7.96 (d, *J* = 2.4 Hz, 1H), 7.60 (t, *J* = 7.8 Hz, 1H), 7.27 (d, *J* = 2.0 Hz, 1H), 5.98 (s, 2H), 4.0 (t, *J* = 7.4 Hz, 2H), 1.65 – 1.55 (m, 2H), 1.33 – 1.27 (m, 4H), 1.25 – 1.19 (m, 26H), 0.83 (t, *J* = 6.8 Hz, 3H). ^{13}C NMR (101 MHz, DMSO-d_6) δ 164.19, 164.02, 148.35, 134.02, 131.89, 127.36, 125.82, 123.03, 122.23, 122.18, 121.04, 112.14, 31.75, 29.46, 29.34, 29.16, 27.96, 26.97, 22.55, 14.38

5-N-glucosyl-2-hexyl-1H-benzo[*de*]isoquinoline-1,3(2*H*)-dione 5a: Amorphous yellow solid; yield: 93% (0.425 g); mp: 147 – 149 °C. IR (KBr, cm^{-1}): 3376, 2924, 2853, 1699, 1649. ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.14 (d, *J* = 7.6 Hz, 1H), 8.11 (d, *J* = 8.8 Hz, 1H), 8.09 (d, *J* = 2.4 Hz, 1H), 7.66 (t, *J* = 8.0 Hz, 1H), 7.44 (d, *J* = 2.0 Hz, 1H), 7.20 (d, *J* = 7.6 Hz, 1H), 5.03 (d, *J* = 4.8 Hz, 1H), 4.96 (dd, *J* = 11.6, 5.2 Hz, 2H), 4.58 (t, *J* = 8.0 Hz, 1H), 4.46 (t, *J* = 6.0 Hz, 1H), 4.01 (t, *J* = 7.6 Hz, 2H), 3.73 – 3.67 (m, 1H), 3.52 – 3.46 (m, 1H), 3.37 (m, 1H), 3.30 – 3.14 (m, 3H), 1.65 – 1.57 (m, 2H), 1.28 – 1.34 (m, 6H), 0.86 (t, *J* = 7.2 Hz, 3H). ^{13}C NMR (101 MHz, DMSO-d$_6$) δ 164.14, 163.92, 146.66, 133.78, 132.60, 127.53, 126.50, 122.82, 122.27, 122.16, 121.70, 111.58, 85.12, 78.24, 77.98, 73.52, 70.56, 61.35, 31.44, 27.95, 26.68, 22.47, 14.39. HRMS (ESI, m/z): $[M+H]^+$ calcd. for $C_{24}H_{31}N_2O_7$: 459.2131; found: 459.2155.

5-N-glucosyl-2-octyl-1H-benzo[*de*]isoquinoline-1,3(2*H*)-dione 5b: Amorphous yellow solid; yield: 89% (0.432 g); mp: 152-154 °C. IR (KBr, cm^{-1}): 3376, 2924, 2824, 1699, 1649.^{1}H NMR (400 MHz, DMSO-d_6) δ 8.14 (d, *J* = 7.6 Hz, 1H), 8.10 (s, 1H), 8.09 (d, *J* = 2.4 Hz, 1H), 7.66 (t, *J* = 8.0 Hz, 1H), 7.44 (d, *J* = 2.0 Hz, 1H), 7.20 (d, *J* = 7.6 Hz, 1H), 5.03 (d, *J* = 4.4 Hz, 1H), 4.96 (dd, *J* = 10.8, 5.2 Hz, 2H), 4.58 (t, *J* = 8.0 Hz, 1H), 4.46 (t, *J* = 6.0 Hz, 1H), 4.01 (t, *J* = 7.6 Hz, 2H), 3.71 – 3.68 (m, 1H), 3.52 – 3.46 (m, 1H), 3.42 – 3.35 (m, 1H), 3.31 – 3.13 (m, 3H), 1.66 – 1.56 (m, 2H), 1.36-1.30 (m, 4H), 1.28 – 1.22 (m, 6H), 0.85 (t, J = 6.8 Hz, 3H). ^{13}C NMR (101 MHz, DMSO-d_6) δ 164.16, 163.94, 146.69, 133.80, 132.60, 127.54, 126.51, 122.86, 122.28, 122.20, 121.73, 111.61, 85.15, 78.24, 77.99, 73.53, 70.58, 61.36, 31.70, 29.18, 29.06, 27.98, 27.03, 22.55, 14.42. HRMS (ESI, m/z): $[M+H]^+$ calcd. for $C_{26}H_{35}N_2O_7$: 487.2444; found: 487.2471.

5-N-glucosyl-2-decyl-1H-benzo[*de*]isoquinoline-1,3(2*H*)-dione 5c: Amorphous yellow solid; yield: 91% (0.467 g); mp: 159-161°C. IR (KBr, cm^{-1}): 3375, 2953, 2851, 1691, 1650. ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.13 (d, *J* = 7.2 Hz, 1H), 8.10 (s, 1H), 8.09 (d, *J* = 2.4 Hz, 1H), 7.66 (t, *J* = 7.6 Hz, 1H), 7.44 (d, *J* = 2.0 Hz, 1H), 7.20 (d, *J* = 7.6 Hz, 1H), 5.03 (d, *J* = 4.4 Hz, 1H), 4.96 (dd, *J* = 10.8, 5.2 Hz, 2H), 4.58 (t, *J* = 8.0 Hz, 1H), 4.46 (t, *J* = 6.0 Hz, 1H), 4.01 (t, *J* = 7.6 Hz, 2H), 3.71 – 3.68 (m, 1H), 3.52 – 3.46 (m, 1H), 3.39 – 3.35 (m, 1H), 3.29 – 3.16 (m, 3H), 1.65 – 1.57 (m, 2H), 1.31 (m, J = 2.8 Hz, 4H), 1.23 (m, 10H), 0.84 (t, J = 6.8 Hz, 3H). ^{13}C NMR (101 MHz, DMSO-d_6) δ 164.18, 163.96, 146.71, 133.83, 132.62, 127.57, 126.52, 122.88, 122.28, 122.22, 121.74, 111.60, 85.14, 78.24, 77.99, 73.52, 70.56, 61.34, 31.76, 29.42, 29.39, 29.21, 29.15, 27.98, 27.01, 22.57, 14.44. HRMS (ESI, m/z): $[M+H]^+$ calcd. for $C_{28}H_{39}N_2O_7$: 515.2757; found: 515.2775.

5-N-glucosyl-2-dodecyl-1H-benzo[*de*]isoquinoline-1,3(2*H*)-dione 5d: Amorphous yellow solid; yield: 88% (0.476 g); mp: 137-139 °C. IR (KBr, cm^{-1}): 3325, 2922, 2849, 1694, 1654 ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.13 (d, *J* = 7.2 Hz, 1H), 8.10 (s, 1H), 8.09 (d, *J* = 2.0 Hz, 1H), 7.66 (t, *J* = 8.0 Hz, 1H), 7.44 (d, *J* = 2.0 Hz, 1H), 7.20 (d, *J* = 7.6 Hz, 1H), 5.03 (d, *J* = 4.4 Hz, 1H), 4.96 (dd, *J* = 10.4, 5.2 Hz, 2H), 4.58 (t, J = 8.0 Hz, 1H), 4.46 (t, J = 6.0 Hz, 1H), 4.01 (t, *J* = 7.6 Hz, 2H), 3.71 – 3.68 (m, 1H), 3.52-3.46 (m, 1H), 3.36 (m, 1H), 3.28 – 3.18 (m, 3H), 1.65 – 1.56 (m, 2H), 1.31 (m, 4H), 1.23 (m, 14H), 0.85 (t, J = 7.2 Hz, 3H). ^{13}C NMR (101 MHz, DMSO-d_6) δ 164.16,

163.94, 146.67, 133.80, 132.61, 127.54, 126.51, 122.83, 122.27, 121.72, 111.59, 85.14, 78.23, 77.98, 73.52, 70.55, 61.34, 31.76, 29.40, 29.22, 29.16, 27.98, 27.01, 22.58, 14.44. HRMS (ESI, m/z): $[M+H]^+$ calcd. for $_{C30}H_{43}N_2O_7$: 543.3070; found: 543.3092.

5-N-glucosyl-2-tetradecyl-1H-benzo[*de*]isoquinoline-1,3(2*H*)-dione 5e: Amorphous yellow solid; yield: 86% (0.490 g); mp: 129-131 °C. IR (KBr, cm^{-1}): 3323, 2922, 2849, 1695, 1654 ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.13 (d, *J* = 7.6 Hz, 1H), 8.10 (s, 1H), 8.09 (d, *J* = 2.4 Hz, 1H), 7.66 (t, *J* = 7.66 Hz, 1H), 7.44 (d, *J* = 2.0 Hz, 1H), 7.20 (d, *J* = 7.6 Hz, 1H), 5.03 (d, *J* = 4.4 Hz, 1H), 4.96 (dd, *J* = 10.4, 5.2 Hz, 2H), 4.58 (t, *J* = 8.0 Hz, 1H), 4.46 (t, *J* = 6.0 Hz, 1H), 4.01 (t, *J* = 7.2 Hz, 2H), 3.73 – 3.66 (m, 1H), 3.52 – 3.46 (m, 1H), 3.36 (m, 1H), 3.30 – 3.16 (m, 3H), 1.61 – 1.59 (m, 2H), 1.31 (m, 4H), 1.22 (m, 18H), 0.84 (t, *J* = 6.8 Hz, 3H). ^{13}C NMR (101 MHz, DMSO-d_6) δ 164.23, 163.96, 146.71, 141.22, 133.83, 132.62, 127.57, 126.52, 122.89, 122.28, 111.59, 85.14, 78.24, 77.99, 73.52, 70.55, 61.33, 31.77, 29.48, 29.18, 27.98, 27.01, 22.58, 14.45. HRMS (ESI, m/z): $[M+H]^+$ calcd. for $C_{32}H_{47}N_2O_7$: 571.3383; found: 571.3414.

5-N-glucosyl-2-hexadecyl-1H-benzo[*de*]isoquinoline-1,3(2*H*)-dione 5f: Amorphous yellow solid; yield: 89% (0.532 g); mp: 126-128 °C. IR (KBr, cm^{-1}): 3324, 2921, 2849, 1694, 1654 ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.13 (d, *J* = 7.6 Hz, 1H), 8.10 (s, 1H), 8.08 (d, *J* = 2.0 Hz, 1H), 7.66 (t, *J* = 8.0 Hz, 1H), 7.44 (d, *J* = 2.0 Hz, 1H), 7.20 (d, *J* = 7.6 Hz, 1H), 5.03 (d, *J* = 4.8 Hz, 1H), 4.96 (dd, *J* = 10.8, 5.2 Hz, 2H), 4.58 (t, *J* = 8.0 Hz, 1H), 4.46 (t, *J* = 6.0 Hz, 1H), 4.01 (t, *J* = 7.2 Hz, 2H), 3.73 – 3.67 (m, 1H), 3.52 – 3.46 (m, 1H), 3.36 (m, 1H), 3.29 – 3.15 (m, 3H), 1.64 – 1.57 (m, 2H), 1.31 (m, 4H), 1.22 (m, 22H), 0.84 (t, J = 6.8 Hz, 3H). ^{13}C NMR (101 MHz, DMSO-d_6) δ 164.18, 163.96, 146.70, 133.83, 132.63, 127.57, 126.52, 122.88, 122.28, 122.22, 121.74, 111.60, 85.15, 78.23, 77.99, 73.52, 70.56, 61.34, 31.77, 29.48, 29.38, 29.18, 27.98, 27.02, 22.57, 14.44. HRMS (ESI, m/z): $[M+H]^+$ calcd. for $C_{34}H_{51}N_2O_7$: 599.3696; found: 599.3720.

5-N-glucosyl-2-octadecyl-1H-benzo[*de*]isoquinoline-1,3(2*H*)-dione 5g: Amorphous yellow solid; yield: 88% (0.550 g); mp: 139-141°C. IR (KBr, cm^{-1}): 3323, 2921, 2849, 1691, 1654. ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.13 (d, *J* = 7.2 Hz, 1H), 8.10 (s, 1H), 8.09 (d, *J* = 3.2 Hz, 1H), 7.66 (t, *J* = 8.0 Hz, 1H), 7.44 (d, *J* = 2.0 Hz, 1H), 7.20 (d, *J* = 7.2 Hz, 1H), 5.03 (d, *J* = 4.4 Hz, 1H), 4.96 (dd, *J* = 10.4, 5.2 Hz, 2H), 4.58 (t, *J* = 8.0

Hz, 1H), 4.46 (t, *J* = 5.6 Hz, 1H), 4.01 (t, *J* = 7.2 Hz, 2H), 3.72 – 3.67 (m, 1H), 3.52 – 3.46 (m, 1H), 3.36 (m, 1H), 3.28 – 3.16 (m, 3H), 1.63 – 1.59 (m, 2H), 1.31 (m, 4H), 1.22 (m, 26H), 0.84 (t, *J* = 6.8 Hz, 3H). ^{13}C NMR (101 MHz, DMSO-d_6) δ 164.17, 163.95, 146.71, 132.61, 127.56, 126.51, 122.88, 122.29, 122.23, 121.74, 111.60, 85.16, 78.24, 77.99, 73.52, 70.56, 61.34, 31.77, 29.48, 29.19, 27.99, 27.02, 22.58, 14.43. HRMS (ESI, m/z): $[M+H]^+$ calcd. for $C_{36}H_{55}N_2O_7$: 627.4009; found: 627.4036.

5-N-galactosyl-2-hexyl-1H-benzo[*de*]isoquinoline-1,3(2*H*)-dione 6a: Amorphous yellow solid; yield: 94% (0.430 g); mp: 142-144 °C. IR (KBr, cm^{-1}): 3369, 2954, 2857, 1700, 1654. ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.13 (d, *J* = 7.2 Hz, 1H), 8.10 (s, 1H), 8.09 (d, *J* = 4.4 Hz, 1H), 7.66 (t, *J* = 7.6 Hz, 1H), 7.45 (d, *J* = 2.0 Hz, 1H), 7.18 (d, *J* = 7.6 Hz, 1H), 4.81 (d, *J* = 5.2 Hz, 2H), 4.60 – 4.52 (m, 2H), 4.45 (d, *J* = 4.0 Hz, 1H), 4.01 (t, *J* = 7.6 Hz, 2H), 3.78 (t, *J* = 3.6 Hz, 1H), 3.64 – 3.53 (m, 3H), 3.50 – 3.45 (m, 2H),1.66 – 1.56 (m, 2H), 1.31 (m, 6H), 0.86 (t, *J* = 7.2 Hz, 3H). ^{13}C NMR (101 MHz, DMSO-d_6) δ 164.17, 163.96, 146.80, 133.78, 132.53, 127.56, 126.47, 122.85, 122.24, 122.19, 121.67, 111.61, 85.61, 76.23, 74.82, 70.59, 68.84, 60.95, 31.44, 27.94, 26.67, 22.47, 14.39. HRMS (ESI, m/z): $[M+H]^+$ calcd. for $C_{24}H_{31}N_2O_7$: 459.2131; found: 459.2151.

5-N-galactosyl-2-octyl-1H-benzo[*de*]isoquinoline-1,3(2*H*)-dione 6b: Amorphous yellow solid; yield: 87% (0.422 g); mp: 140-142 °C. IR (KBr, cm^{-1}): 3372, 2924, 2853, 1700, 1653. ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.13 (d, *J* = 6.8 Hz, 1H), 8.10 (s, 1H), 8.09 (d, *J* = 4.0 Hz, 1H), 7.66 (t, *J* = 8.0 Hz, 1H), 7.45 (d, *J* = 2.0 Hz, 1H), 7.18 (d, *J* = 8.0 Hz, 1H), 4.81 (d, *J* = 5.2 Hz, 2H), 4.61 – 4.52 (m, 2H), 4.45 (d, J = 4.0 Hz, 1H), 4.01 (t, J = 7.2 Hz, 2H), 3.78 (t, *J* = 3.6 Hz, 1H), 3.61 – 3.55 (m, 3H), 3.51 – 3.43 (m, 2H), 1.64 – 1.57 (m, 2H), 1.31 (m, 4H), 1.24 (m, 6H), 0.85 (t, *J* = 6.8 Hz, 3H). ^{13}C NMR (101 MHz, DMSO-d_6) δ 164.16, 163.95, 146.79, 133.77, 132.51, 127.52, 126.45, 122.85, 122.22, 122.19, 121.68, 111.63, 85.64, 76.23, 74.81, 70.58, 68.84, 60.95, 31.67, 29.15, 29.03, 27.95, 26.99, 22.52, 14.38. HRMS (ESI, m/z): $[M+H]^+$ calcd. for $C_{26}H_{35}N_2O_7$: 487.2444; found: 487.2469.

5-N-galactosyl-2-decyl-1H-benzo[*de*]isoquinoline-1,3(2*H*)-dione 6c: Amorphous yellow solid; yield: 90% (0.462 g); mp: 168-170 °C. IR (KBr, cm^{-1}): 3382, 2922, 2850, 1703, 1651. ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.16 – 8.07 (m, 3H), 7.66 (t, J = 7.8 Hz,

1H), 7.45 (s, 1H), 7.17 (d, J = 7.4 Hz, 1H), 4.82 (d, J = 5.2 Hz, 2H), 4.61-4.53 (m, 2H), 4.46 (d, J = 4.0 Hz, 1H), 4.01 (t, J = 7.2 Hz, 2H), 3.78 (s, 1H), 3.63 – 3.48 (m, 5H), 1.61 (d, J = 0.8 Hz, 2H), 1.31 (s, 4H), 1.23 (s, 10H), 0.83 (t, J = 6.8 Hz, 3H). ^{13}C NMR (101 MHz, DMSO-d_6) δ 164.16, 163.95, 146.80, 133.77, 132.50, 127.52, 126.44, 122.85, 122.23, 122.19, 121.68, 111.63, 85.65, 76.23, 74.82, 70.59, 68.83, 60.94, 31.73, 29.38, 29.36, 29.19, 29.12, 27.95, 26.98, 22.54, 14.40. HRMS (ESI, m/z): $[M+H]^+$ calcd. for $C_{28}H_{39}N_2O_7$: 515.2757; found: 515.2774.

5-N-galactosyl-2-dodecyl-1H-benzo[*de*]isoquinoline-1,3(2*H*)-dione 6d: Amorphous yellow solid; yield: 88% (0.476 g); mp: 141-143 °C. IR (KBr, cm^{-1}): 3386, 2922, 2851, 1701, 1653. ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.13 (d, *J* = 7.2 Hz, 1H), 8.10 (s, 1H), 8.09 (d, *J* = 4.4 Hz, 1H), 7.66 (t, *J* = 8.0 Hz, 1H), 7.45 (d, *J* = 2.0 Hz, 1H), 7.18 (d, *J* = 7.6 Hz, 1H), 4.81 (d, *J* = 5.6 Hz, 2H), 4.60 – 4.52 (m, 2H), 4.45 (d, *J* = 4.0 Hz, 1H), 4.01 (t, *J* = 7.2 Hz, 2H), 3.78 (t, *J* = 3.6 Hz, 1H), 3.63 – 3.54 (m, 3H), 3.51 – 3.44 (m, 2H), 1.64 – 1.57 (m, 2H), 1.31 (m, 4H), 1.22 (m, 14H), 0.84 (t, *J* = 6.8 Hz, 3H). ^{13}C NMR (101 MHz, DMSO-d_6) δ 164.15, 163.94, 146.80, 133.78, 132.51, 127.52, 126.43, 122.84, 122.24, 122.19, 121.68, 111.59, 85.63, 76.23, 74.83, 70.59, 68.82, 60.93, 31.77, 29.48, 29.40, 29.23, 29.19, 27.98, 27.02, 22.58, 14.43. HRMS (ESI, m/z): $[M+H]^+$ calcd. for $C_{30}H_{43}N_2O_7$: 543.3070; found: 543.3089

5-N-galactosyl-2-tetradecyl-1H-benzo[*de*]isoquinoline-1,3(2*H*)-dione 6e: Amorphous yellow solid; yield: 87% (0.495 g); mp: 133-135 °C. IR (KBr, cm^{-1}): 3389, 2922, 2851, 1702, 1651. ^{1}H NMR (400 MHz, DMSO-d_6) 8.13 (d, *J* = 7.2 Hz, 1H), 8.10 (s, 1H), 8.09 (d, *J* = 4.4 Hz, 1H), 7.66 (t, *J* = 8.0 Hz, 1H), 7.45 (d, *J* = 2.4 Hz, 1H), 7.18 (d, *J* = 7.6 Hz, 1H), 4.81 (d, *J* = 5.2 Hz, 2H), 4.60 – 4.52 (m, 2H), 4.44 (d, *J* = 4.4 Hz, 1H), 4.01 (t, *J* = 7.6 Hz, 2H), 3.78 (t, J = 3.6 Hz, 1H), 3.63 – 3.54 (m, 3H), 3.50 – 3.44 (m, 2H), 1.65 – 1.57 (m, 2H), 1.31 (m, 4H), 1.22 (m, 18H), 0.84 (t, *J* = 7.2 Hz, 3H). ^{13}C NMR (101 MHz, DMSO-d_6) δ 164.16, 163.95, 146.81, 133.79, 132.52, 127.53, 126.44, 122.86, 122.24, 122.20, 121.69, 111.60, 85.64, 76.23, 74.83, 70.58, 68.82, 60.93, 31.77, 29.49, 29.39, 29.22, 29.19, 27.98, 27.02, 22.58, 14.43. HRMS (ESI, m/z): $[M+H]^+$ calcd. for $C_{32}H_{47}N_2O_7$: 571.3383; found: 571.3406.

5-N-galactosyl-2-hexadecyl-1H-benzo[*de*]isoquinoline-1,3(2*H*)-dione 6f: Amorphous yellow solid; yield: 89% (0.532 g); mp: 131-133 °C. IR (KBr, cm^{-1}): 3388,

2920, 2849, 1702, 1654. ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.13 (d, *J* = 7.2 Hz, 1H),), 8.10 (s, 1H), 8.09 (d, *J* = 4.4 Hz, 1H), 7.66 (t, *J* = 7.6 Hz, 1H), 7.44 (d, *J* = 1.6 Hz, 1H), 7.18 (d, *J* = 7.6 Hz, 1H), 4.80 (d, *J* = 5.6 Hz, 2H), 4.59 – 4.53 (m, 2H), 4.44 (d, *J* = 4.0 Hz, 1H), 4.01 (t, *J* = 7.2 Hz, 2H), 3.78 (t, *J* = 3.6 Hz, 1H), 3.59 – 3.54 (m, 3H), 3.50 – 3.43 (m, 2H), 1.65 – 1.57 (m, 2H), 1.30 (m, 4H), 1.22 (m, 22H), 0.84 (t, *J* = 7.2 Hz, 3H). ^{13}C NMR (101 MHz, DMSO-d_6) δ 164.14, 163.94, 146.79, 133.77, 132.51, 127.51, 126.43, 122.83, 122.18, 121.68, 111.60, 85.63, 76.21, 74.82, 70.58, 68.81, 60.92, 31.77, 29.49, 29.39, 29.22, 29.19, 27.98, 27.03, 22.58, 14.42. HRMS (ESI, m/z): $[M+H]^+$ calcd. for $C_{34}H_{51}N_2O_7$: 599.3696; found: 599.3715.

5-N-galactosyl-2-octadecyl-1H-benzo[*de*]isoquinoline-1,3(2*H*)-dione 6g: Amorphous yellow solid; yield: 86% (0.538 g); mp: 140-142 °C. IR (KBr, cm^{-1}): 3388, 2922, 2850, 1702, 1651. ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.13 (d, *J* = 7.2 Hz, 1H),), 8.10 (s, 1H), 8.09 (d, *J* = 4.4 Hz, 1H), 7.66 (t, *J* = 8.0 Hz, 1H),7.44 (d, *J* = 2.0 Hz, 1H), 7.18 (d, J = 7.6 Hz, 1H), 4.80 (d, *J* = 5.2 Hz, 2H), 4.60 – 4.51 (m, 2H), 4.44 (d, *J* = 4.4 Hz, 1H), 4.01 (t, *J* = 7.6 Hz, 2H), 3.78 (t, *J* = 3.6 Hz, 1H), 3.61 – 3.54 (m, 3H), 3.50 – 3.43 (m, 2H), 1.64 – 1.57 (m, 2H), 1.31 (m, 4H), 1.22 (m, 26H), 0.84 (t, *J* = 7.2 Hz, 3H). ^{13}C NMR (101 MHz, DMSO-d_6) δ 164.14, 163.94, 146.80, 133.78, 132.51, 127.51, 126.43, 122.84, 122.24, 122.19, 121.68, 111.60, 85.64, 76.22, 74.82, 70.58, 68.81, 60.92, 31.78, 29.49, 29.40, 29.23, 29.19, 27.99, 27.03, 22.58, 14.42. HRMS (ESI, m/z): $[M+H]^+$ calcd. for $C_{36}H_{55}N_2O_7$: 627.4009; found: 627.4036

5-N-xylosyl-2-hexyl-1H-benzo[*de*]isoquinoline-1,3(2*H*)-dione 7a: Amorphous yellow solid; yield: 93% (0.398 g); mp: 183-185 °C. IR (KBr, cm^{-1}): 3431, 3329, 2929, 2855, 1703, 1651. ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.15 (d, *J* = 2.4 Hz, 1H), 8.13 (s, 1H), 8.07 (d, *J* = 2.4 Hz, 1H), 7.67 (t, *J* = 8.0 Hz, 1H), 7.44 (d, *J* = 2.0 Hz, 1H), 7.19 (d, *J* = 8.0 Hz, 1H), 5.08 (d, *J* = 4.0 Hz, 1H), 5.01 (t, *J* = 4.8 Hz, 2H), 4.56 (t, *J* = 8.0 Hz, 1H), 4.01 (t, *J* =7.6, 2H), 3.73 (dd, J = 10.0, 4.4 Hz, 1H), 3.42 – 3.34 (m, 1H), 3.30–3.21 (m, 3H), 1.66 – 1.56 (m, 2H), 1.32 (m, 6H), 0.86 (t, *J* = 6.8 Hz, 3H). ^{13}C NMR (101 MHz, DMSO-d_6) δ 164.11, 163.91, 146.50, 133.73, 132.55, 127.56, 126.55, 122.90, 122.19, 122.10, 121.74, 111.50, 85.72, 78.16, 73.39, 70.31, 67.04, 31.45, 27.94, 26.68, 22.47, 14.39. HRMS (ESI, m/z): $[M+H]^+$ calcd. for $C_{23}H_{29}N_2O_6$: 429.2026; found: 429.2041.

5-N-xylosyl-2-octyl-1H-benzo[*de*]isoquinoline-1,3(2*H*)-dione 7b: Amorphous yellow solid; yield: 91% (0.414 g); mp: 182-184 °C. IR (KBr, cm^{-1}): 3427, 3328, 2925, 2852, 1703, 1651. ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.15 (d, *J* = 2.4 Hz, 1H), 8.13 (d, *J* = 1.2 Hz, 1H), 8.07 (d, *J* = 2.4 Hz, 1H), 7.67 (t, *J* = 8.0 Hz, 1H), 7.44 (d, *J* = 2.4 Hz, 1H), 7.19 (d, *J* = 8.0 Hz, 1H), 5.08 (d, *J* = 4.4 Hz, 1H), 5.01 (t, *J* = 4.8 Hz, 2H), 4.56 (t, *J* = 8.0 Hz, 1H), 4.01 (t, *J* =7.6, 2H), 3.73 (dd, J = 10.0, 4.4 Hz, 1H), 3.41 – 3.34 (m, 1H), 3.30–3.20 (m, 3H), 1.66 – 1.55 (m, 2H), 1.30 (m, 4H), 1.25 (m, 6H), 0.85 (t, *J* = 6.8 Hz, 3H). ^{13}C NMR (101 MHz, DMSO-d_6) δ 164.09, 163.87, 146.27, 133.63, 132.27, 127.16, 126.53, 122.94, 122.26, 122.12, 121.99, 111.57, 86.00, 79.37, 79.05, 78.72, 77.91, 73.18, 70.22, 66.93, 31.76, 29.28, 29.14, 28.08, 27.12, 22.59, 14.34. HRMS (ESI, m/z): $[M+H]^+$ calcd. for $C_{25}H_{33}N_2O_6$: 457.2339; found: 457.2362.

5-N-xylosyl-2-decyl-1H-benzo[*de*]isoquinoline-1,3(2*H*)-dione 7c: Amorphous yellow solid; yield: 94% (0.454 g); mp: 175-177 °C. IR (KBr, cm–1): 3427, 3335, 2923, 2852, 1703, 1650. ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.15 (d, *J* = 2.8 Hz, 1H), 8.13 (d, *J* = 1.6 Hz, 1H), 8.07 (d, *J* = 2.4 Hz, 1H), 7.67 (t, *J* = 8.0 Hz, 1H), 7.44 (d, *J* = 2.0 Hz, 1H), 7.19 (d, *J* = 8.0 Hz, 1H), 5.08 (d, *J* = 4.0 Hz, 1H), 5.01 (t, *J* = 5.2 Hz, 2H), 4.55 (t, *J* = 8.0 Hz, 1H), 4.01 (t, *J* = 7.6 Hz, 2H), 3.73 (dd, *J* = 10.4, 4.4 Hz, 1H), 3.39 – 3.34 (m, 1H), 3.30 – 3.21 (m, 3H), 1.62 (m, 2H), 1.31 (m, 4H), 1.23 (m, 10H), 0.84 (t, *J* = 6.8 Hz, 3H). ^{13}C NMR (101 MHz, DMSO-d_6) δ 164.12, 163.92, 146.51, 133.75, 132.55, 127.55, 126.54, 122.92, 122.20, 122.10, 121.76, 111.50, 85.73, 78.16, 73.39, 70.31, 67.04, 31.75, 29.40, 29.22, 29.15, 27.97, 27.01, 22.57, 14.42. HRMS (ESI, m/z): $[M+H]^+$ calcd. for $C_{27}H_{37}N_2O_6$: 485.2652; found: 485.2669

5-N-xylosyl-2-dodecyl-1H-benzo[*de*]isoquinoline-1,3(2*H*)-dione 7d: Amorphous yellow solid; yield: 89% (0.455 g); mp: 177-179°C. IR (KBr, cm^{-1}): 3426, 3329, 2921, 2851, 1704, 1651. ^{1}H NMR (400 MHz, , DMSO-d_6) δ 8.15 (d, *J* = 2.4 Hz, 1H), 8.13 (d, *J* = 1.2 Hz, 1H), 8.06 (d, *J* = 2.4 Hz, 1H), 7.67 (t, *J* = 7.6 Hz, 1H), 7.44 (d, *J* = 2.0 Hz, 1H), 7.19 (d, *J* = 8.0 Hz, 1H), 5.07 (d, *J* = 4.0 Hz, 1H), 5.01 (t, *J* = 5.6 Hz, 2H), 4.55 (t, *J* = 8.0 Hz, 1H), 4.04 – 3.97 (m, 2H), 3.73 (dd, J = 10.4, 4.4 Hz, 1H), 3.40 – 3.34 (m, 1H), 3.30 – 3.22 (m, 3H), 1.66 – 1.55 (m, 2H), 1.31 (m, 4H), 1.22 (m, 14H), 0.84 (t, *J* = 6.8 Hz, 3H). ^{13}C NMR (101 MHz, DMSO-d_6) δ 164.15, 163.94, 146.54, 146.09, 133.77, 132.57, 127.58, 126.55, 122.95, 122.24, 122.11, 121.78, 111.52, 85.73, 78.16, 73.39,

70.31, 67.05, 31.77, 29.47, 29.38, 29.22, 29.18, 27.97, 27.00, 22.57, 14.43. HRMS (ESI, m/z): $[M+H]^+$ calcd. for $C_{29}H_{41}N_2O_6$: 513.2965; found: 513.2984.

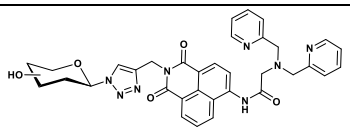
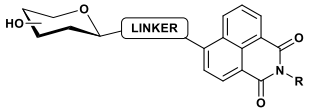
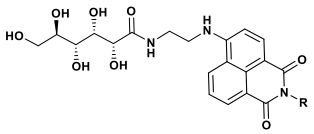
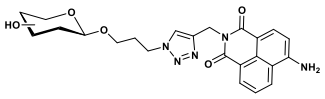
5-N-xylosyl-2-tetradecyl-1H-benzo[*de*]isoquinoline-1,3(2*H*)-dione 7e: Amorphous yellow solid; yield: 91% (0.491 g); mp: 159-161 °C. IR (KBr, cm^{-1}): 3426, 3333, 2920, 2850, 1704, 1650.^{1}H NMR (400 MHz, DMSO-d_6) δ 8.15 (d, *J* = 2.4 Hz, 1H), 8.13 (s, 1H), 8.06 (d, *J* = 2.0 Hz, 1H), 7.66 (t, *J* = 8.0 Hz, 1H), 7.44 (d, *J* = 2.0 Hz, 1H), 7.18 (d, *J* = 8.0 Hz, 1H), 5.07 (d, *J* = 4.0 Hz, 1H), 5.01 (t, *J* = 6.0 Hz, 2H), 4.55 (t, *J* = 7.6 Hz, 1H), 4.05 – 3.96 (m, 2H), 3.73 (dd, *J* = 10.0, 4.4 Hz, 1H), 3.41 – 3.34 (m, 1H), 3.29 – 3.21 (m, 3H), 1.66 – 1.57 (m, 2H), 1.30 (m, 4H), 1.22 (m, 18H), 0.84 (t, *J* = 7.2 Hz, 3H). ^{13}C NMR (101 MHz, DMSO-d_6) δ 164.16, 163.95, 162.74, 146.54, 133.78, 132.58, 127.59, 126.57, 122.96, 122.24, 122.11, 121.78, 111.53, 85.72, 78.15, 73.39, 70.31, 67.04, 31.77, 29.48, 29.36, 29.18, 27.96, 27.00, 22.57, 14.43, 0.59. HRMS (ESI, m/z): $[M+H]^+$ calcd. for $C_{31}H_{45}N_2O_6$: 541.3275; found: 541.3299.

5-N-xylosyl-2-hexadecyl-1H-benzo[*de*]isoquinoline-1,3(2*H*)-dione 7f: Amorphous yellow solid; yield: 86% (0.488 g); mp: 158-160 °C. IR (KBr, cm^{-1}): 3426, 3332, 2920, 2850, 1704, 1651.^{1}H NMR (400 MHz, , DMSO-d_6) δ 8.15 (d, *J* = 2.4 Hz, 1H), 8.13 (s, 1H), 8.06 (d, *J* = 2.0 Hz, 1H), 7.66 (t, J = 8.0 Hz, 1H), 7.44 (d, *J* = 2.4 Hz, 1H), 7.18 (d, *J* =8.0 Hz, 1H), 5.08 (d, *J* = 4.0 Hz, 1H), 5.01 (t, *J* = 5.6 Hz, 2H), 4.55 (t, *J* = 8.0 Hz, 1H), 4.04 – 3.97 (m, 2H), 3.73 (dd, *J* = 10.4, 4.4 Hz, 1H), 3.37 – 3.34 (m, 1H), 3.29 – 3.22 (m, 3H), 1.65 – 1.56 (m, 2H), 1.30 (m, 4H), 1.22 (m, 22H), 0.84 (t, J = 6.8 Hz, 3H). ^{13}C NMR (101 MHz, DMSO-d_6) δ 164.16, 163.95, 146.53, 133.78, 132.58, 127.60, 122.96, 122.24, 122.11, 121.77, 111.52, 85.71, 78.14, 73.38, 70.30, 67.03, 31.77, 29.47, 29.35, 29.18, 27.96, 26.99, 22.57, 14.43. HRMS (ESI, m/z): $[M+H]^+$ calcd. for $C_{33}H_{49}N_2O_6$: 569.3591; found: 569.3610.

5-N-xylosyl-2-octadecyl-1H-benzo[*de*]isoquinoline-1,3(2*H*)-dione 7g: Amorphous yellow solid; yield: 88% (0.524 g); mp: 153-155 °C. IR (KBr, cm^{-1}): 3427, 3329, 2920, 2850, 1704, 1651.^{1}H NMR (400 MHz, DMSO-d_6) δ 8.15 (d, *J* = 2.4 Hz, 1H), 8.13 (s, 1H), 8.06 (d, *J* = 2.0 Hz, 1H), 7.66 (t, *J* = 7.6 Hz, 1H), 7.44 (d, *J* = 2.0 Hz, 1H), 7.18 (d, *J* = 8.0 Hz, 1H), 5.07 (d, *J* = 4.0 Hz, 1H), 5.01 (t, *J* = 6.0 Hz, 2H), 4.55 (t, *J* = 8.0 Hz, 1H), 4.04 – 3.97 (m, 2H), 3.73 (dd, *J* = 10.4, 4.4 Hz, 1H), 3.41 – 3.34 (m, 1H), 3.30 – 3.20 (m, 3H), 1.64 – 1.56 (m, 2H), 1.30 (m, 4H), 1.22 (m, 26H), 0.84 (t, *J* = 7.2 Hz, 3H).

^{13}C NMR (101 MHz, DMSO-d_6) δ 163.95, 146.53, 133.78, 132.59, 127.60, 126.57, 122.96, 122.23, 122.11, 121.77, 111.52, 85.71, 78.14, 73.38, 70.30, 67.03, 31.77, 29.47, 29.35, 29.18, 27.96, 26.99, 22.57, 14.43. HRMS (ESI, m/z): $[M+H]^+$ calcd. for $C_{35}H_{52}N_2O_6$: 597.3904; found: 597.3910.

Reference S1: S. Kotowicz, M. Korzec, M. Siwy, S. Golba, J. G. Malecki, H. Janeczek, S. Mackowski, K. Bednarczyk, M. Libera and E. Schab-Balcerzak, *Dye. Pigment.*, **2018**, *158*, 65–78.

T**able S1**. Synthesis of sugar-based naphthalimides			
S. No.	**Structure**	**Summary of the methodology**	**Summary of application**
1		1. Only two derivatives were reported 2. Involves protection and deprotection of saccharide –OH groups 3. Multi-step synthesis 4. Involves column chromatography purification 5. Overall yield: Moderate	Li and co-workers: Enhanced aqueous sensitivity and lowered cytotoxicity of naphthalimide-based zinc ion fluorescence probe.[S2]
2		1. Limited substrate scope 2. Involves protection and deprotection of saccharide –OH groups 3. Multi-step synthesis 4. Involves column chromatography purification 5. Overall yield: Moderate to poor	Robinson and co-workers: Synthesis of amphiphilic sugar naphthalimide derivatives.[S3] Tian and co-workers: Photochromic fluorescent glycoprobes.[S7] Zhang and co-workers: Fluorescent probe for intracellular imaging of hexosaminidase.[S8]
3		1. Only two derivatives were reported 2. Multi-step synthesis 3. Involves column chromatography purification Overall yield: Poor	Yi and co-workers: Hydrogels as a hydrophilic drug delivery system.[S4] Yu and co-workers: construction of a Eu^{3+}-based metallogel *via* energy transfer in a supramolecular scaffold.[S5]
4		1. Involves protection and deprotection of saccharide –OH groups 2. Multi-step synthesis 3. Involves column chromatography purification Overall yield: Poor	Scanlan and co-workers: Fluorescent probes for tumor cell imaging.[S6,S9]

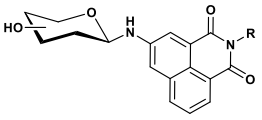
5		Key features of present work: 1. only 2 step reaction 2. selective β-anomeric product 3. broad substrate scope (21 derivatives) 3. Overall yield: excellent 4. No column chromatographic purification 5. Environmental friendly reaction condition 6. only 2 H_2O and O_2 as a side product	**Present work:** A facile **s**ynthesis of amphiphilic N-glycosyl naphthalimides and fabrication of flexible semiconductor using self-assembly

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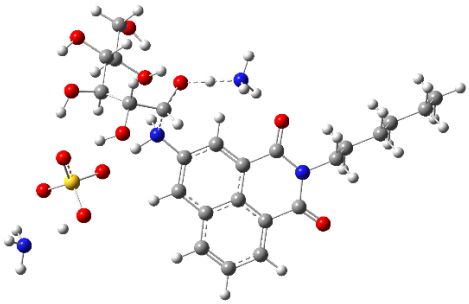
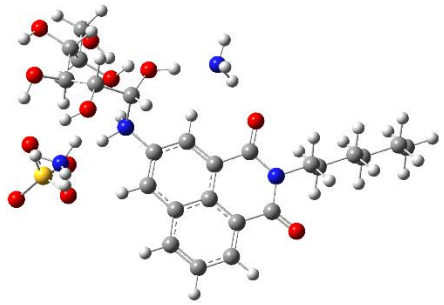
Table S2. Gelation Studies of Compound **5-7a-g** in Various Solvents and Vegetable oils.

Solvent/Oils	5a	5b	5c	5d	5e	5f	5g	6a	6b	6c	6d	6e	6f	6g	7a	7b	7c	7d	7e	7f	7g
linseed oil	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
olive oil	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	G(0.6)	G(0.6)
paraffin light	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	S	S	S	S	S	S	S
PEG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	S	S	S	S	S	S	S
chloroform	S	S	PG	G (0.3)	G (0.3)	G (0.3)	G (0.3)	S	S	PG	G (0.3)	G (0.3)	G (0.3)	G (0.3)	S	S	S	S	S	S	S
DMSO	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
DMSO+H_2O	G(0.5)	G(0.5)	G(0.5)	G(0.5)	G(0.5)	G(0.5)	G(0.5)	G(0.5)	G(0.5)	G(0.5)	G(0.5)	G(0.5)	G(0.5)	G(0.5)	G(0.6)	G(0.6)	G(0.6)	G(0.6)	G(0.6)	G(0.6)	G(0.6)
cyclohexane	I	I	S	G (0.8)	G (0.8)	G (0.8)	G (0.8)	I	S	S	G (0.8)	G (0.8)	G (0.8)	G (0.8)	I	I	S	S	S	S	S
Toulene	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG	PG
N-Methyl-2-pyrrolidone (NMP)	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
1,4-dioxane	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
EtOH	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
methanol	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
isopropanol	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
xylene	S	S	S	G(08)	G(0.6)	G(0.6)	G(0.6)	S	S	S	G(0.8)	G(0.6)	G(0.6)	G(0.6)	S	S	S	S	S	S	S
water	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I

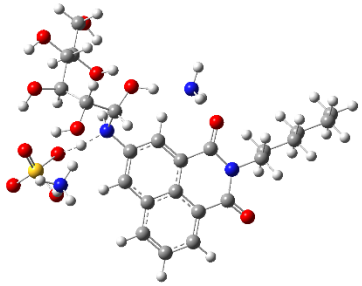
CGC, critical gelation concentration given in % w/v. S, soluble; G, Gel; PG, partial gel; P, precipitation



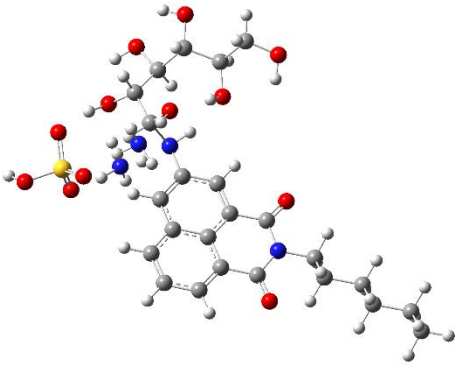
TS1



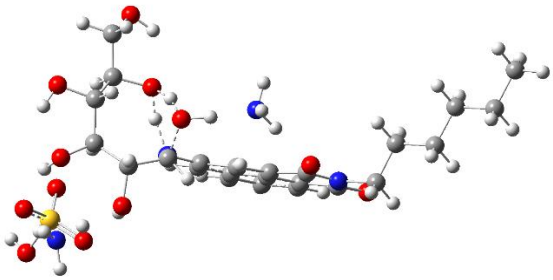
IM1



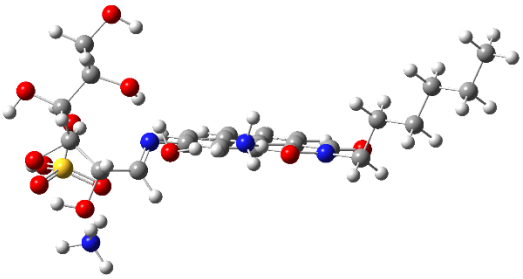
TS2



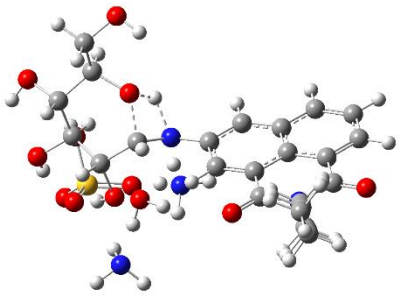
IM2



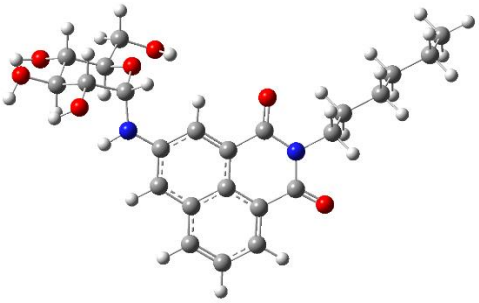
TS3



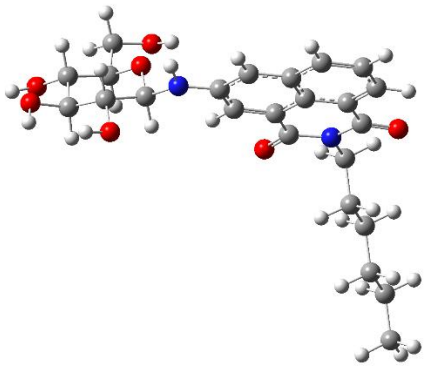
IM3



TS4

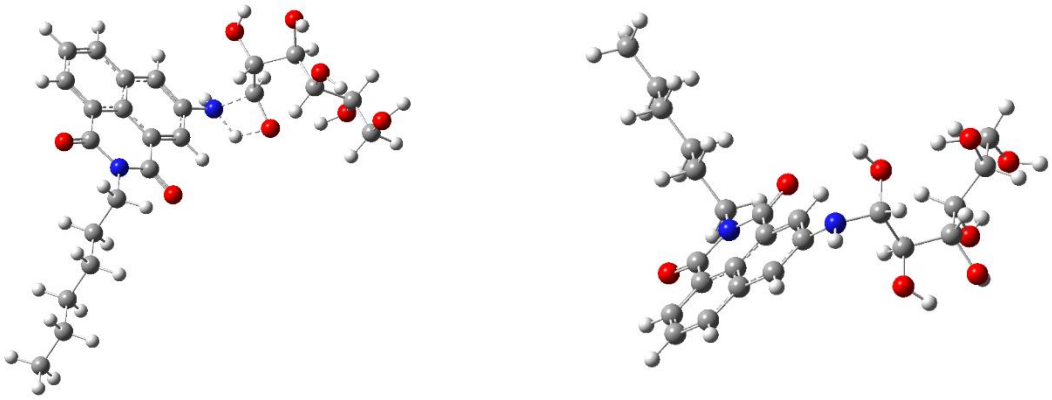


a-PC



e-PC

Figure S1. Images of the optimized geometries of the TSs, IM and products obtained in the reaction between D-glucose and N-alkyl-3-aminonapthlimide in the presence of ammonium sulphate. TS, transition state; IM, intermediate; a-PC, axillary product(α-anomeric product); e-PC, equatorial product(β-anomeric product).



TS **IM2**

Figure S2. Images of the optimized geometries of the TS and IM2 obtained in the reaction between D-glucose and N-alkyl-3-aminonapthlimide in the absence of ammonium sulphate. TS, transition state; IM, intermediate.

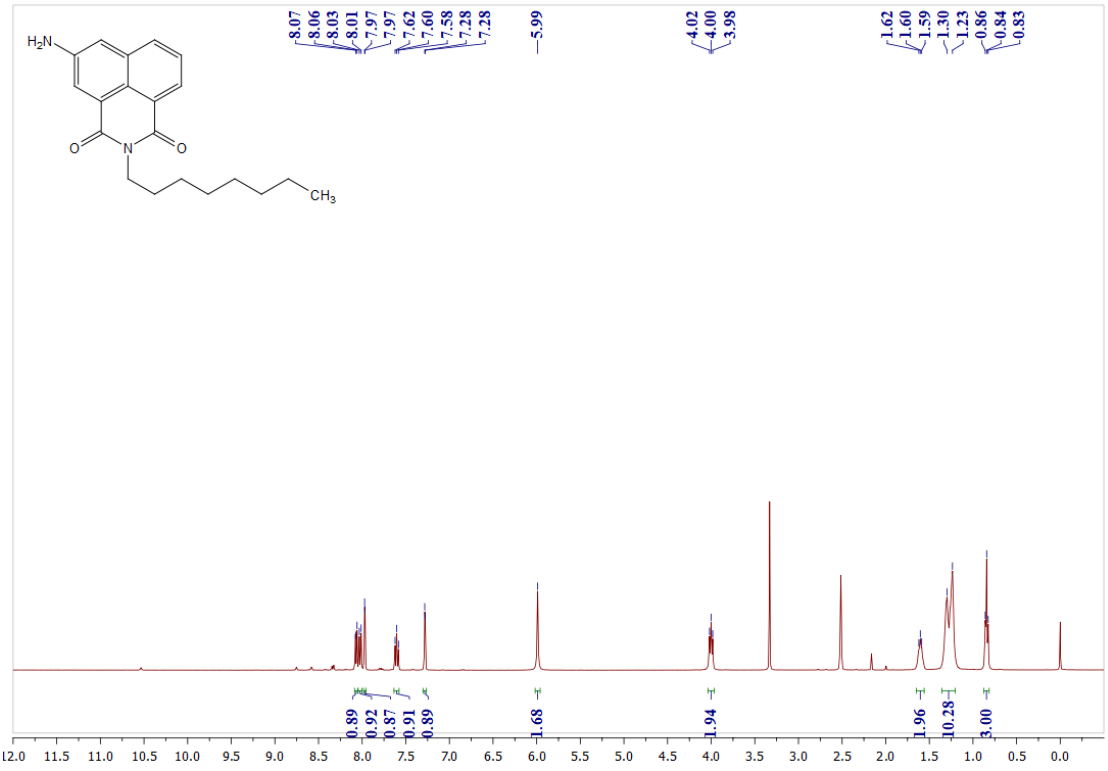


Figure S3. ^{1}H NMR Spectrum of compound 3b (400 MHz, DMSO-d_6)

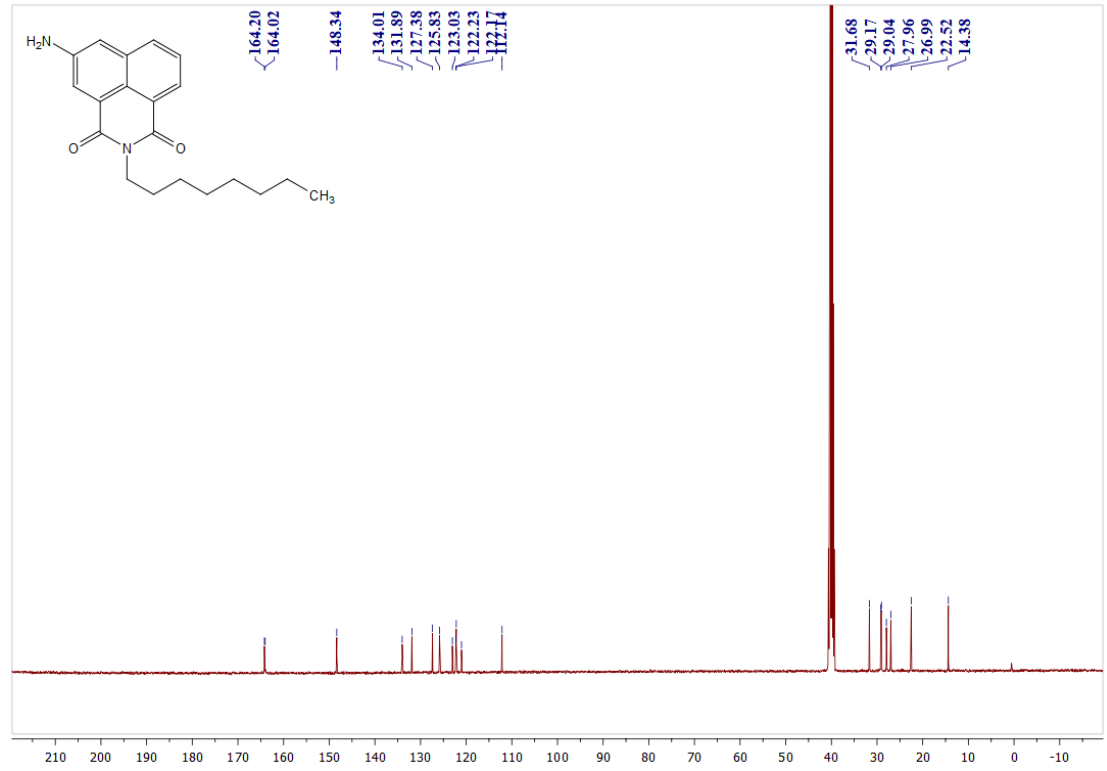


Figure S4. ^{13}C NMR Spectrum of compound 3b (101 MHz, DMSO-d_6)

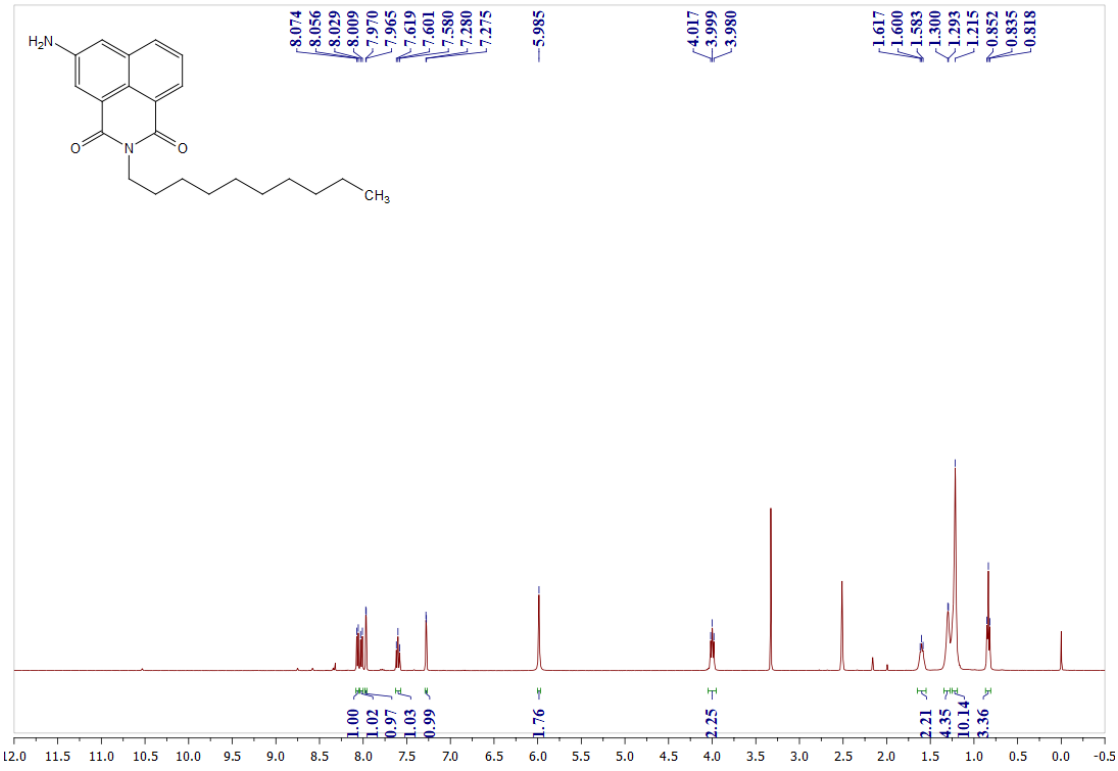


Figure S5. ^{1}H NMR Spectrum of compound 3c (400 MHz, DMSO-d_6)

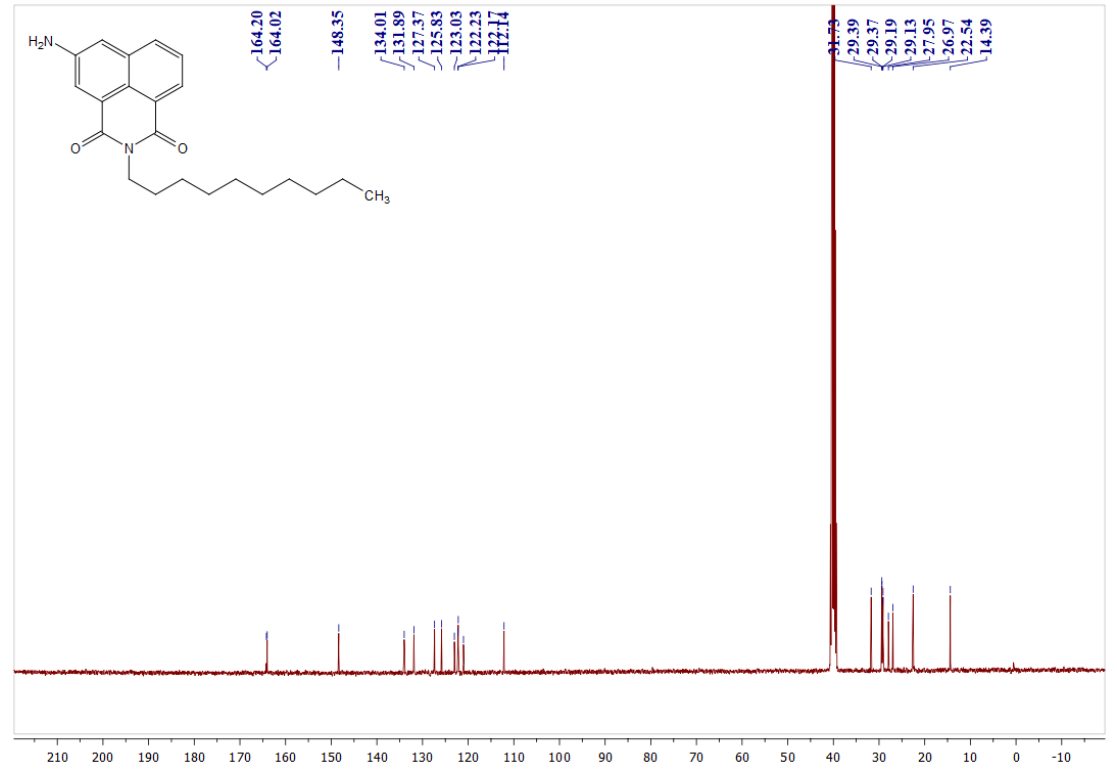


Figure S6. ^{13}C NMR Spectrum of compound 3c (101 MHz, DMSO-d_6)

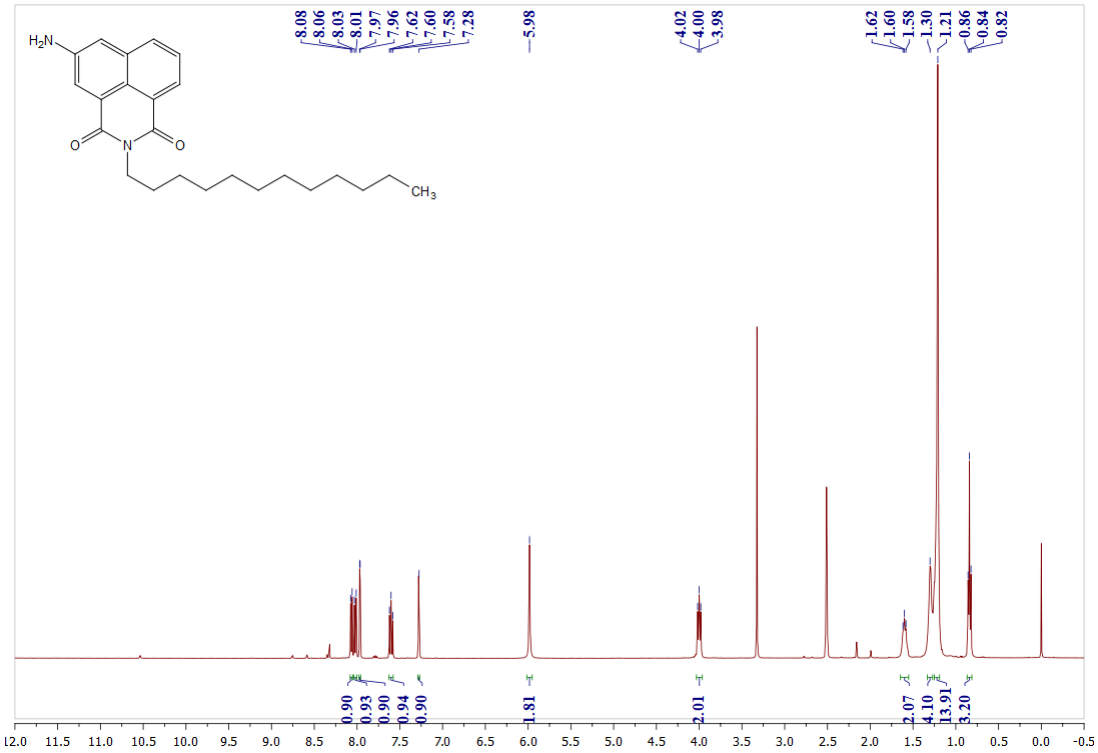


Figure S7. ^{1}H NMR Spectrum of compound 3d (400 MHz, DMSO-d_6)

Figure S8. ^{13}C NMR Spectrum of compound 3d (101 MHz, DMSO-d_6)

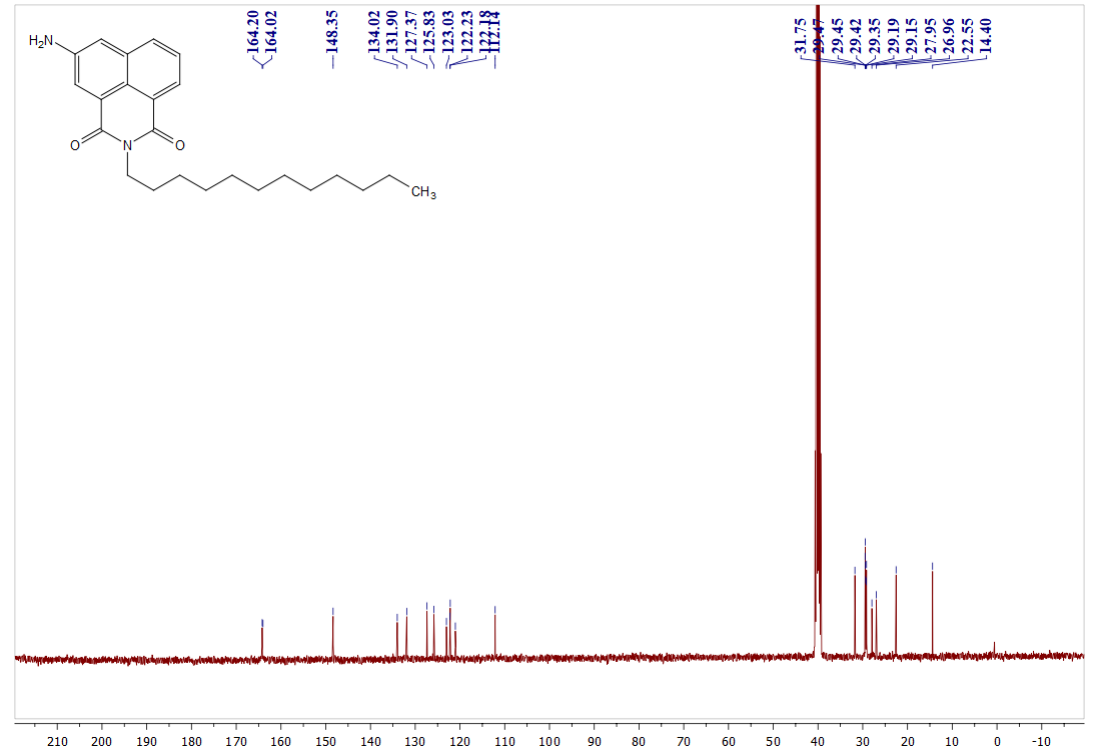


Figure S8. ^{13}C NMR Spectrum of compound 3d (101 MHz, DMSO-d_6)

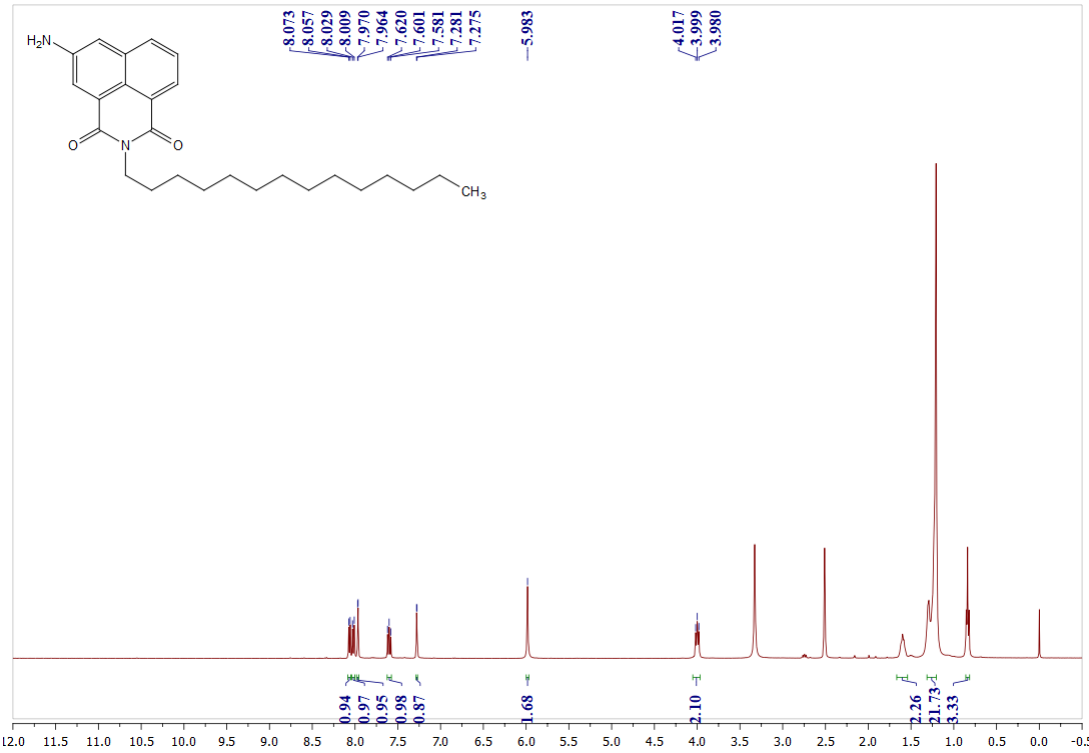


Figure S9. ^{1}H NMR Spectrum of compound 3e (400 MHz, DMSO-d_6)

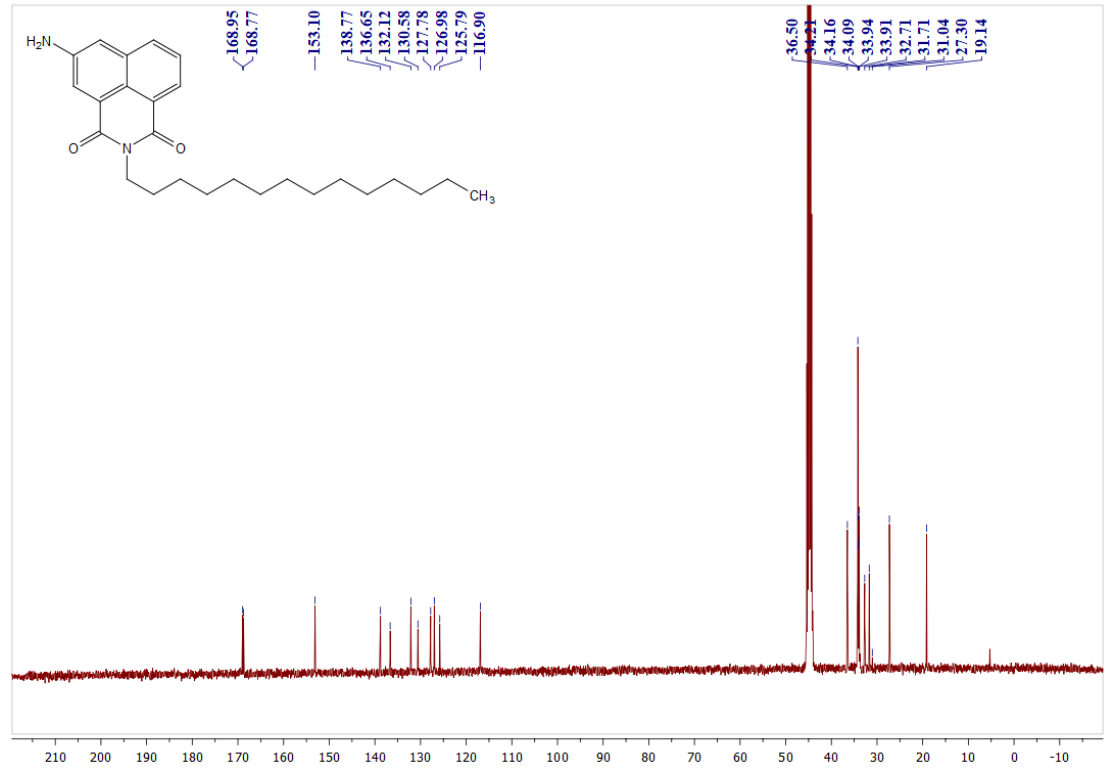


Figure S10. ^{13}C NMR Spectrum of compound 3e (101 MHz, DMSO-d_6)

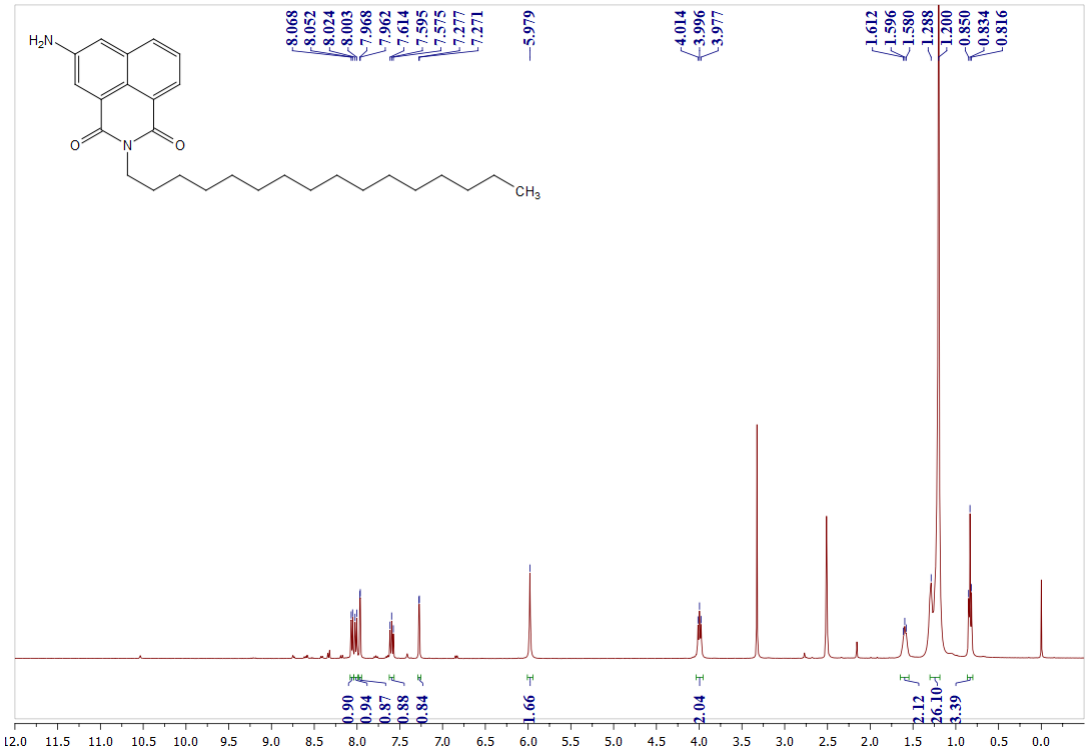


Figure S11. ^{1}H NMR Spectrum of compound 3f (400 MHz, DMSO-d_6)

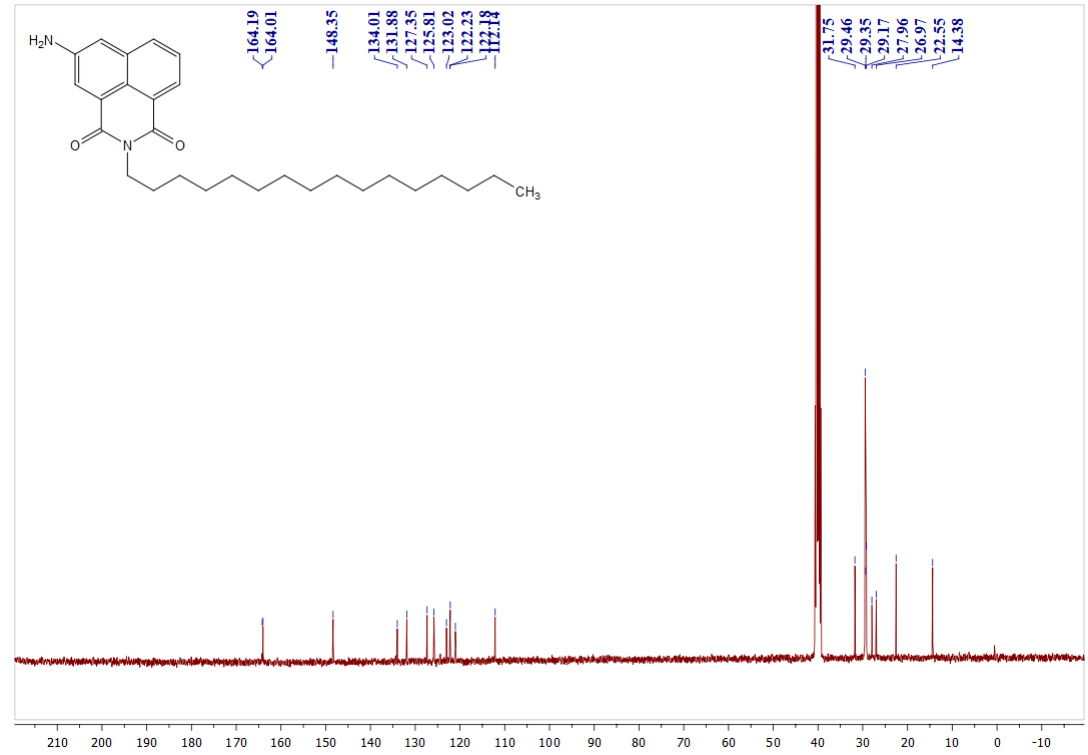


Figure S12. ^{13}C NMR Spectrum of compound 3f (101 MHz, DMSO-d_6)

Figure S13. ^{1}H NMR Spectrum of compound 3g (400 MHz, DMSO-*d*$_6$)

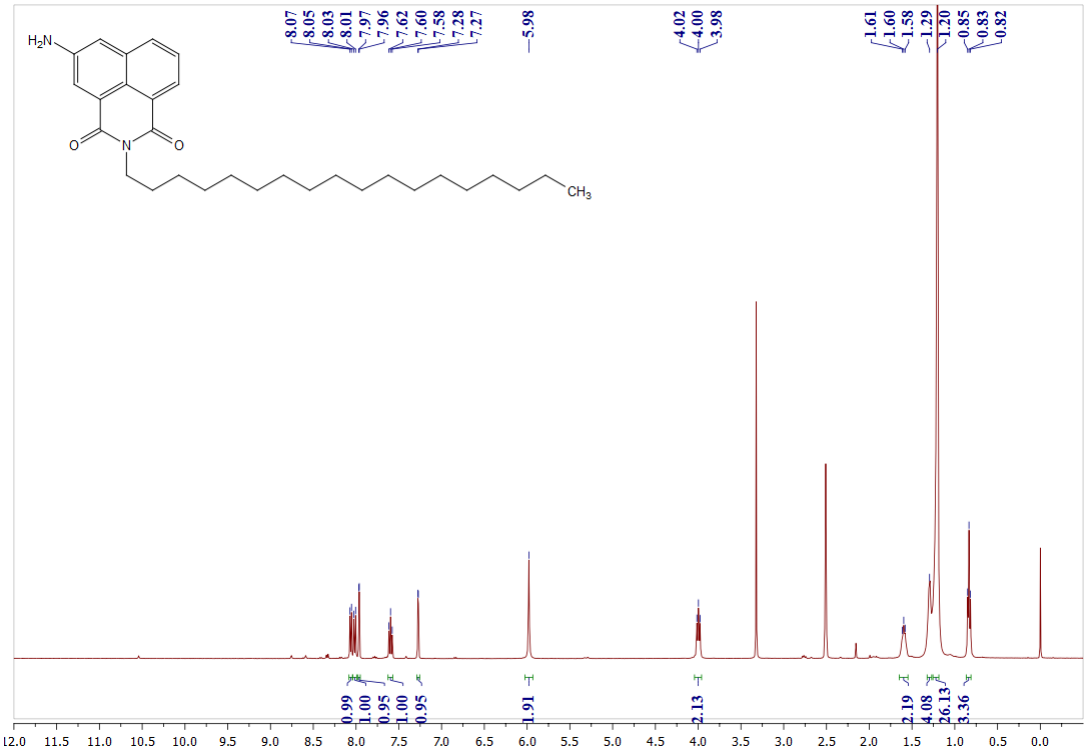


Figure S13. ^{1}H NMR Spectrum of compound 3g (400 MHz, DMSO-*d*$_6$)

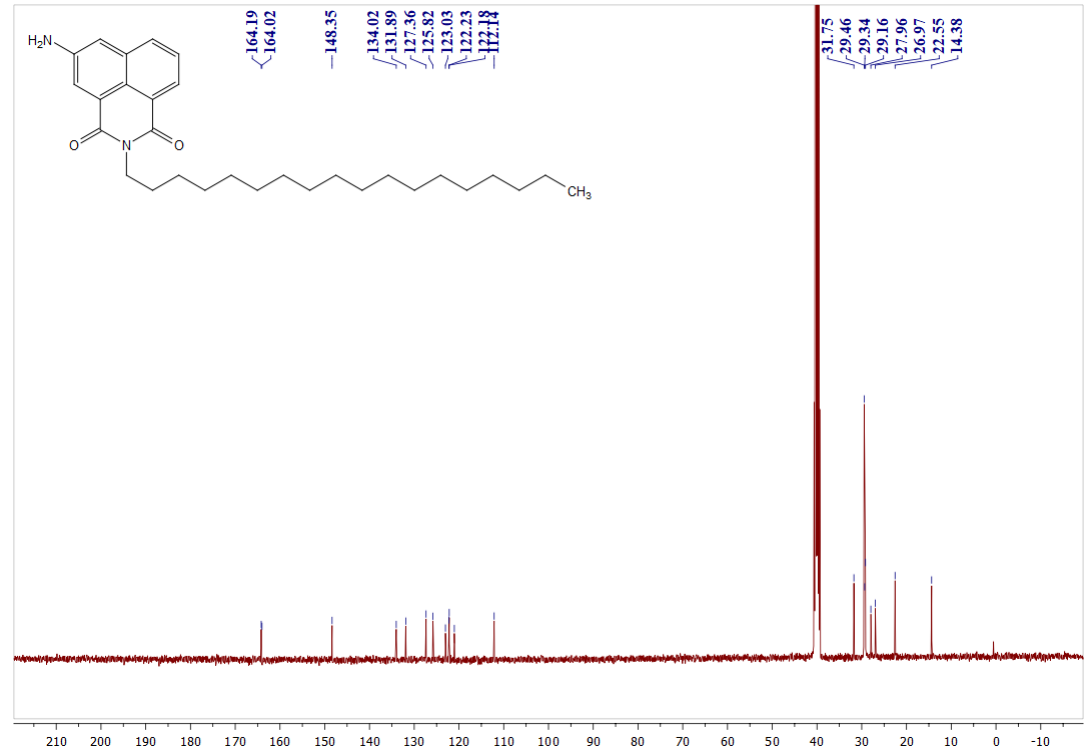


Figure S14. ^{13}C NMR Spectrum of compound 3g (101 MHz, DMSO-*d*$_6$)

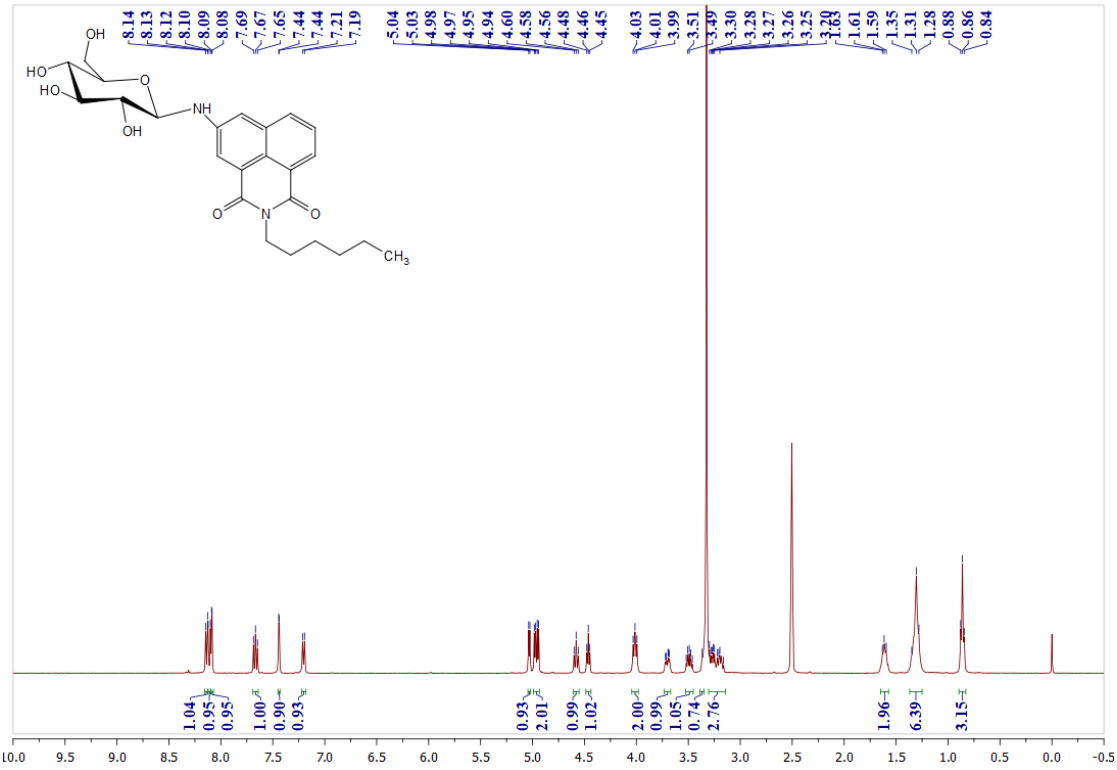


Figure S15. ^{1}H NMR Spectrum of compound 5a (400 MHz, DMSO-d_6)

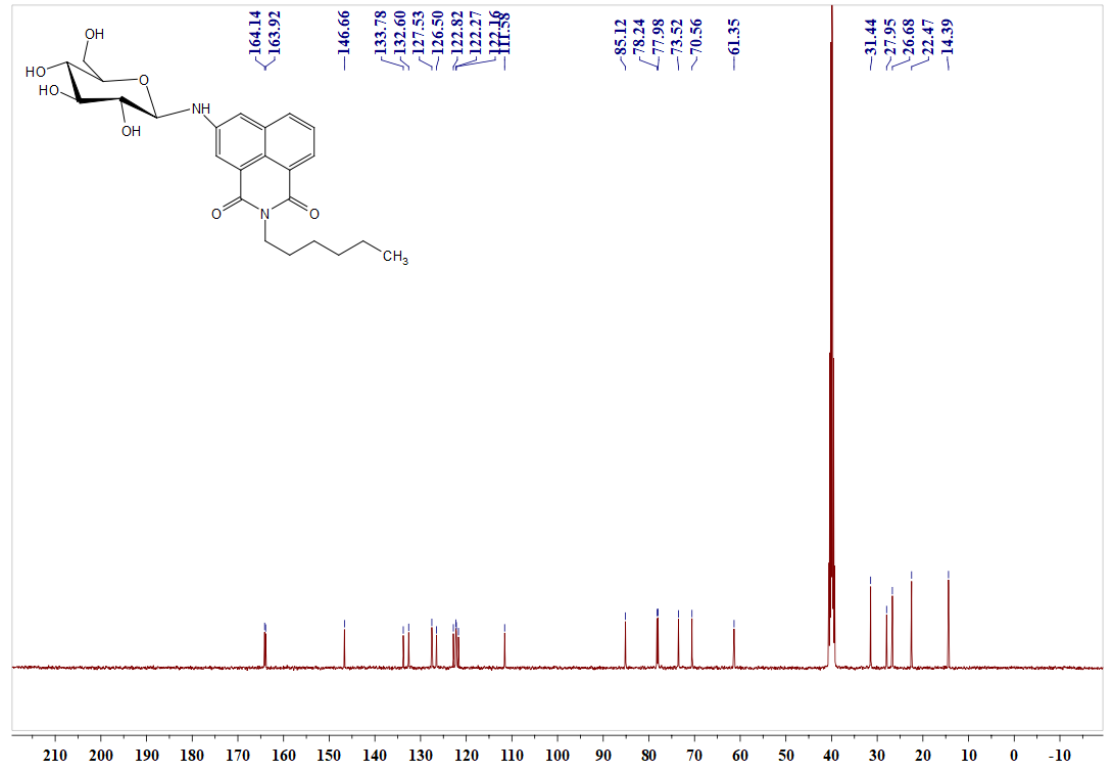


Figure S16. ^{13}C NMR Spectrum of compound 5a (101 MHz, DMSO-d_6)

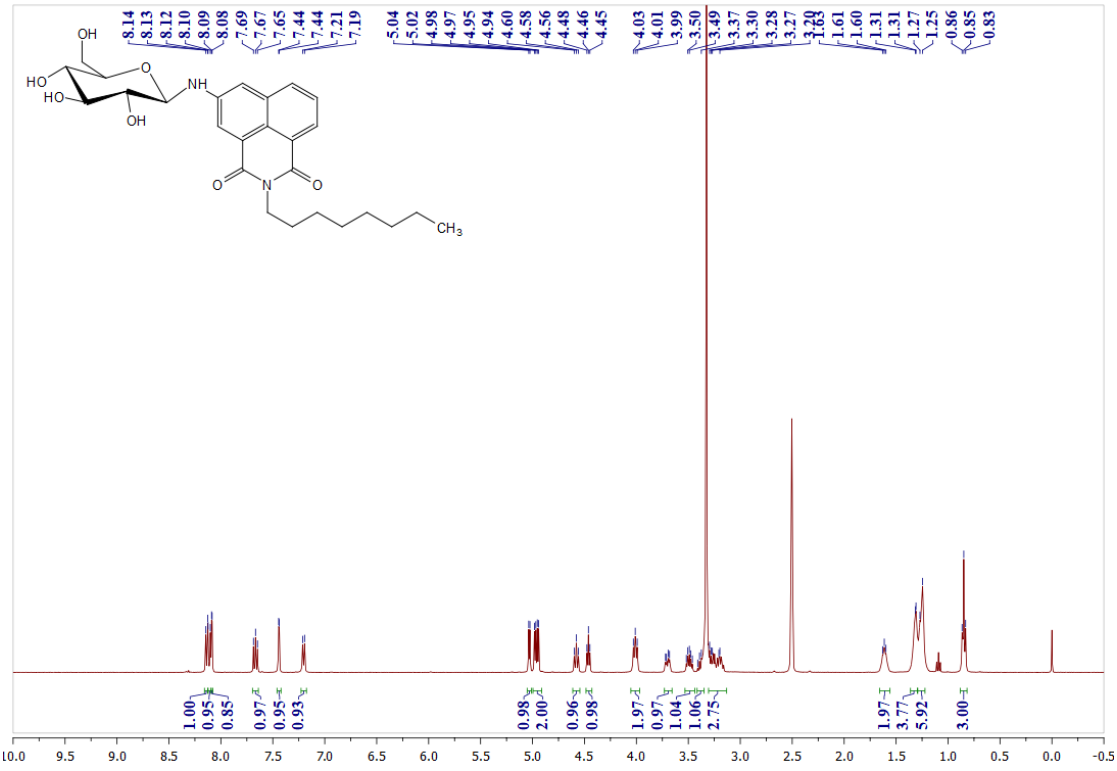


Figure S17. ^{1}H NMR Spectrum of compound 5b (400 MHz, DMSO-*d*$_6$)

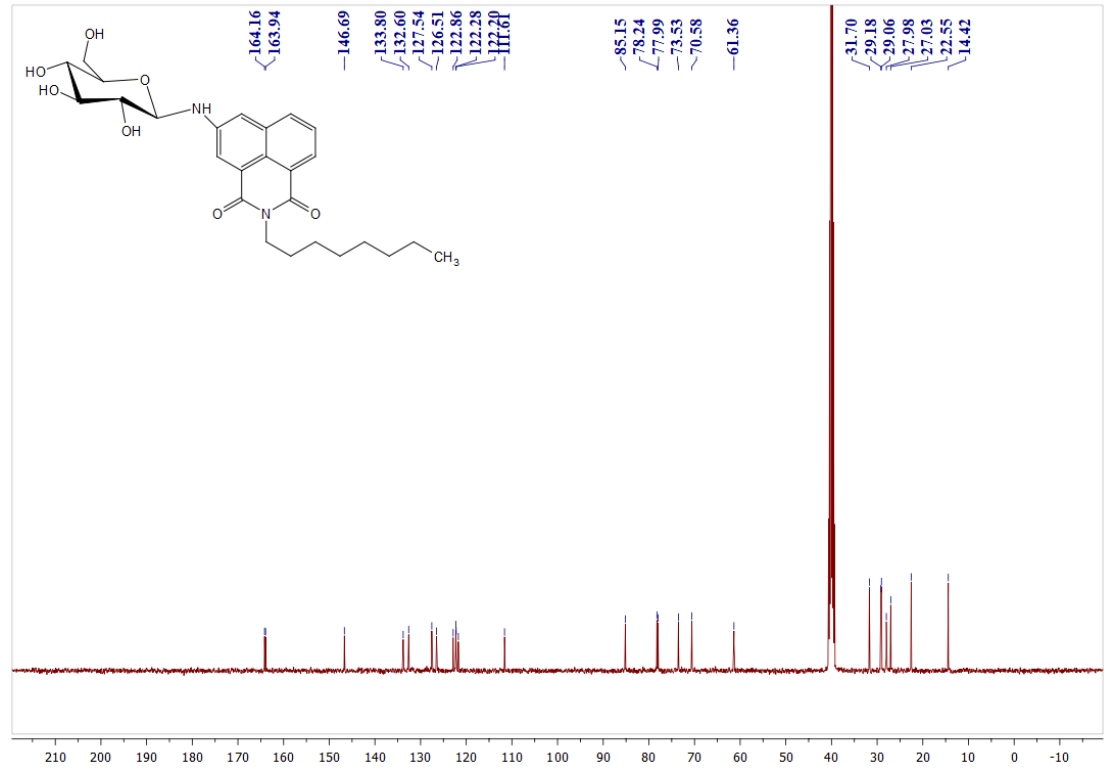


Figure S18. ^{13}C NMR Spectrum of compound 5b (101 MHz, DMSO-*d*$_6$)

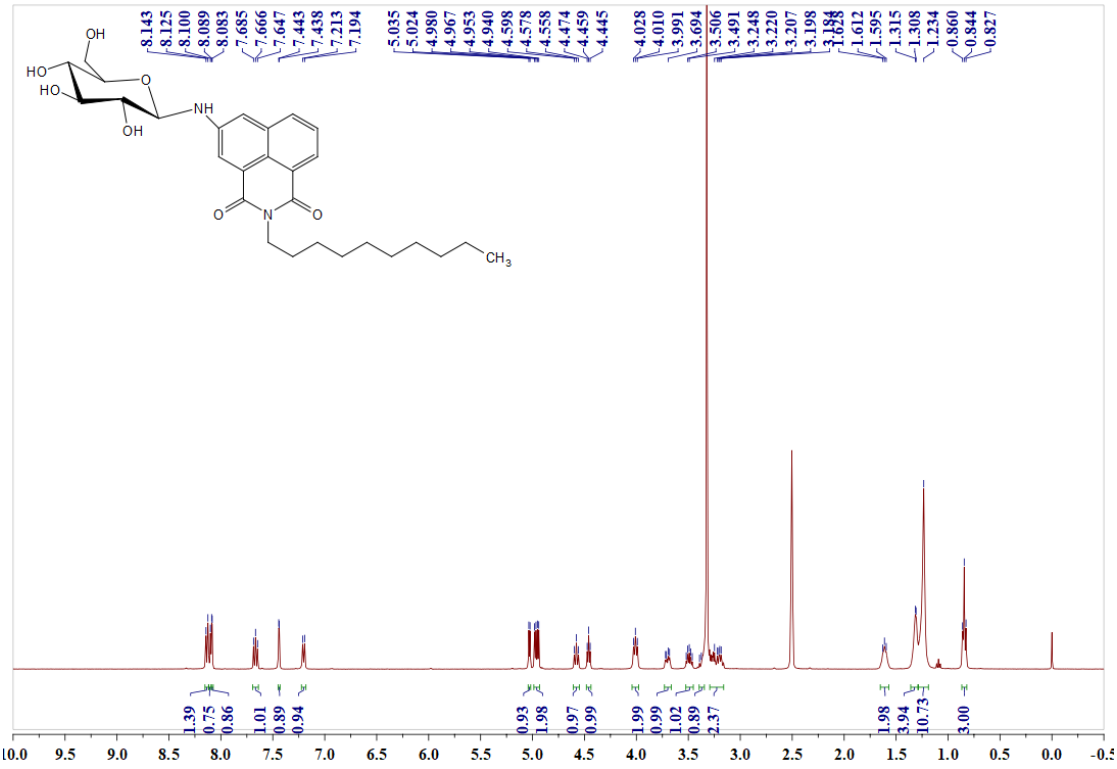


Figure S19. ^{1}H NMR Spectrum of compound 5c (400 MHz, DMSO-d_6)

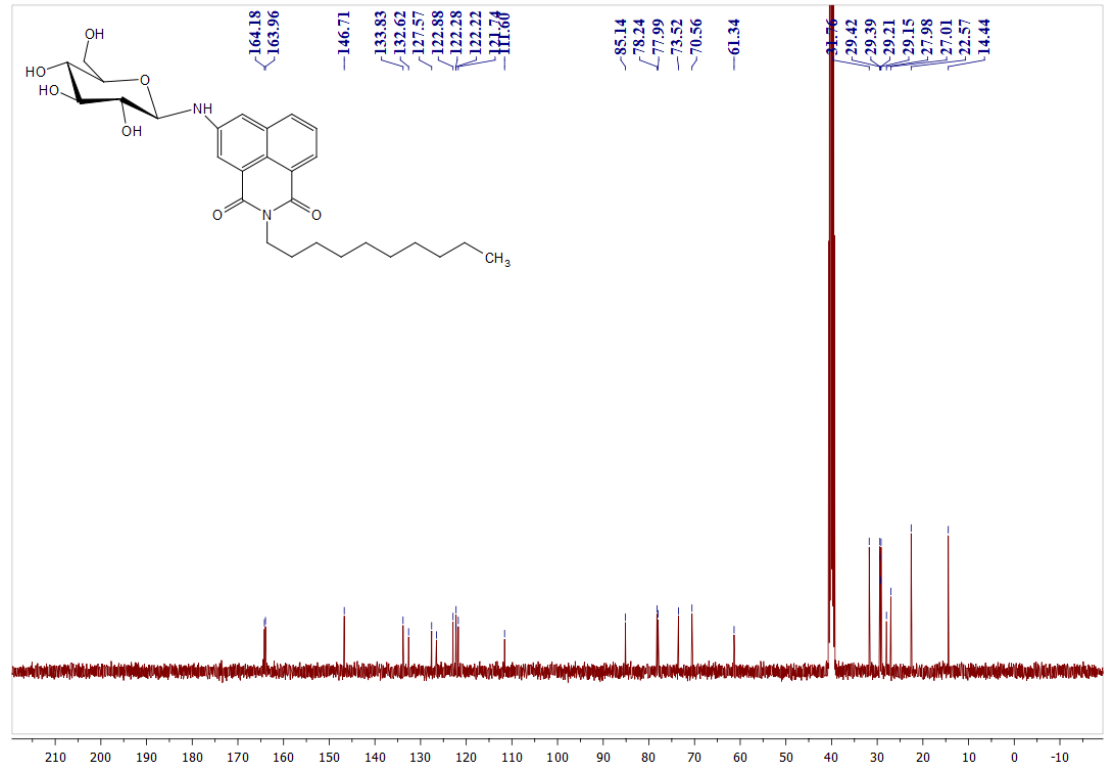


Figure S20. ^{13}C NMR Spectrum of compound 5c (101 MHz, DMSO-d_6)

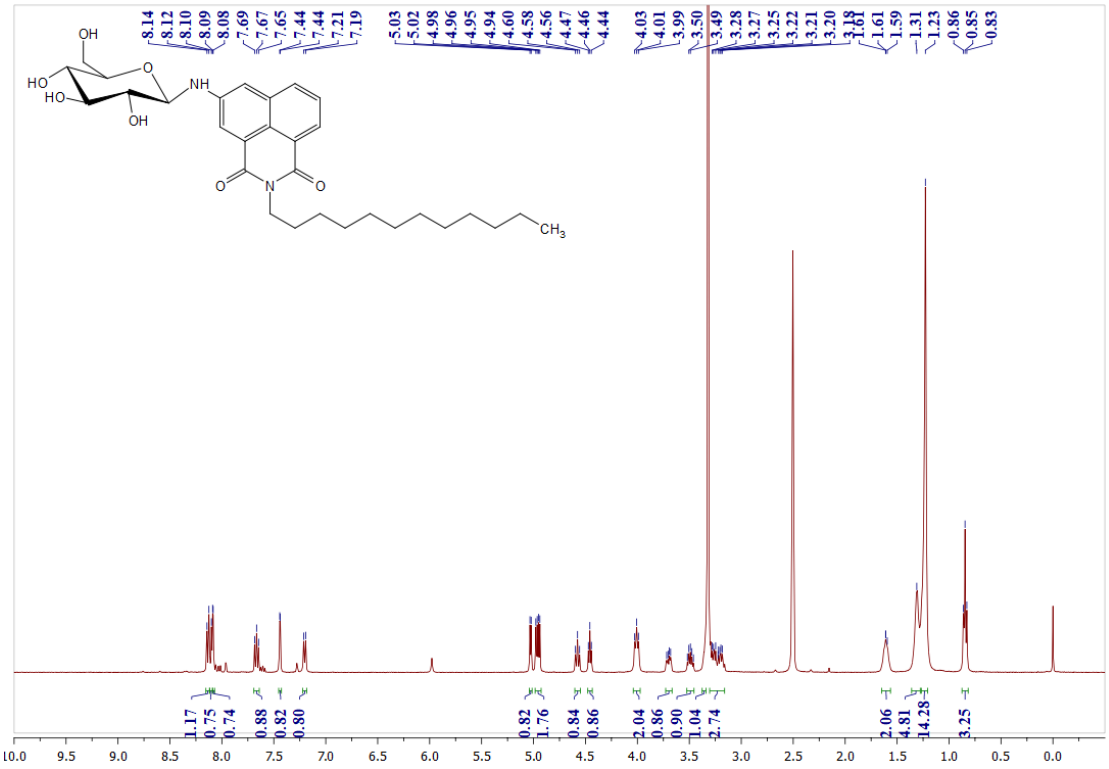


Figure S21. ^{1}H NMR Spectrum of compound 5d (400 MHz, DMSO-d_6)

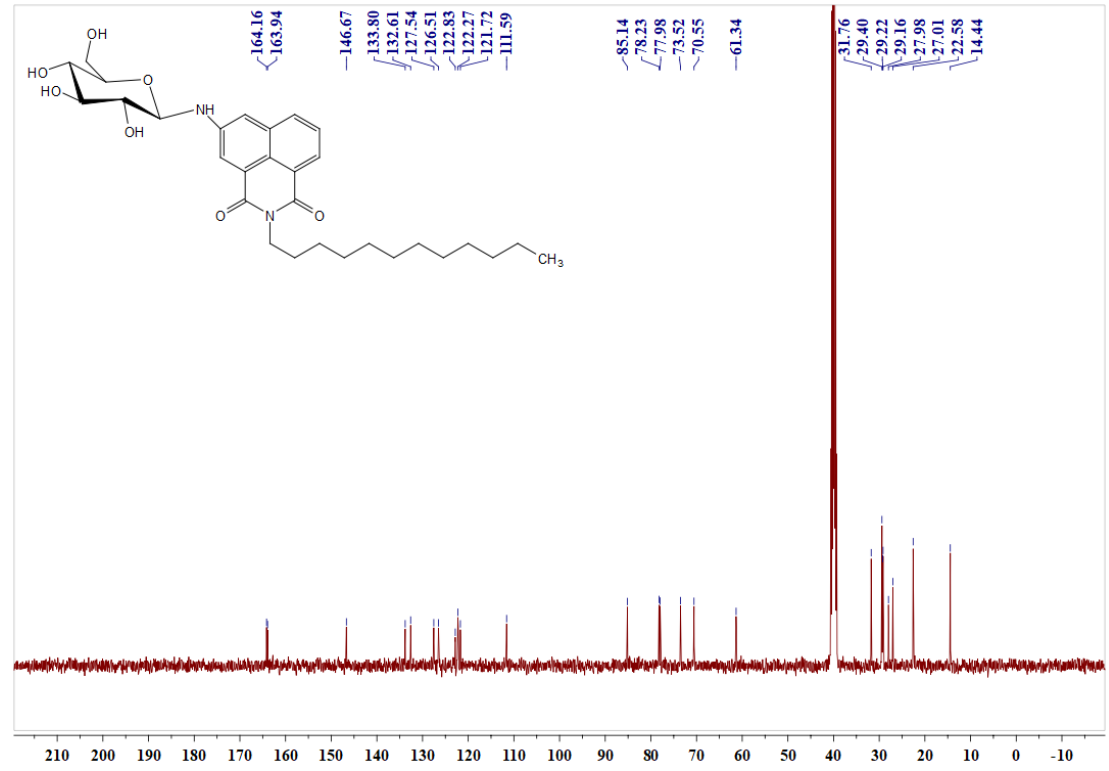


Figure S22. ^{13}C NMR Spectrum of compound 5d (101 MHz, DMSO-d_6)

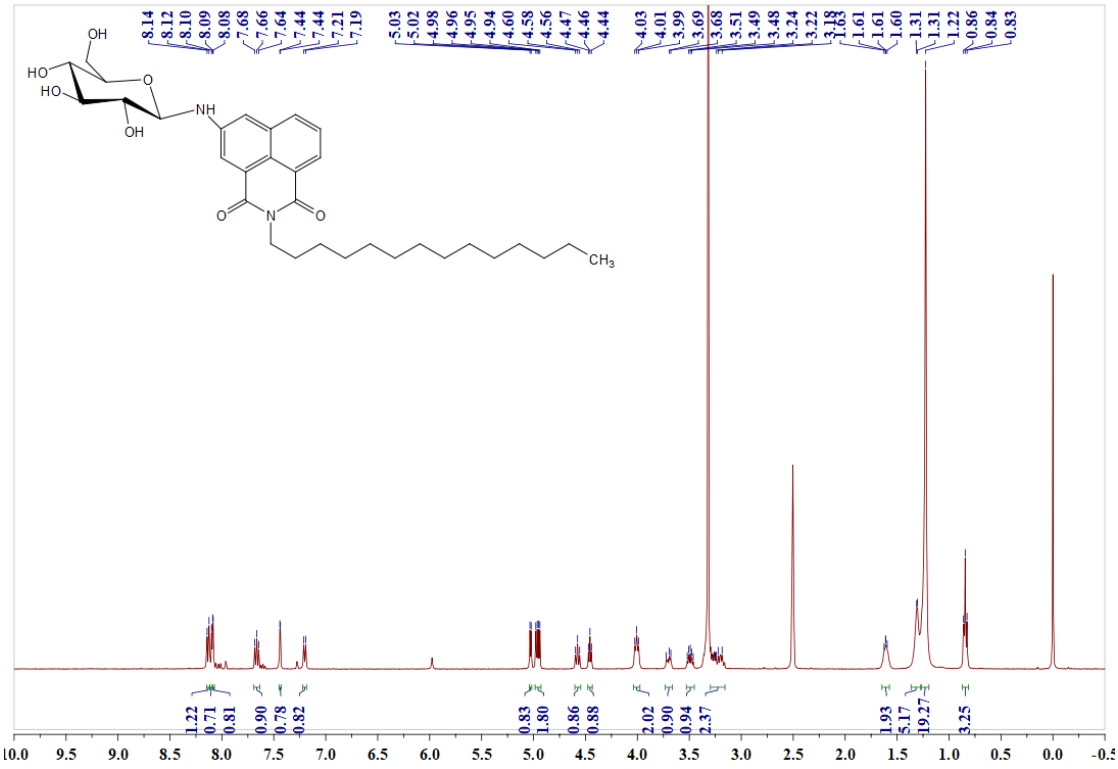


Figure S23. ^{1}H NMR Spectrum of compound 5e (400 MHz, DMSO-d_6)

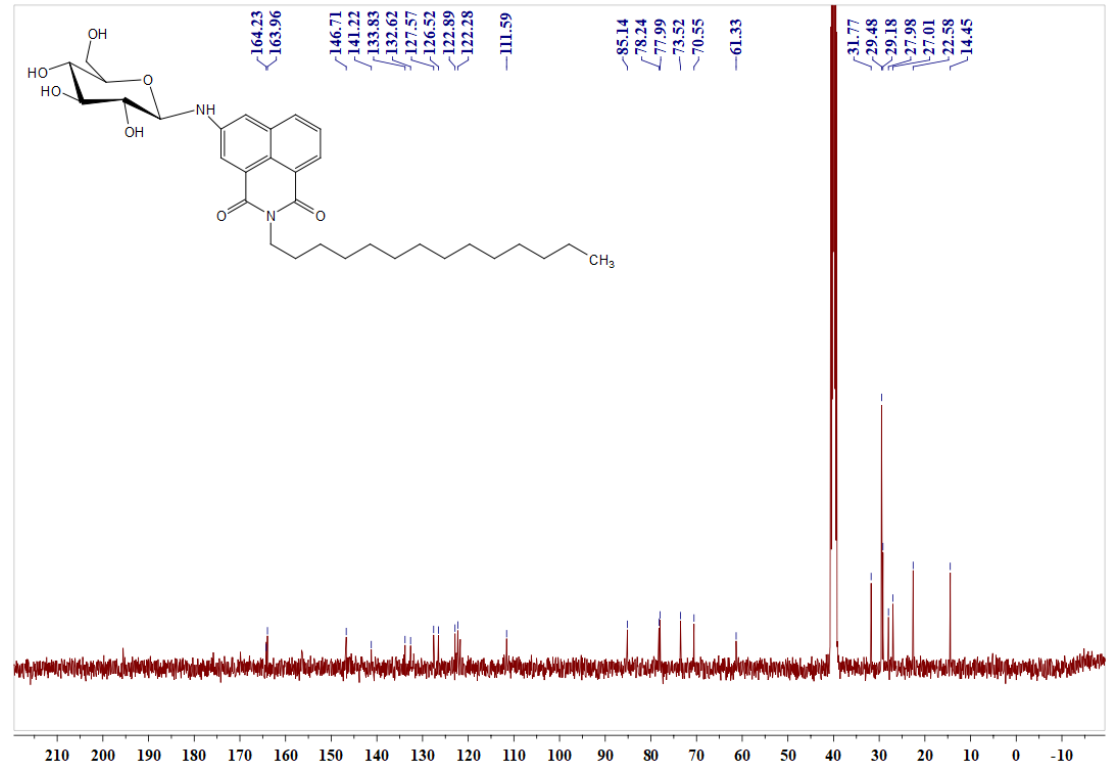


Figure S24. ^{13}C NMR Spectrum of compound 5e (101 MHz, DMSO-d_6)

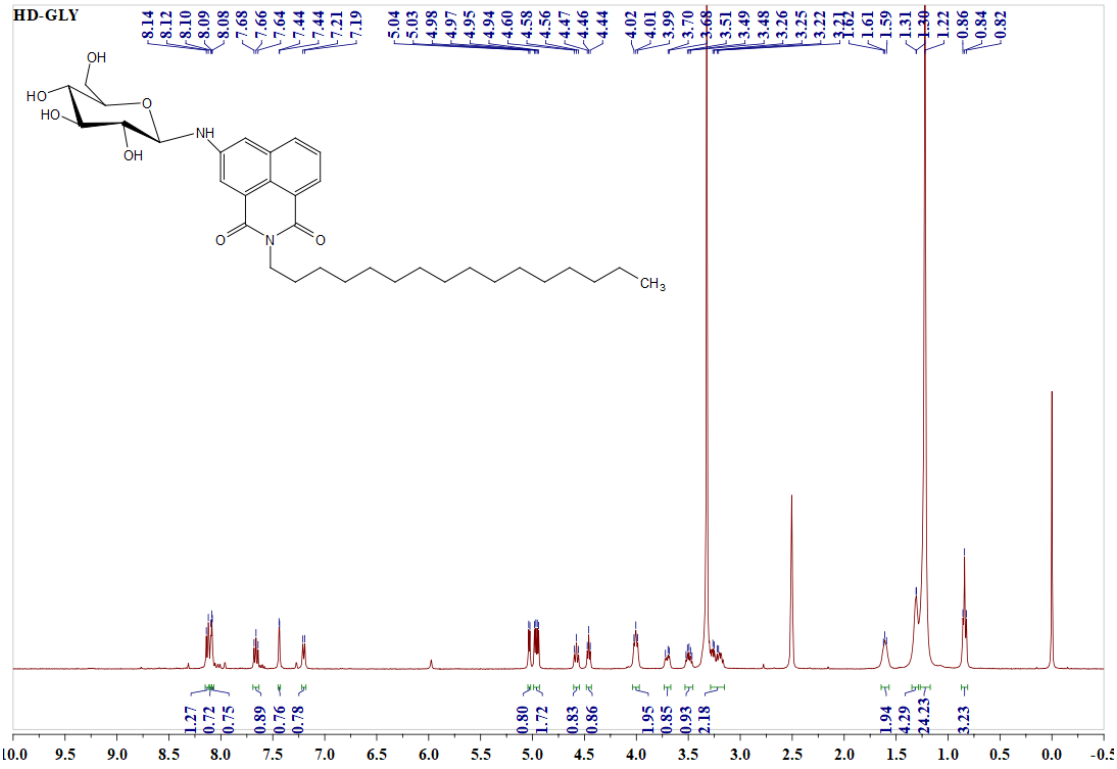


Figure S25. ^{1}H NMR Spectrum of compound 5f (400 MHz, DMSO-d_6)

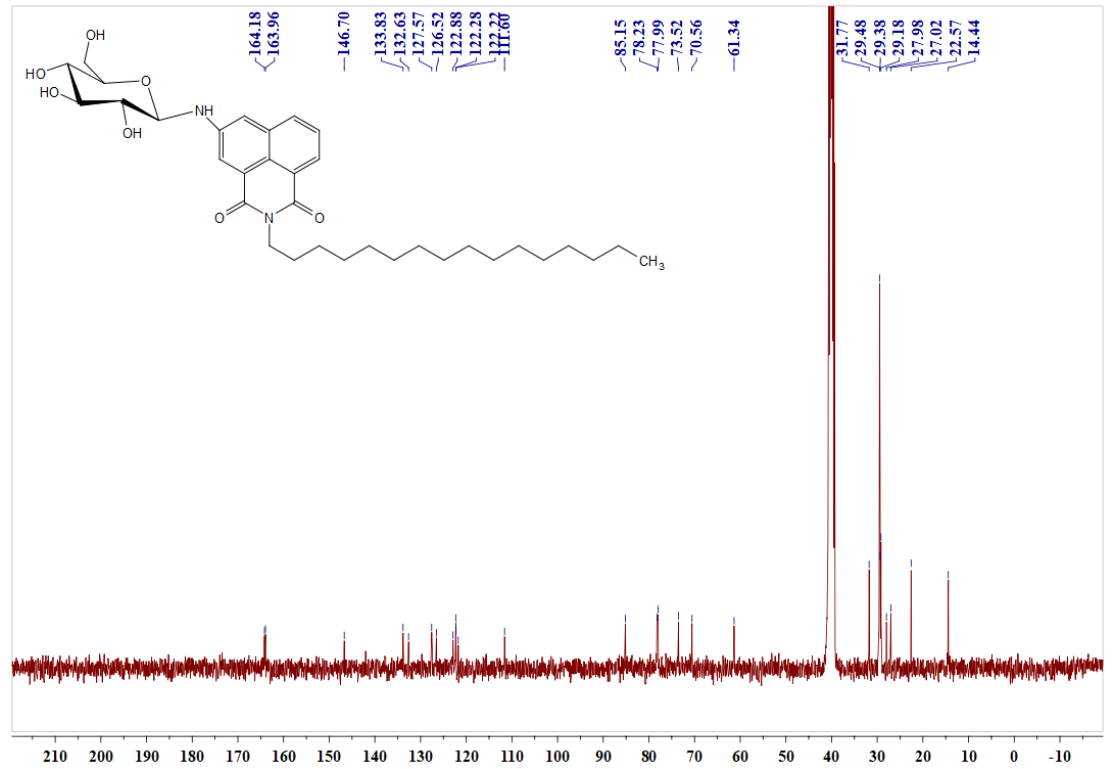


Figure S26. ^{13}C NMR Spectrum of compound 5f (101 MHz, DMSO-d_6)

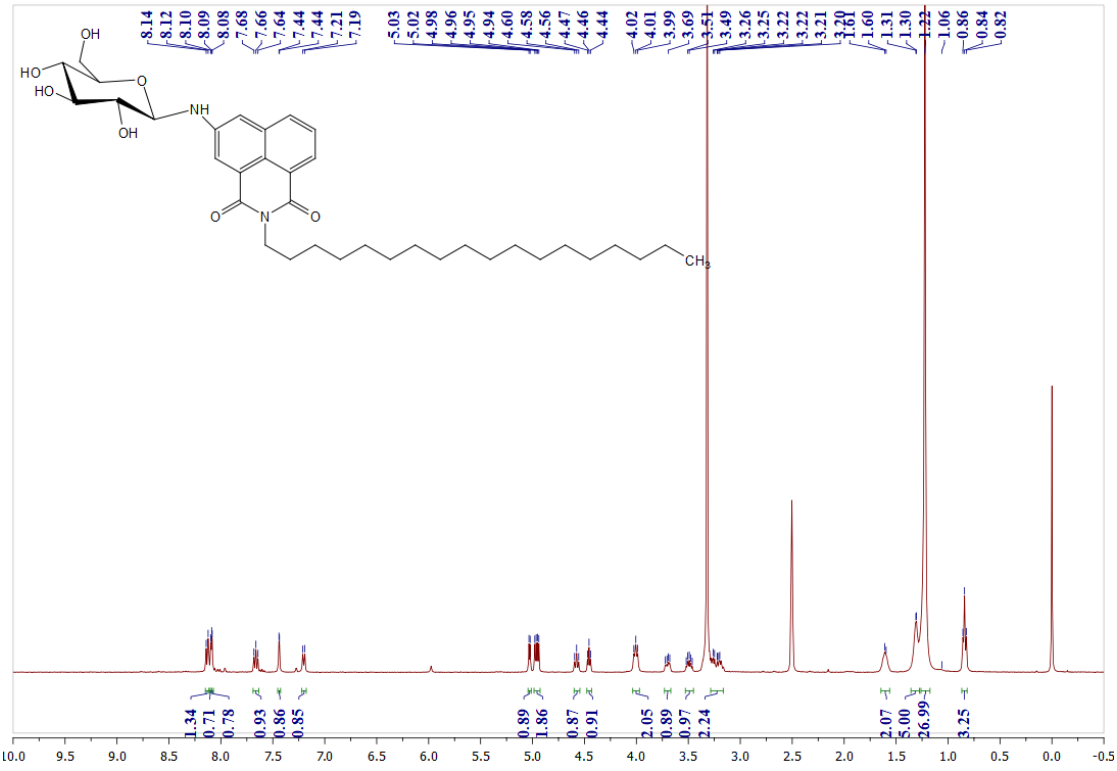


Figure S27. ^{1}H NMR Spectrum of compound 5g (400 MHz, DMSO-d_6)

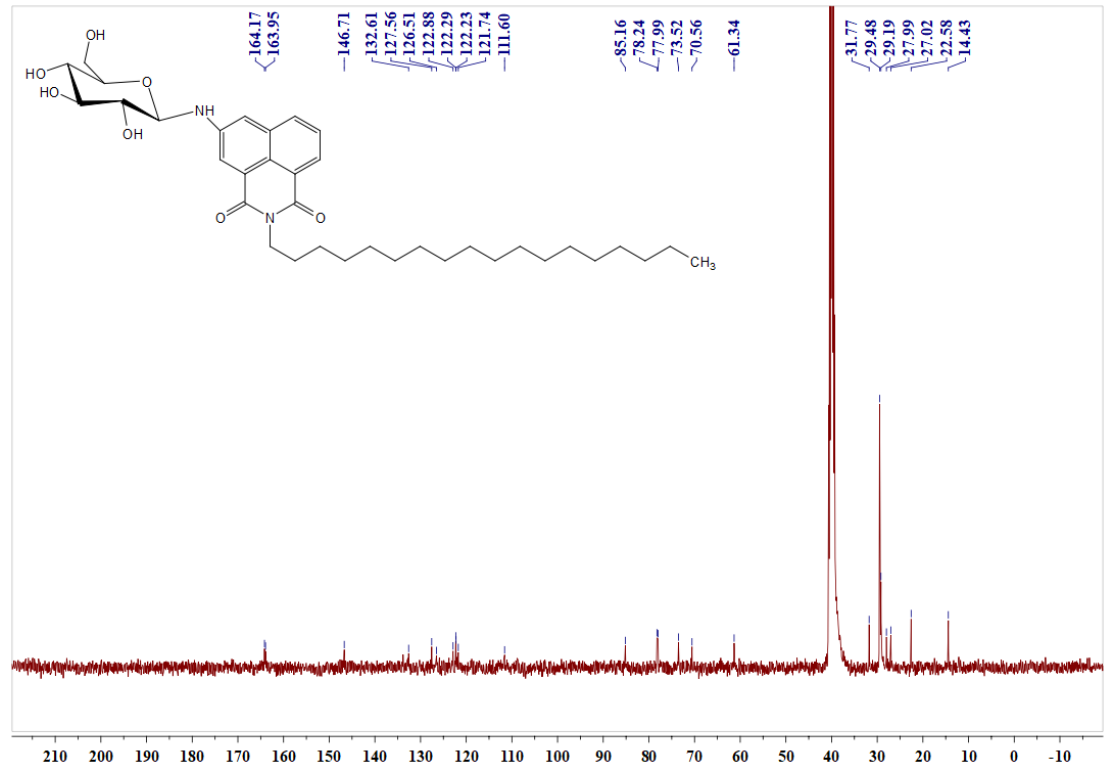


Figure S28. ^{13}C NMR Spectrum of compound 5g (101 MHz, DMSO-d_6)

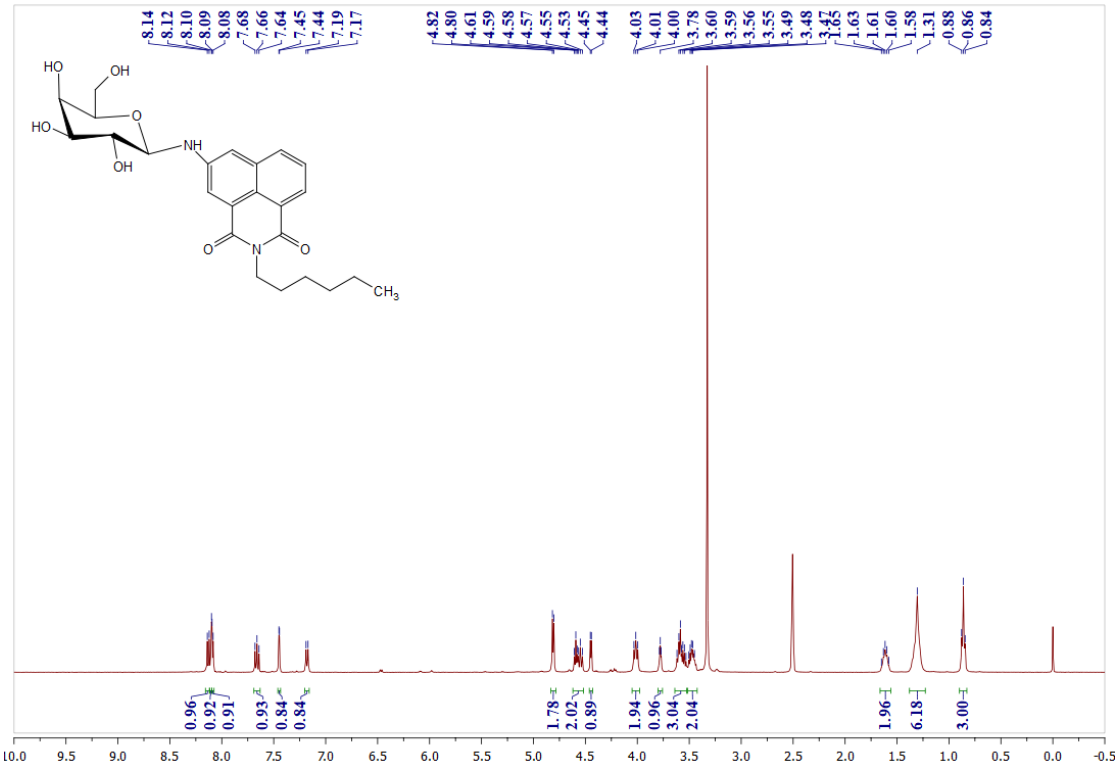


Figure S29. ^{1}H NMR Spectrum of compound 6a (400 MHz, DMSO-d_6)

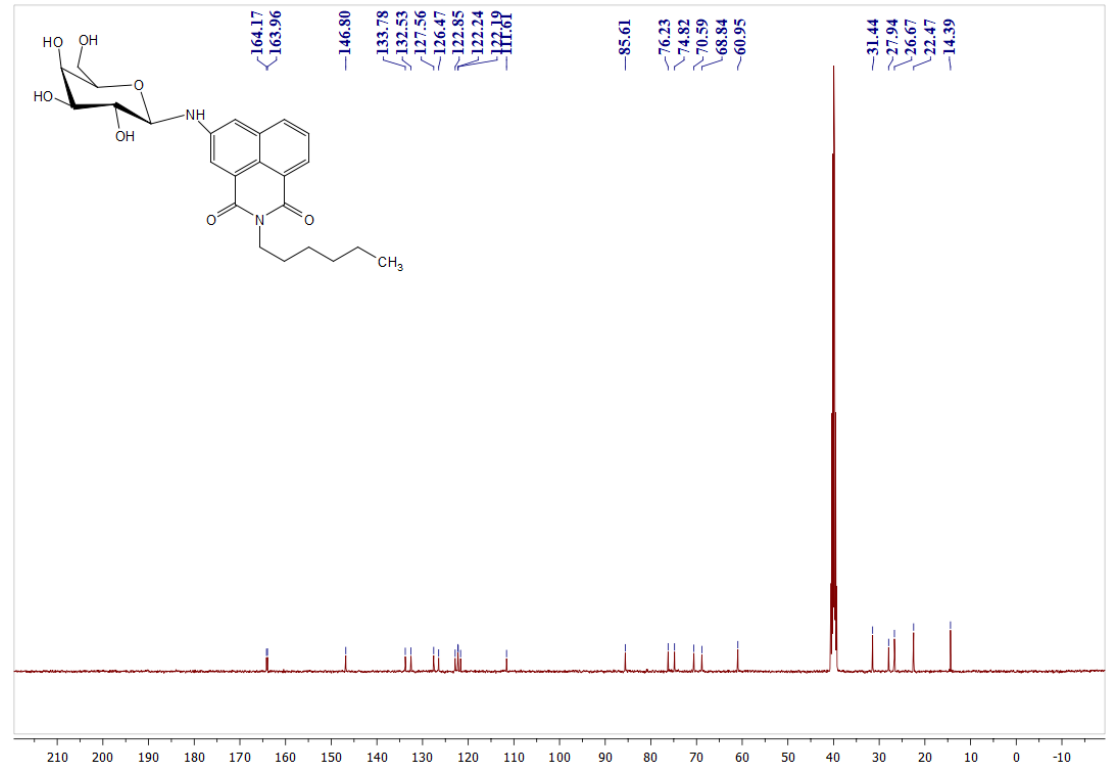


Figure S30. ^{13}C NMR Spectrum of compound 6a (101 MHz, DMSO-d_6)

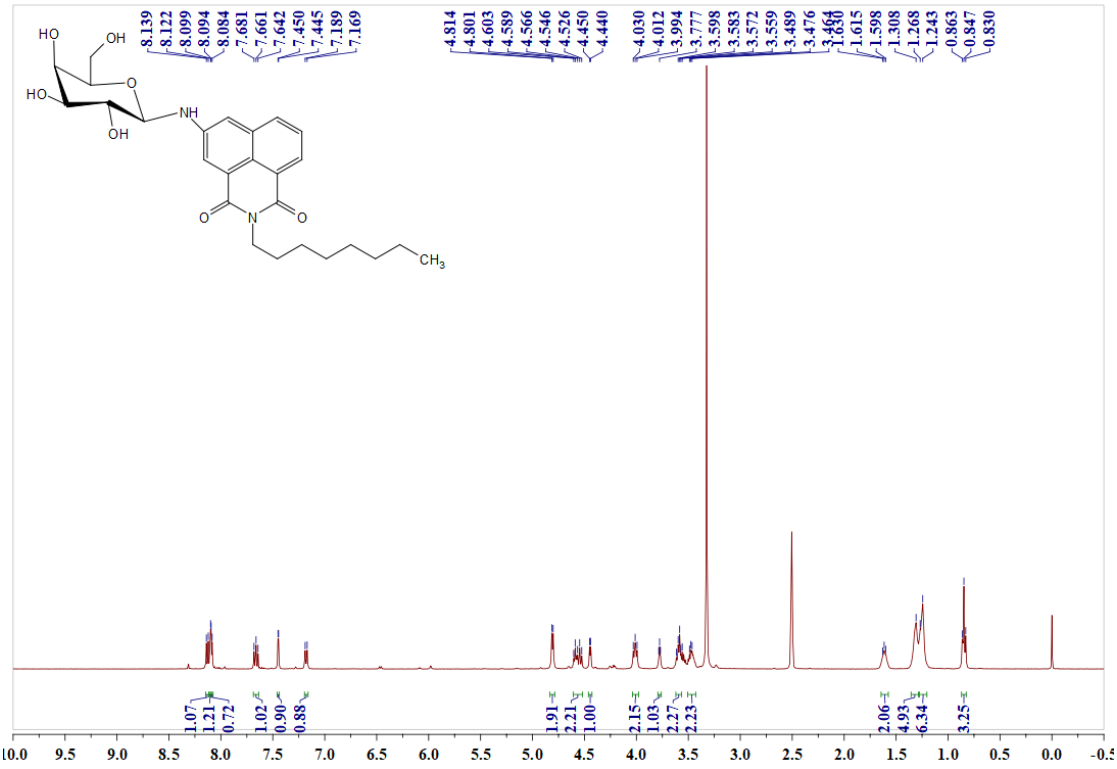


Figure S31. ^{1}H NMR Spectrum of compound 6b (400 MHz, DMSO-d_6)

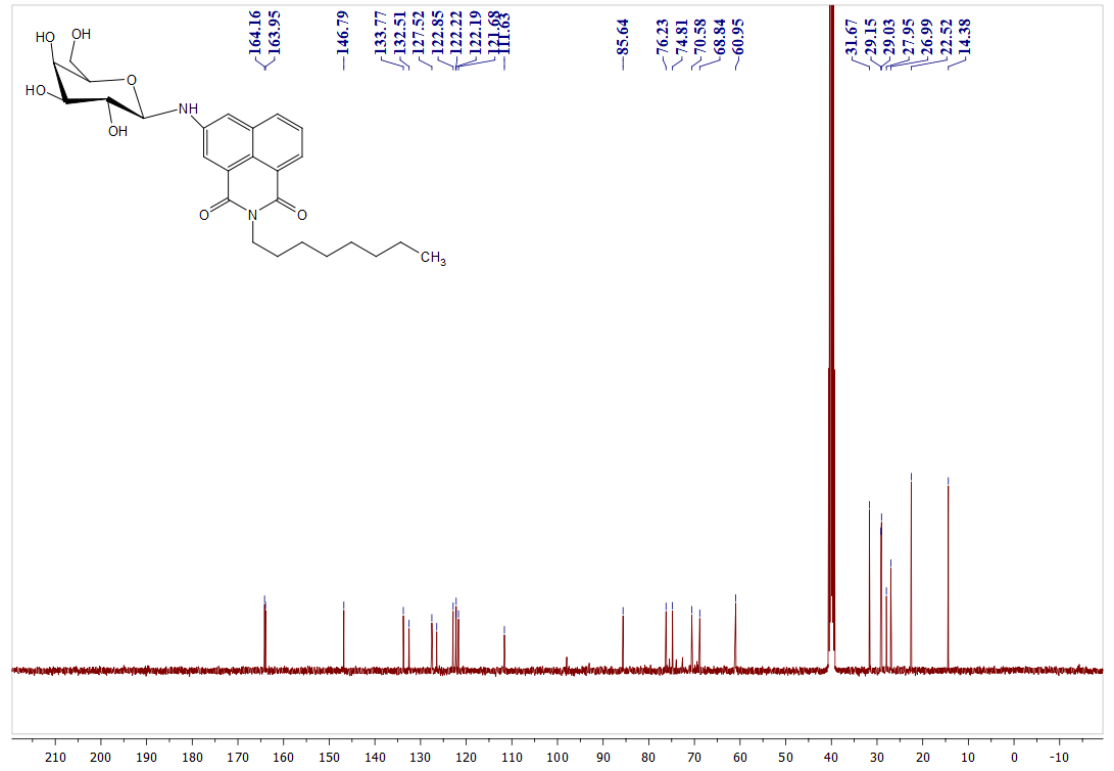


Figure S32. ^{13}C NMR Spectrum of compound 6b (101 MHz, DMSO-d_6)

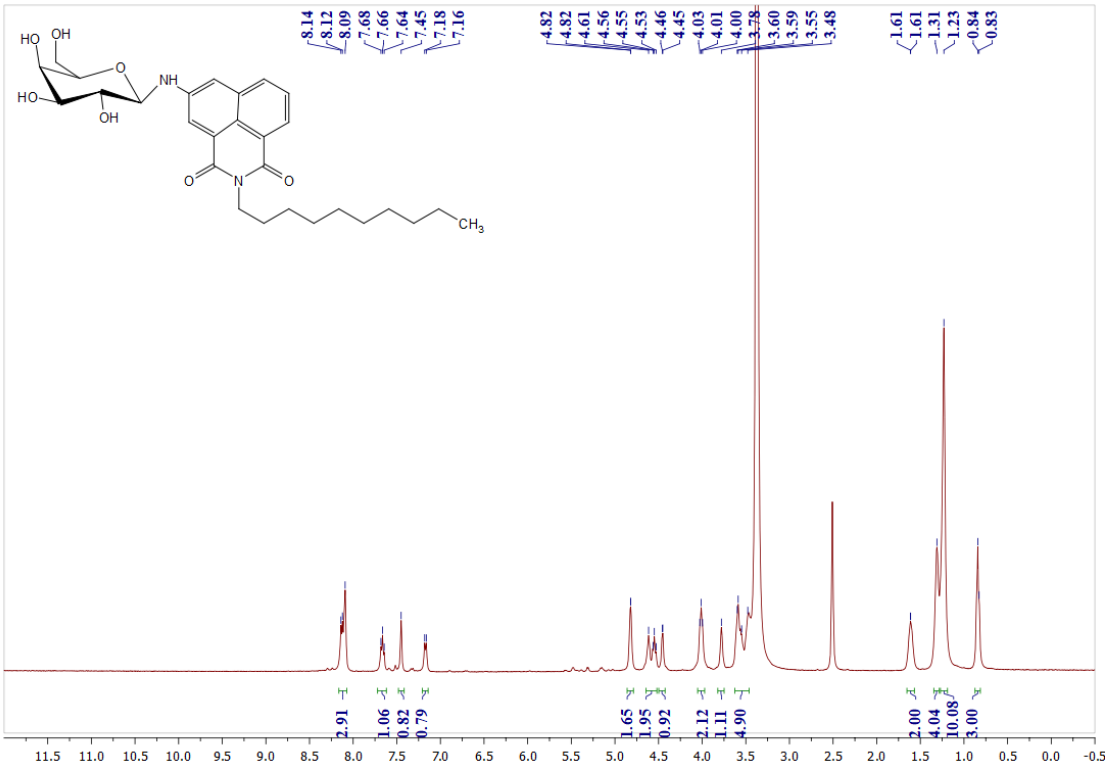


Figure S33. ^{1}H NMR Spectrum of compound 6c (400 MHz, DMSO-d_6)

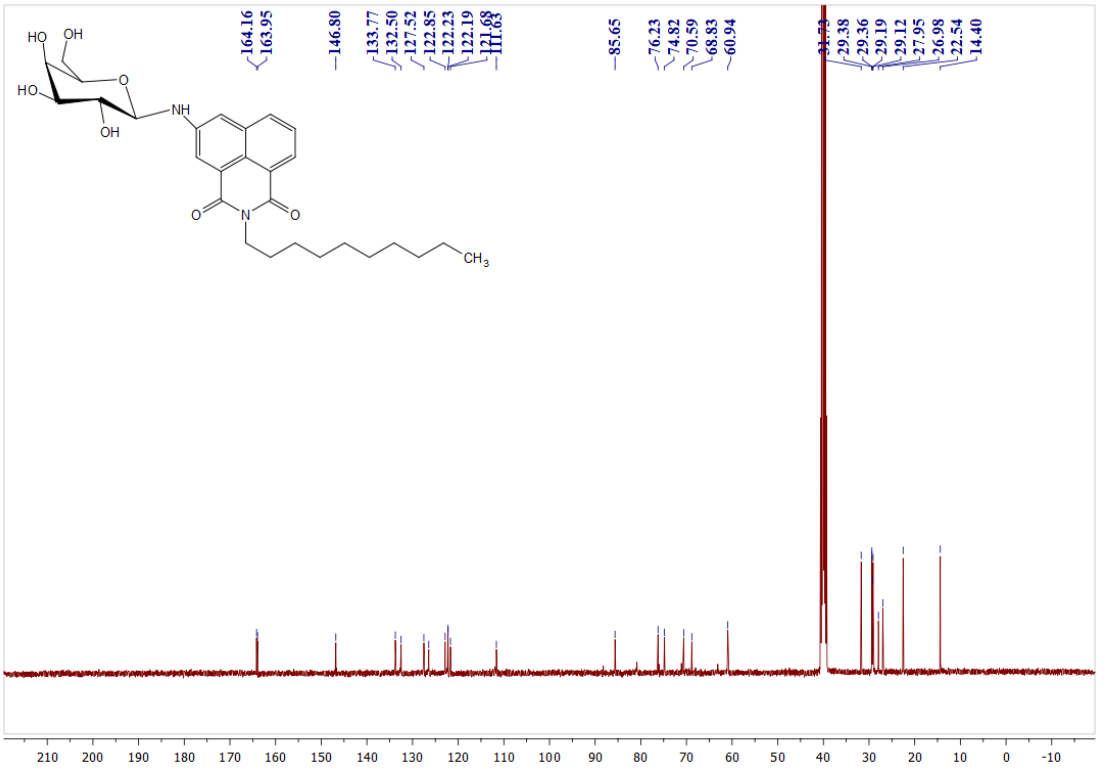


Figure S33. ^{13}C NMR Spectrum of compound 6c (101 MHz, DMSO-d_6)

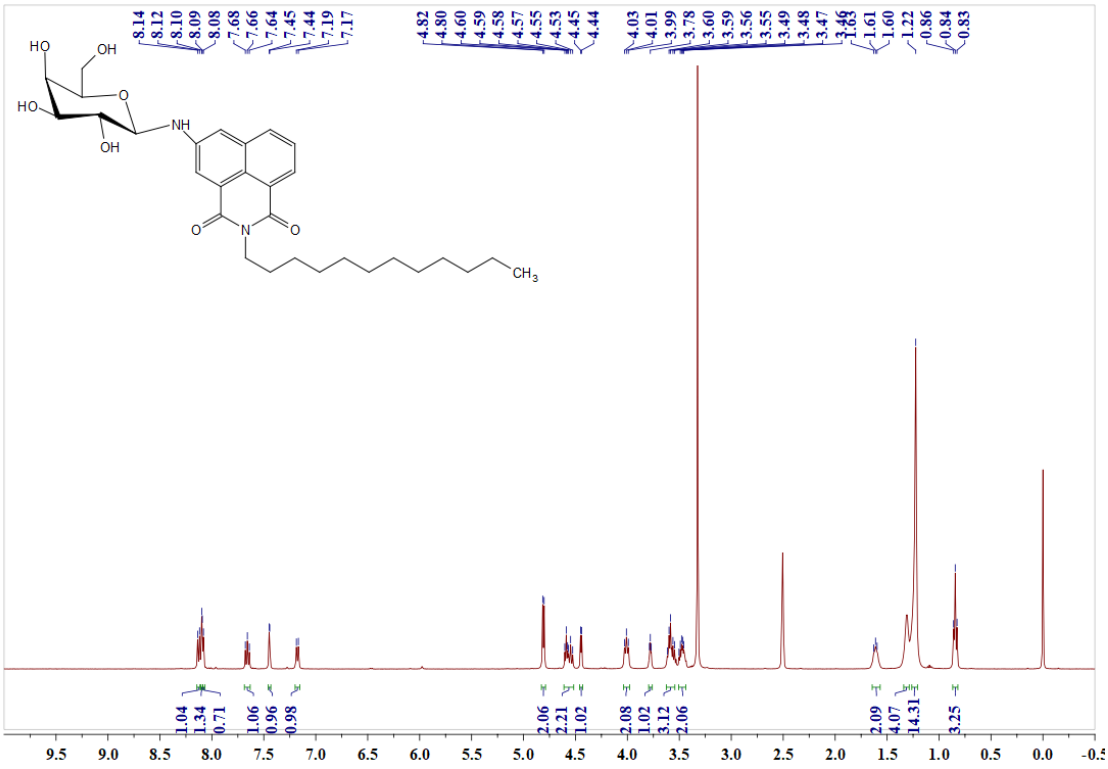


Figure S34. ^{1}H NMR Spectrum of compound 6d (400 MHz, DMSO-d_6)

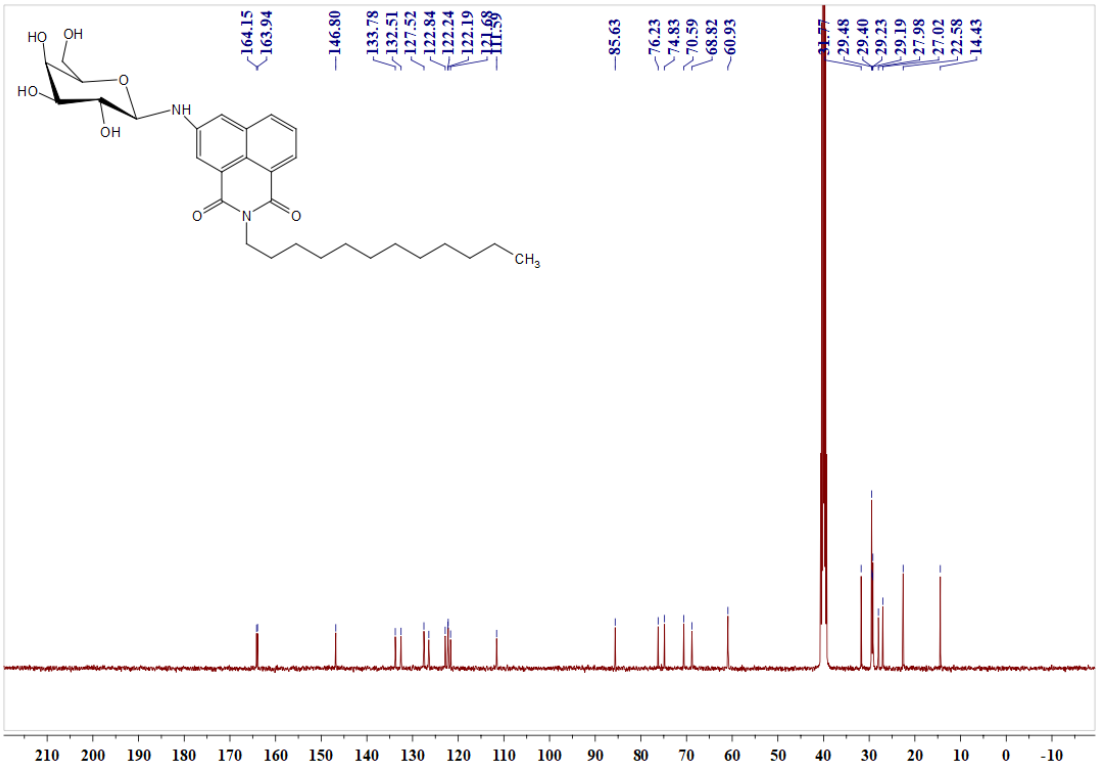


Figure S35. ^{13}C NMR Spectrum of compound 6d (101 MHz, DMSO-d_6)

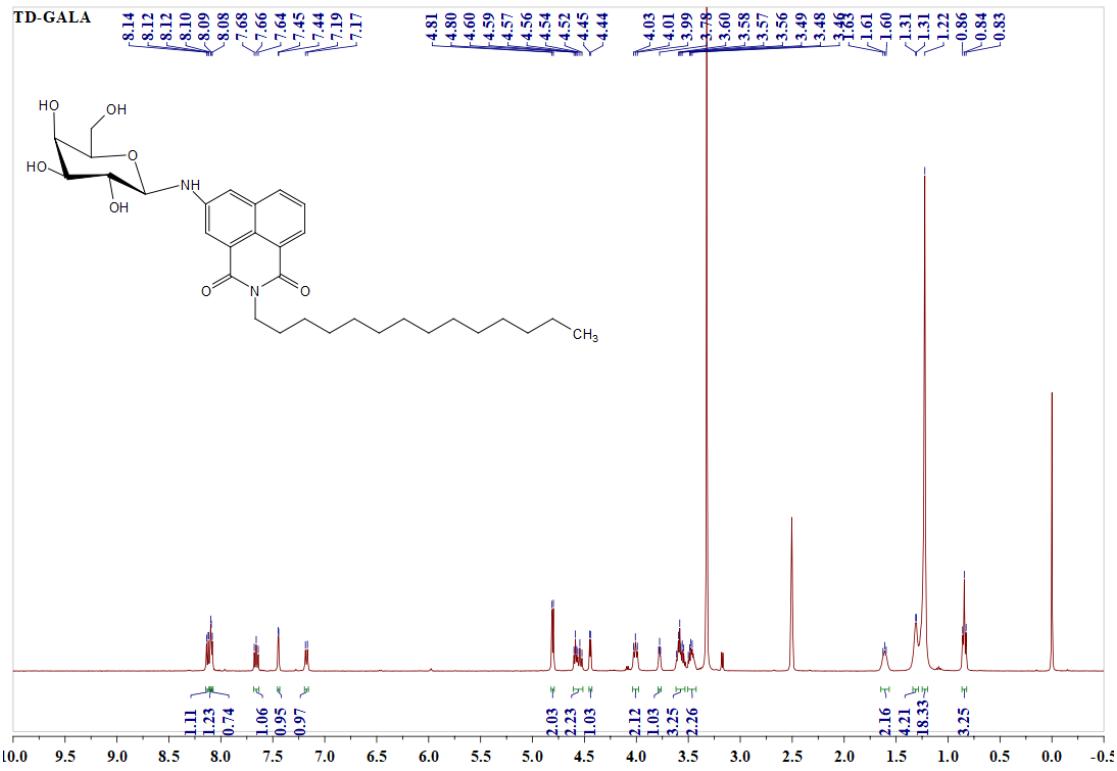


Figure S36. ^{1}H NMR Spectrum of compound 6e (400 MHz, DMSO-d_6)

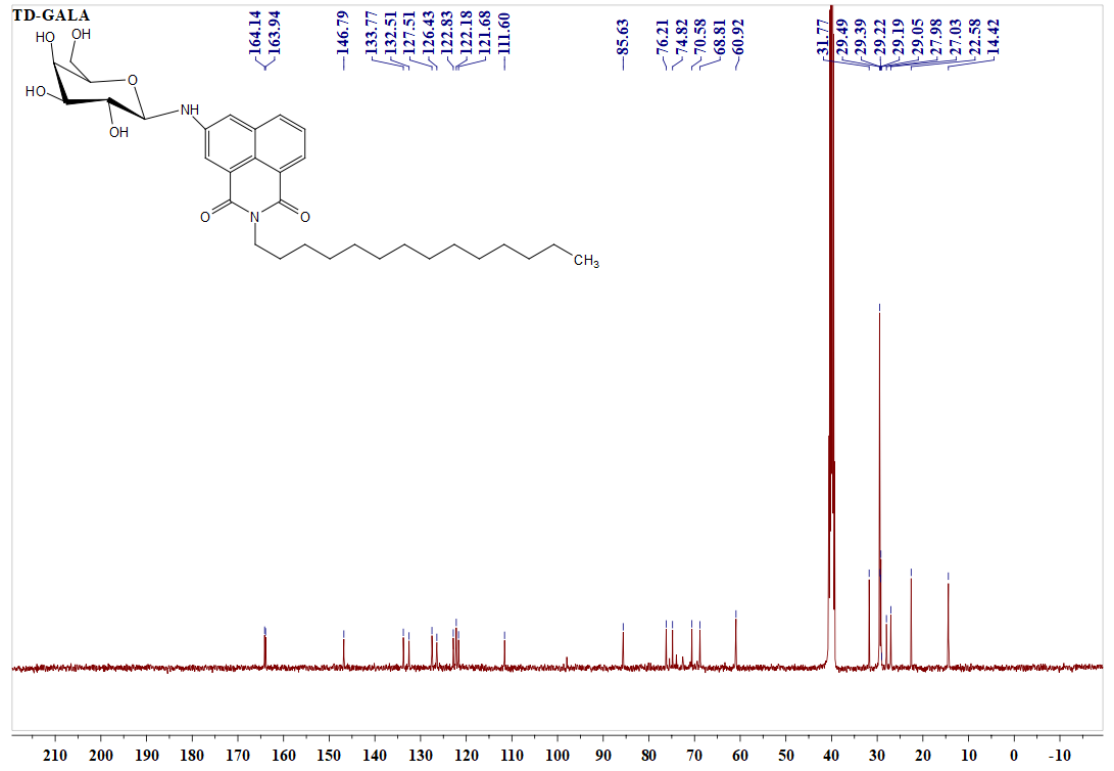


Figure S37. ^{13}C NMR Spectrum of compound 6e (101 MHz, DMSO-d_6)

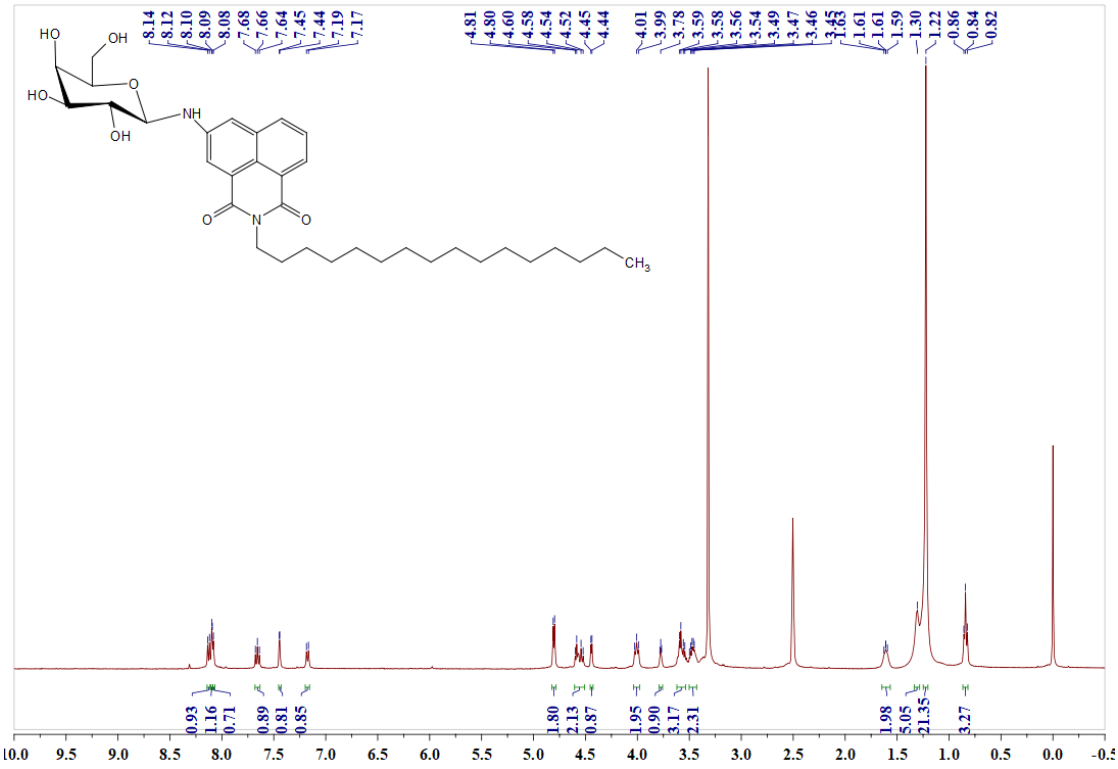


Figure S38. ^{1}H NMR Spectrum of compound 6f (400 MHz, DMSO-d_6)

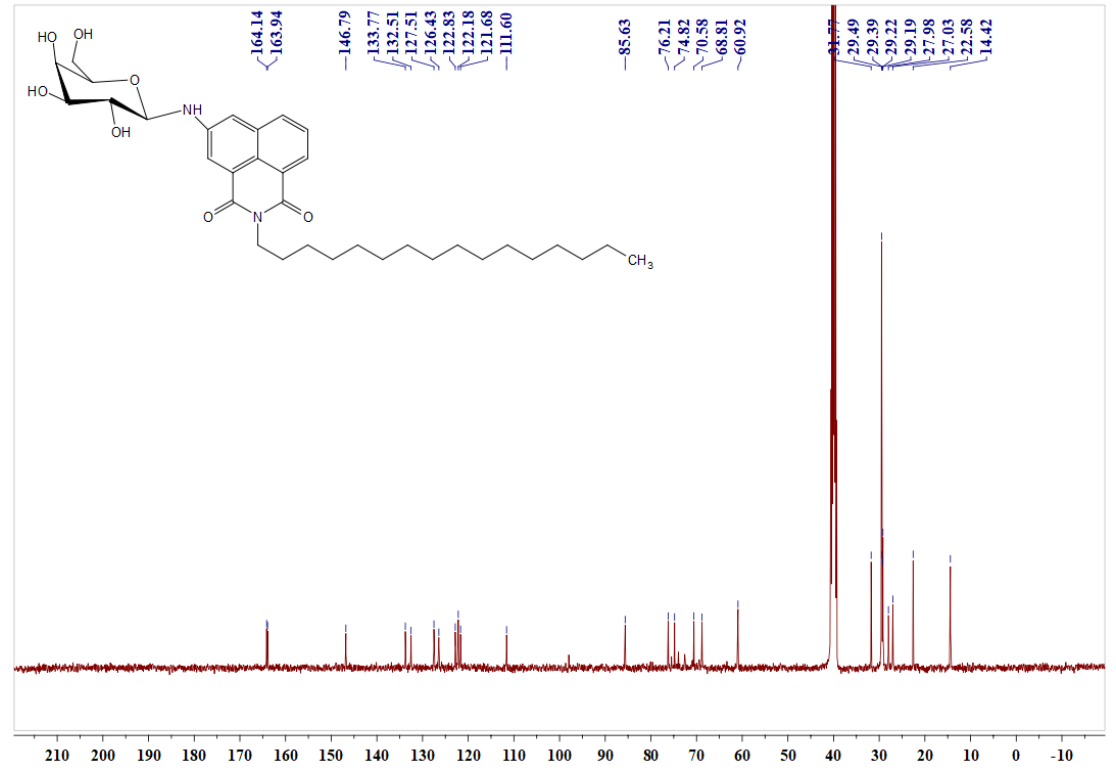


Figure S39. ^{13}C NMR Spectrum of compound 6f (101 MHz, DMSO-d_6)

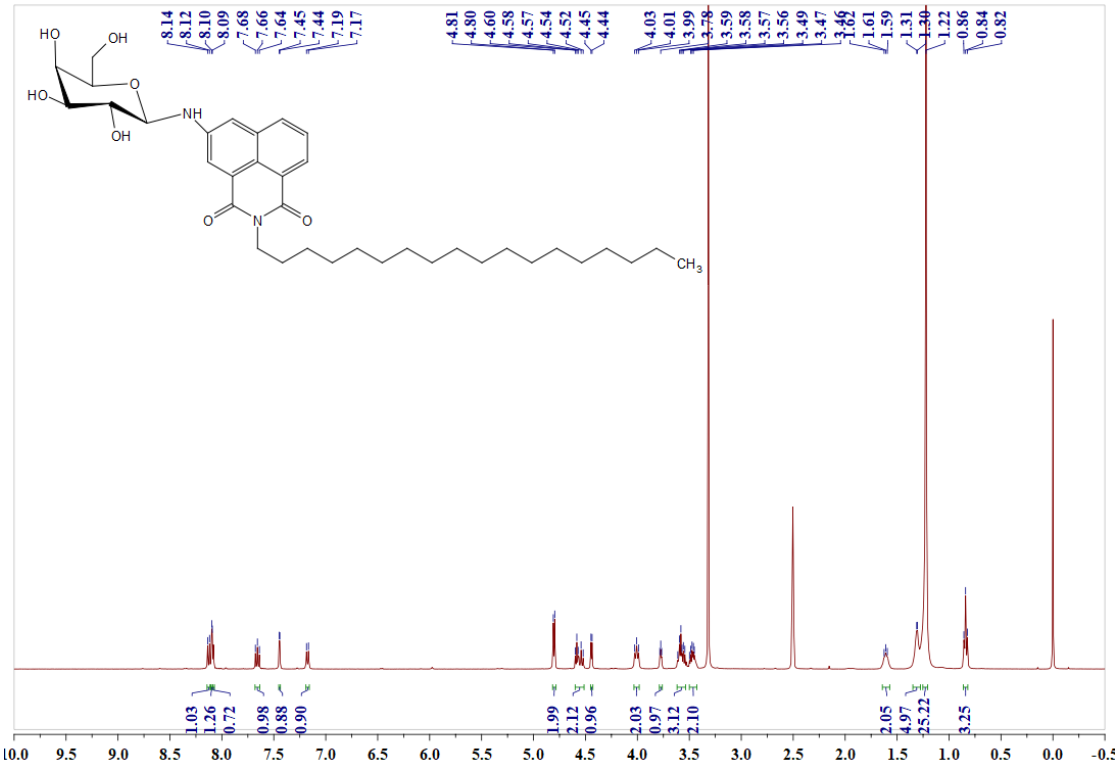


Figure S40. ^{1}H NMR Spectrum of compound 6g (400 MHz, DMSO-*d*$_6$)

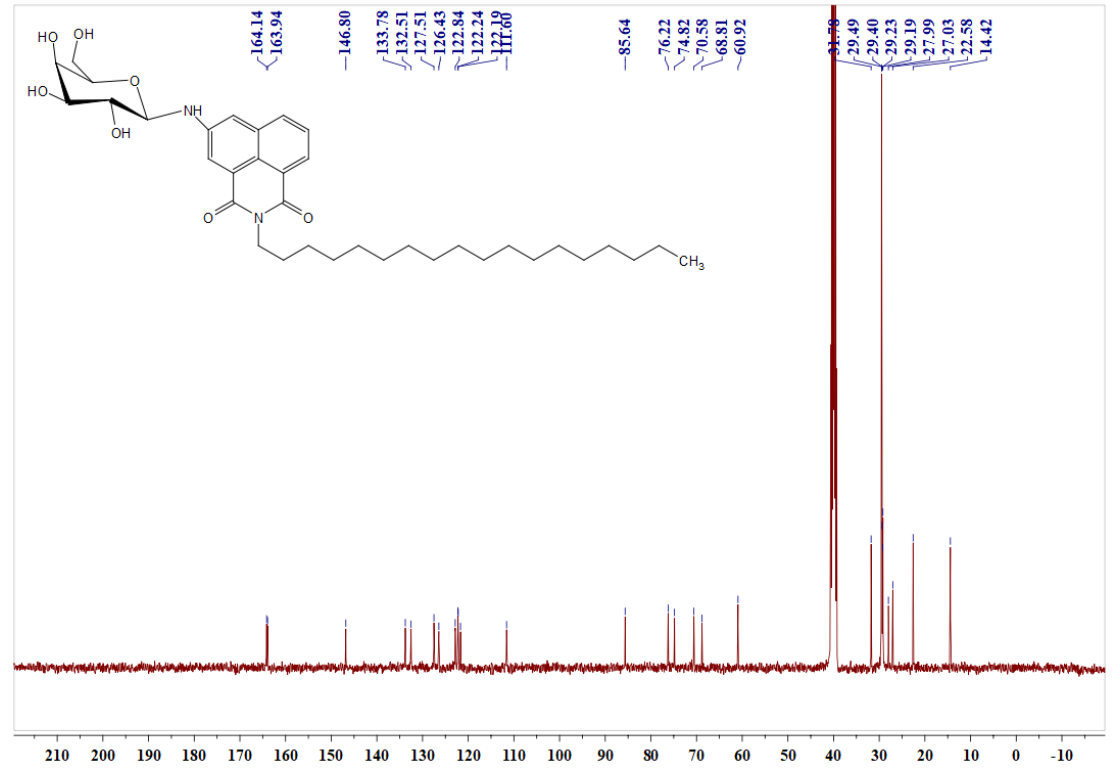


Figure S41. ^{13}C NMR Spectrum of compound 6g (101 MHz, DMSO-*d*$_6$)

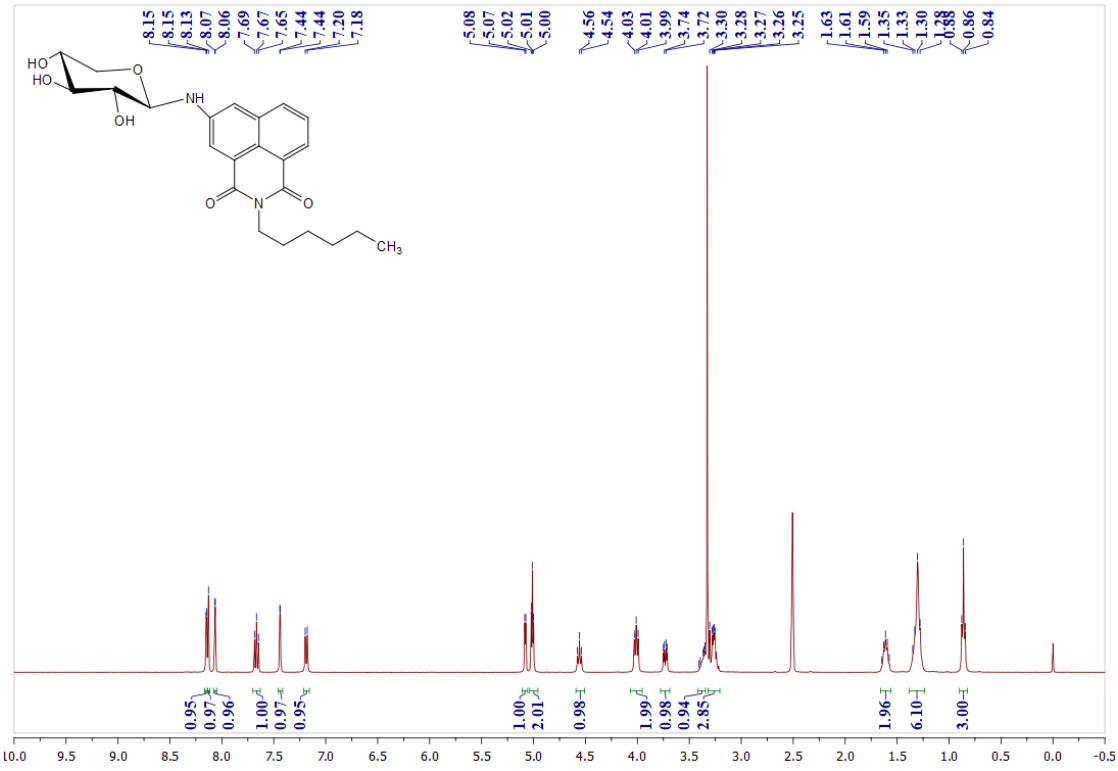


Figure S42. ^{1}H NMR Spectrum of compound 7a (400 MHz, DMSO-d_6)

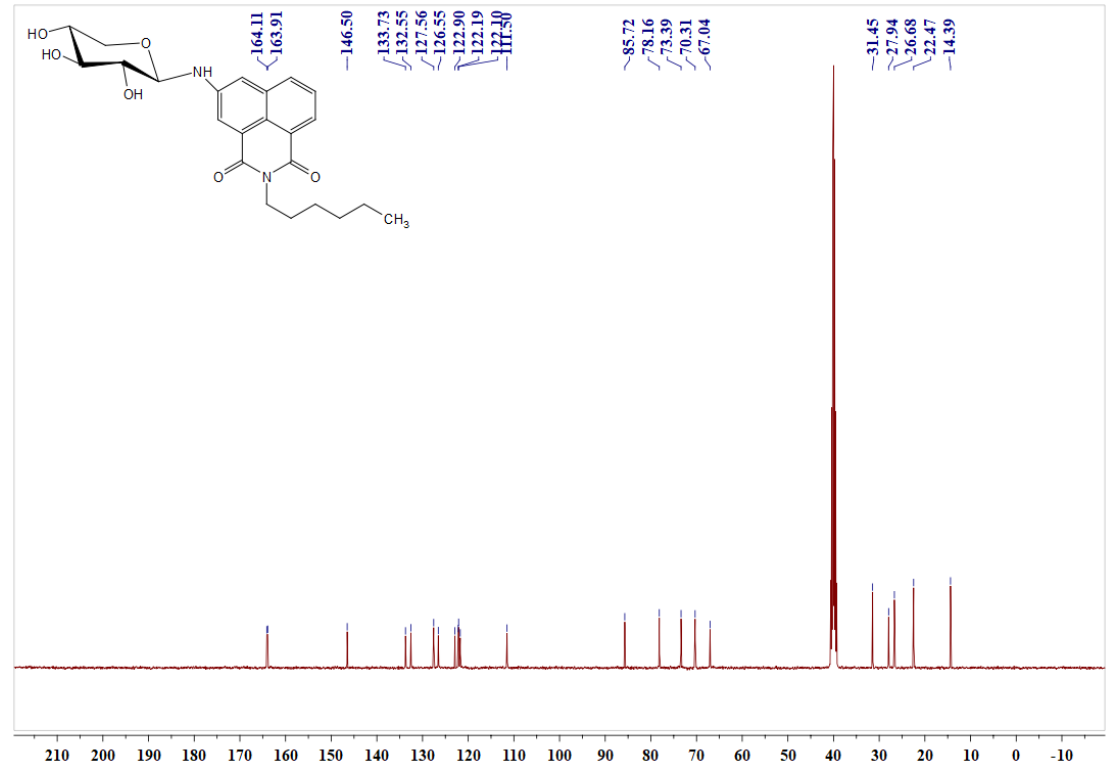


Figure S43. ^{13}C NMR Spectrum of compound 7a (101 MHz, DMSO-d_6)

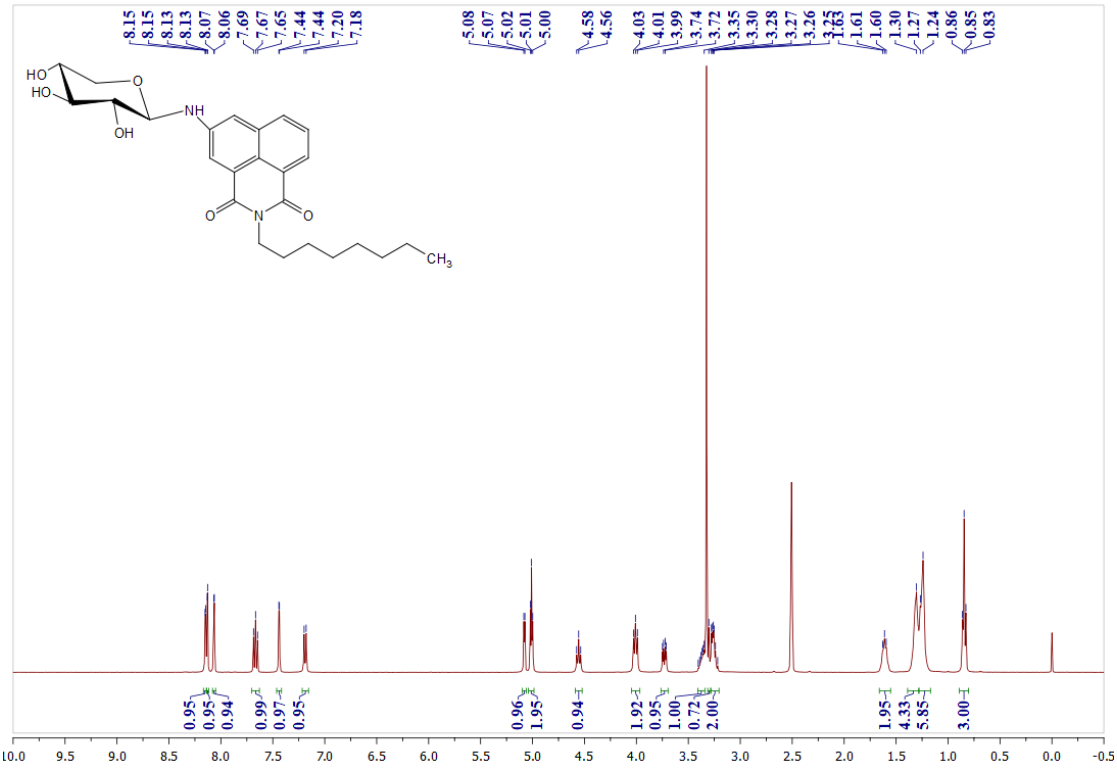


Figure S44. ^{1}H NMR Spectrum of compound 7b (400 MHz, DMSO-d_6)

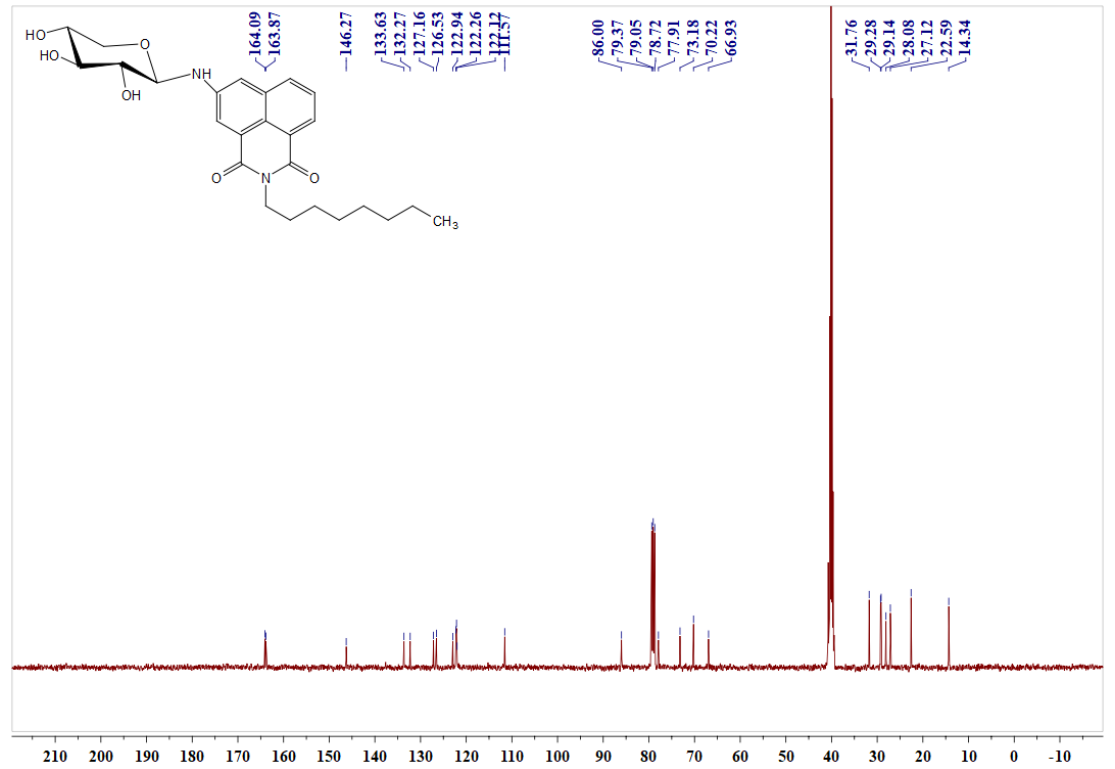


Figure S45. ^{13}C NMR Spectrum of compound 7b (101 MHz, DMSO-d_6)

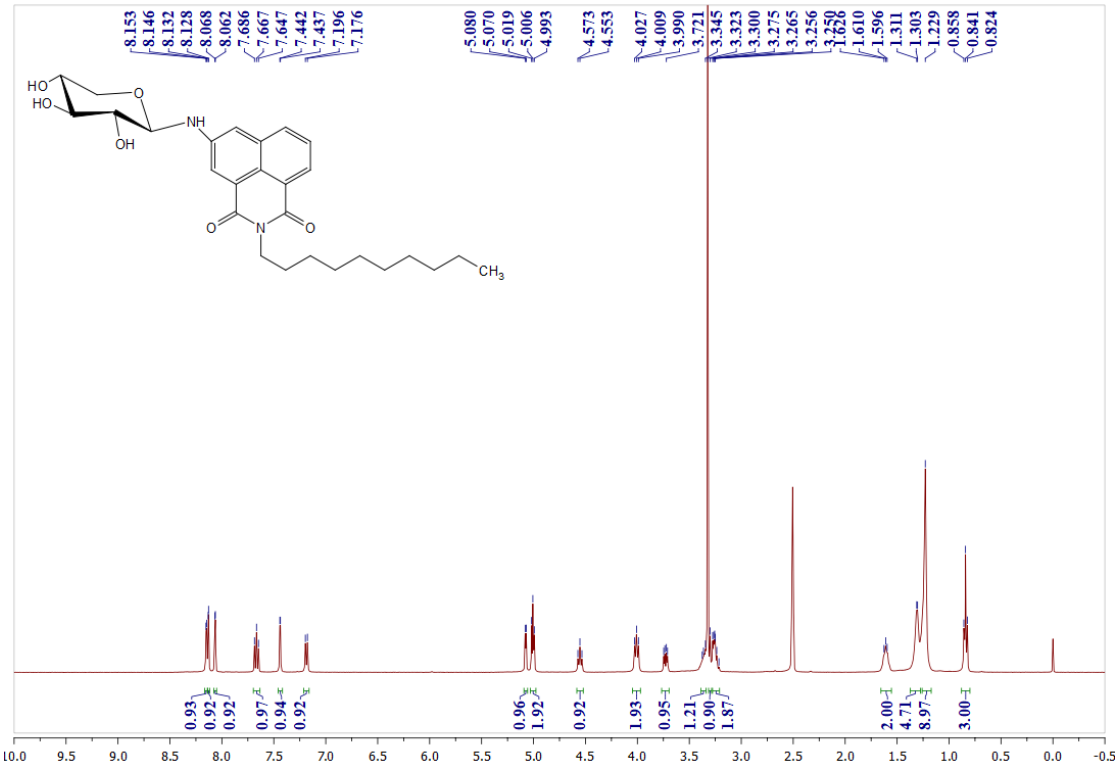


Figure S46. ^{1}H NMR Spectrum of compound 7c (400 MHz, DMSO-d_6)

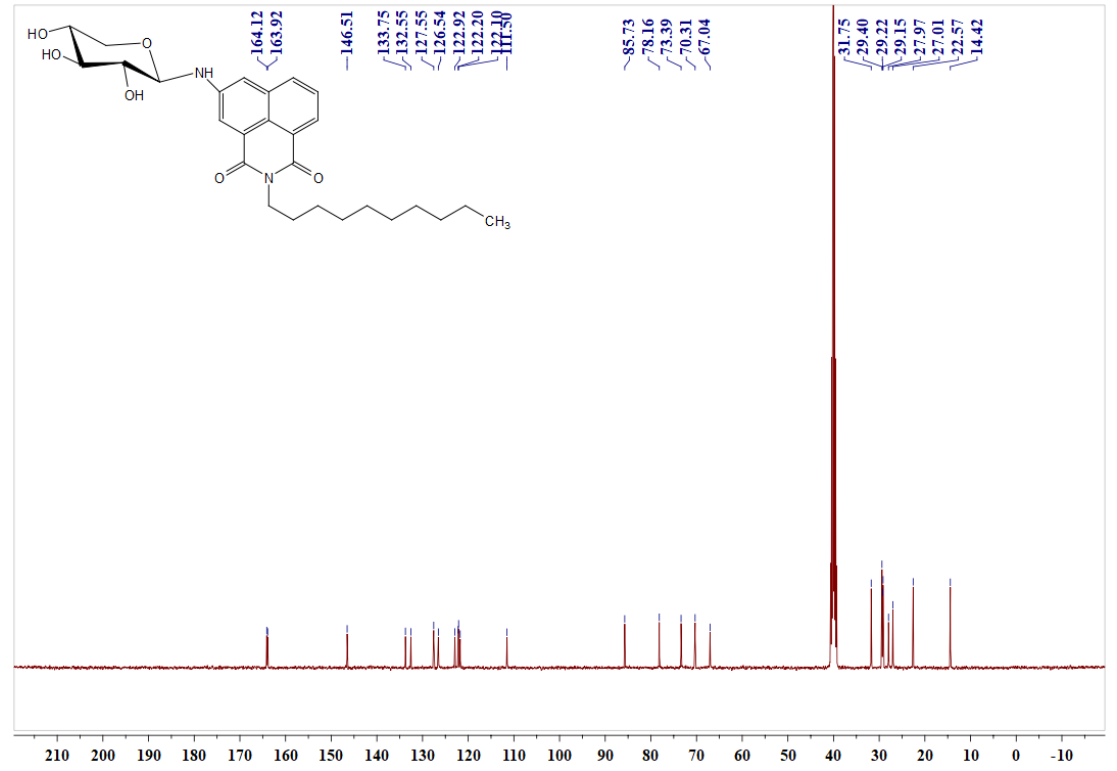


Figure S47. ^{13}C NMR Spectrum of compound 7c (101 MHz, DMSO-d_6)

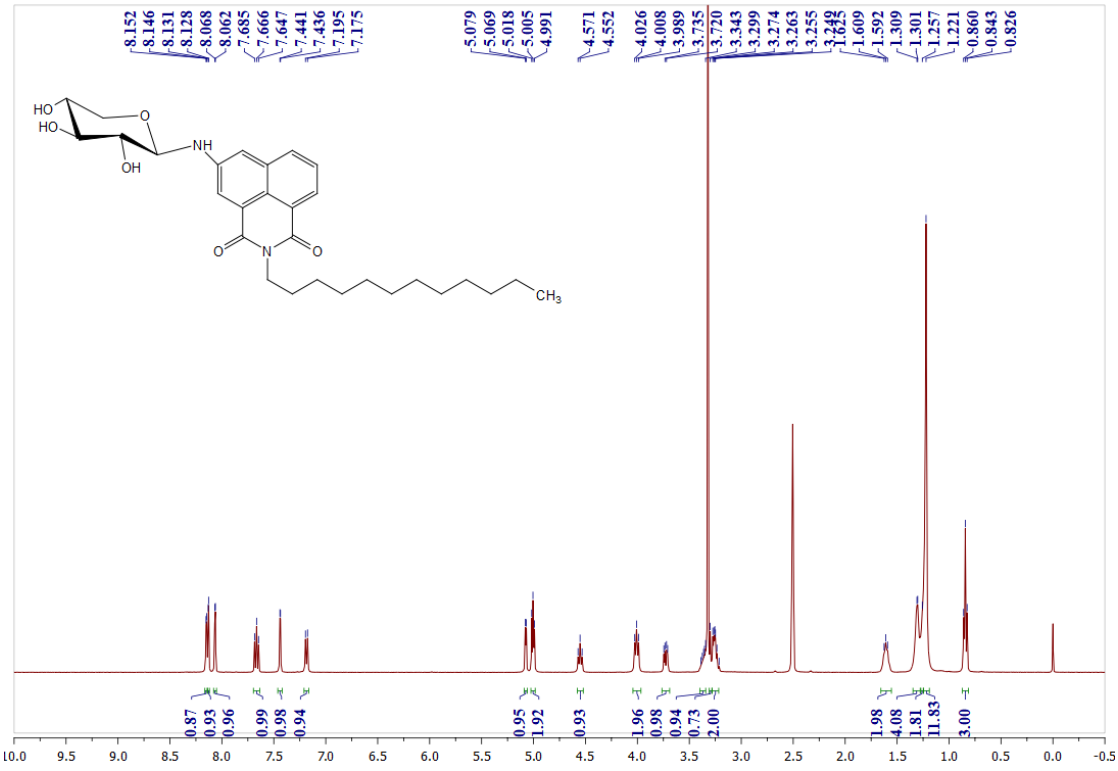


Figure S48. ^{1}H NMR Spectrum of compound 7d (400 MHz, DMSO-d_6)

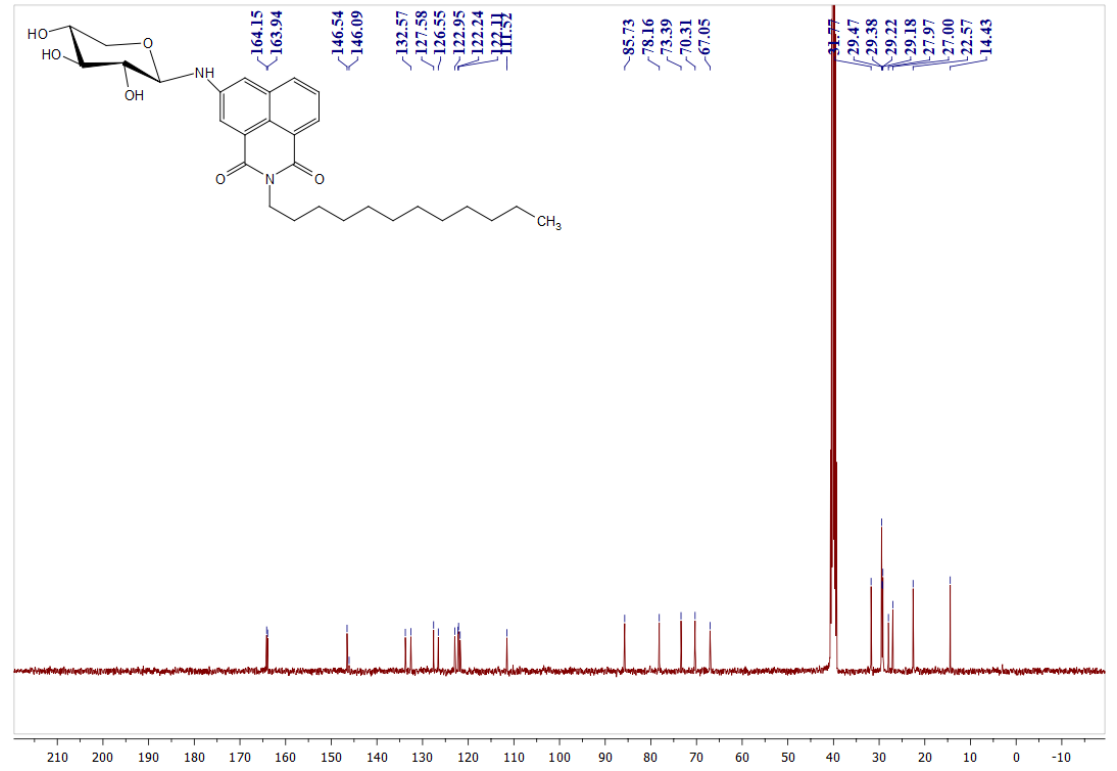


Figure S49. ^{13}C NMR Spectrum of compound 7d (101 MHz, DMSO-d_6)

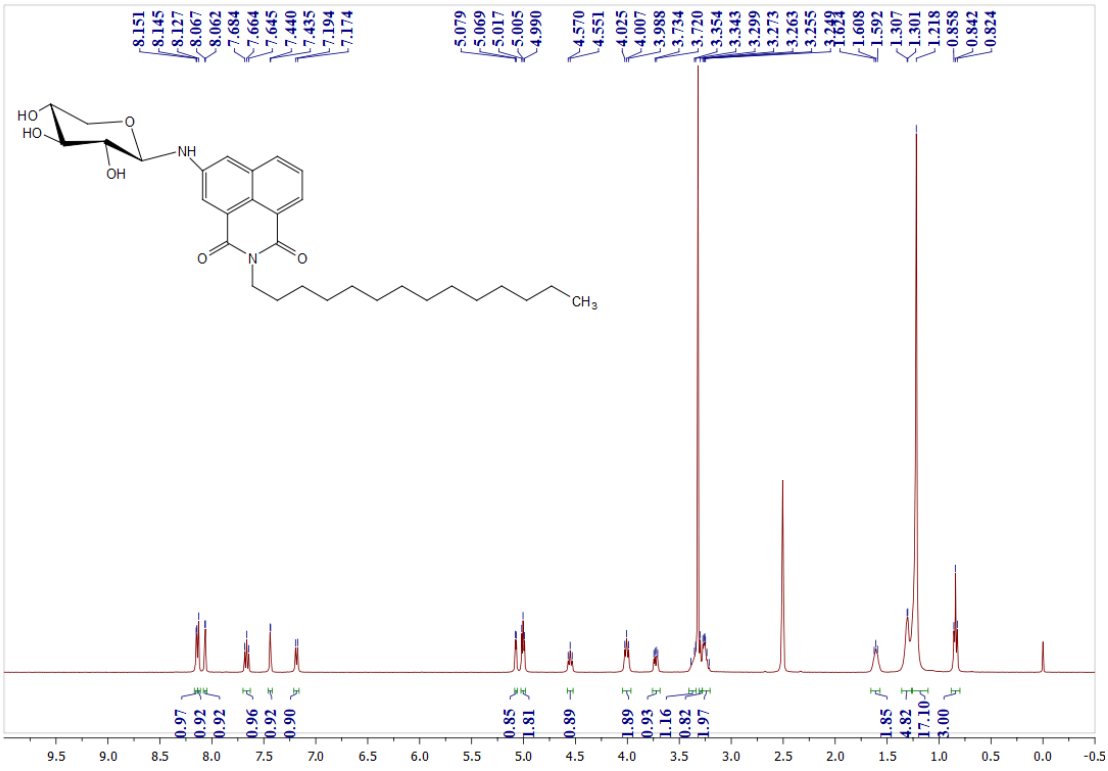


Figure S50. ^{1}H NMR Spectrum of compound 7e (400 MHz, DMSO-d_6)

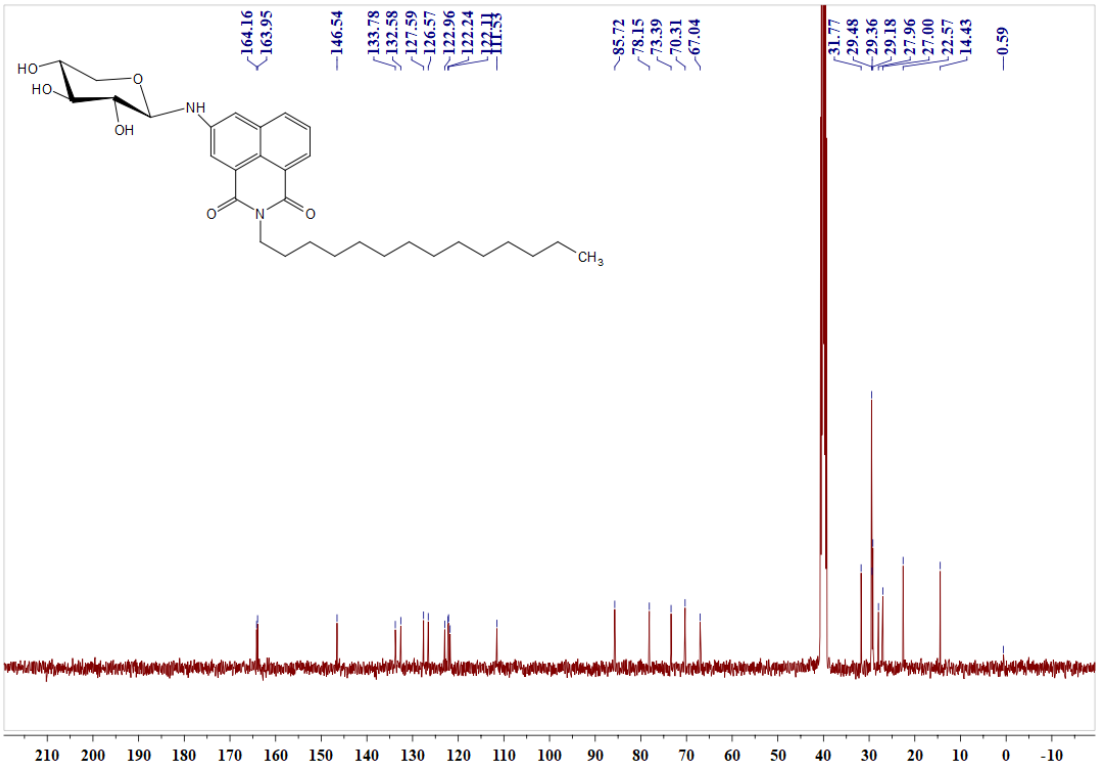


Figure S51. ^{13}C NMR Spectrum of compound 7e (101 MHz, DMSO-d_6)

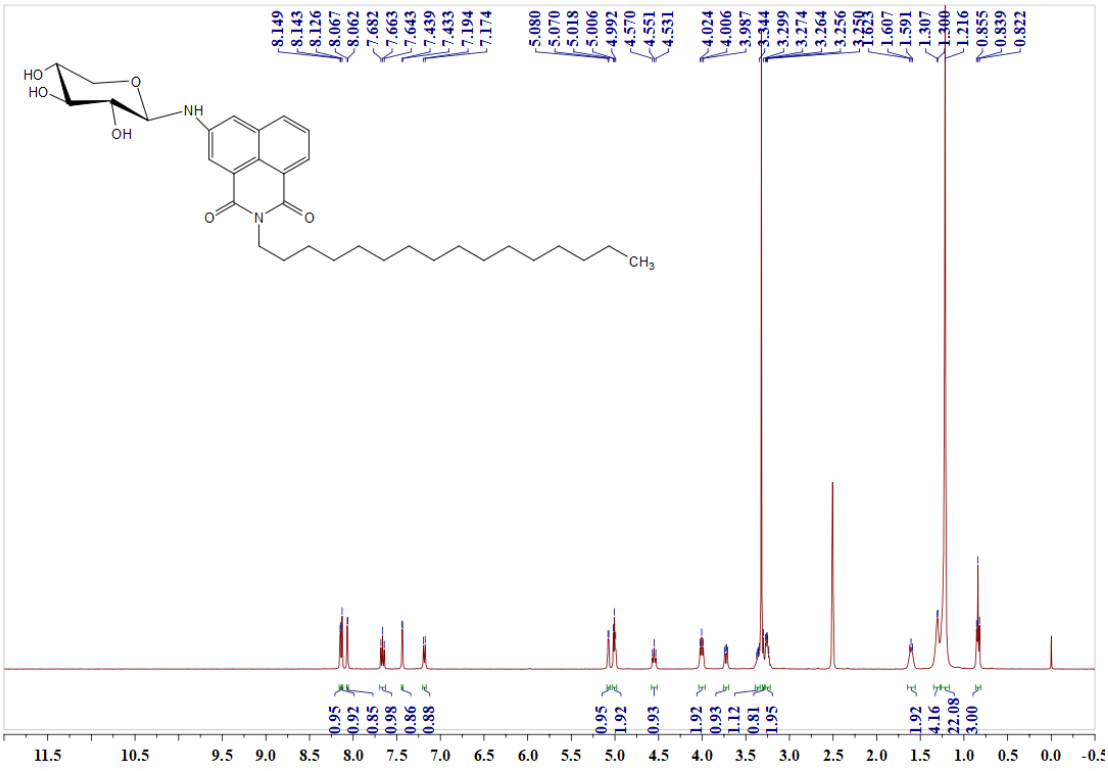


Figure S52. ^{1}H NMR Spectrum of compound 7f (400 MHz, DMSO-d_6)

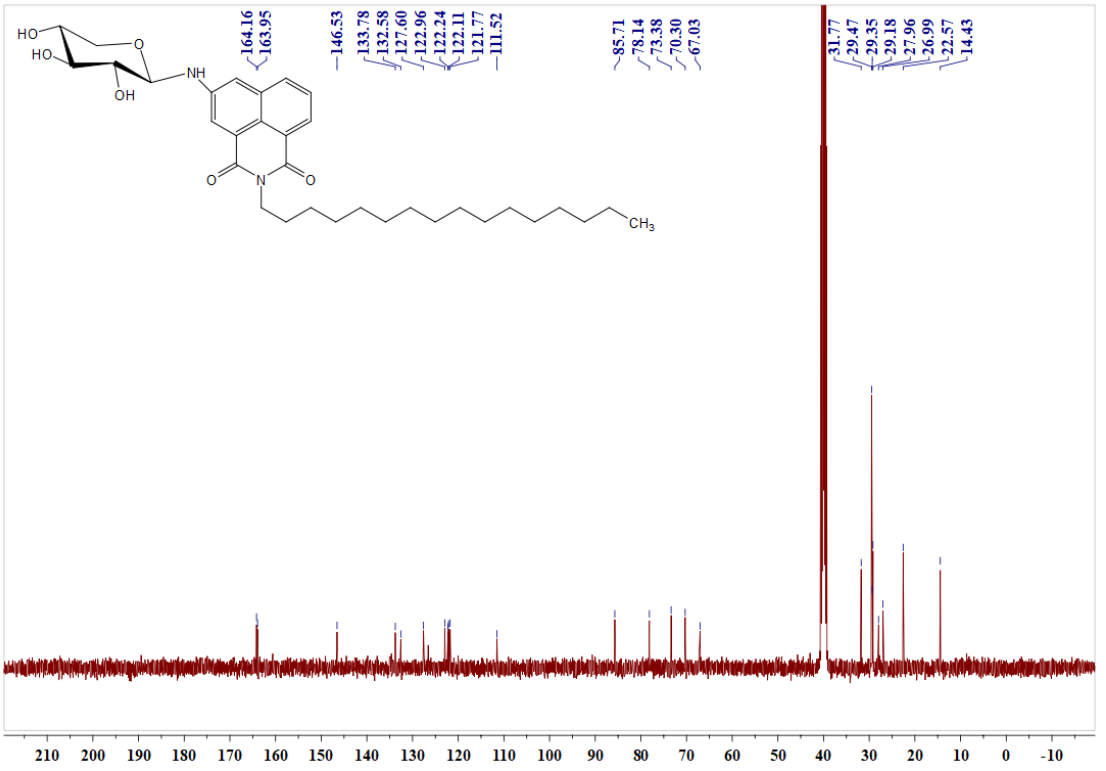


Figure S53. ^{13}C NMR Spectrum of compound 7f (101 MHz, DMSO-d_6)

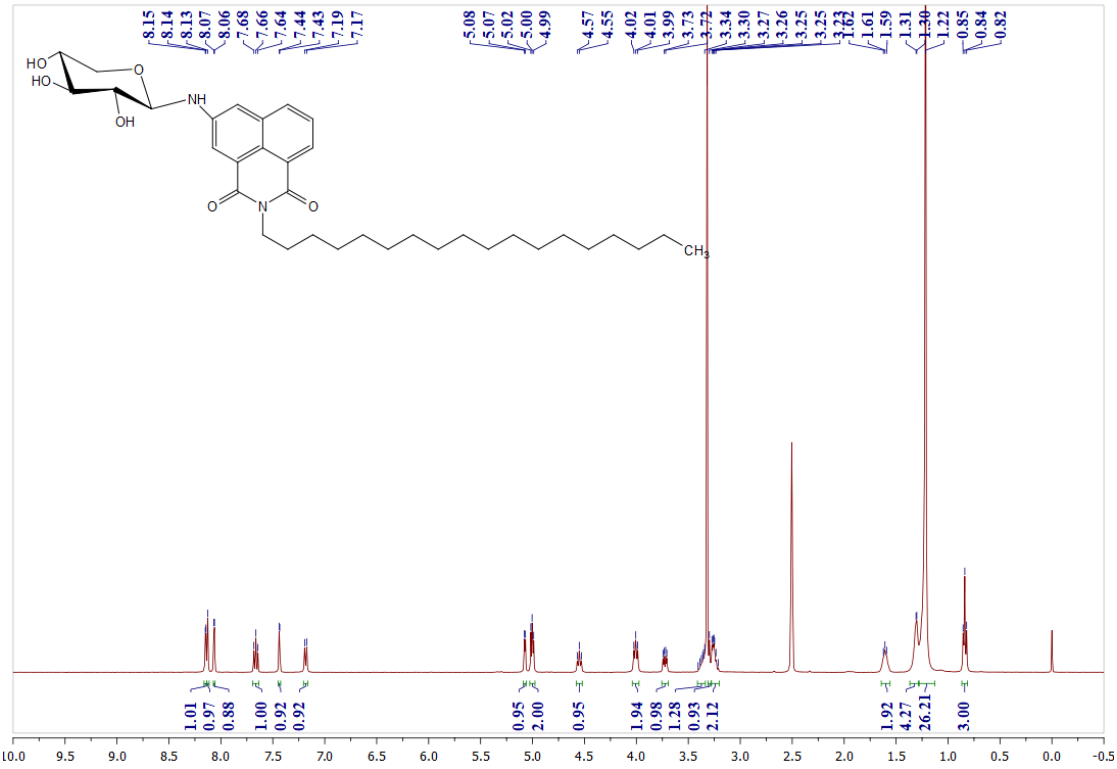


Figure S54. ^{1}H NMR Spectrum of compound 7g (400 MHz, DMSO-d_6)

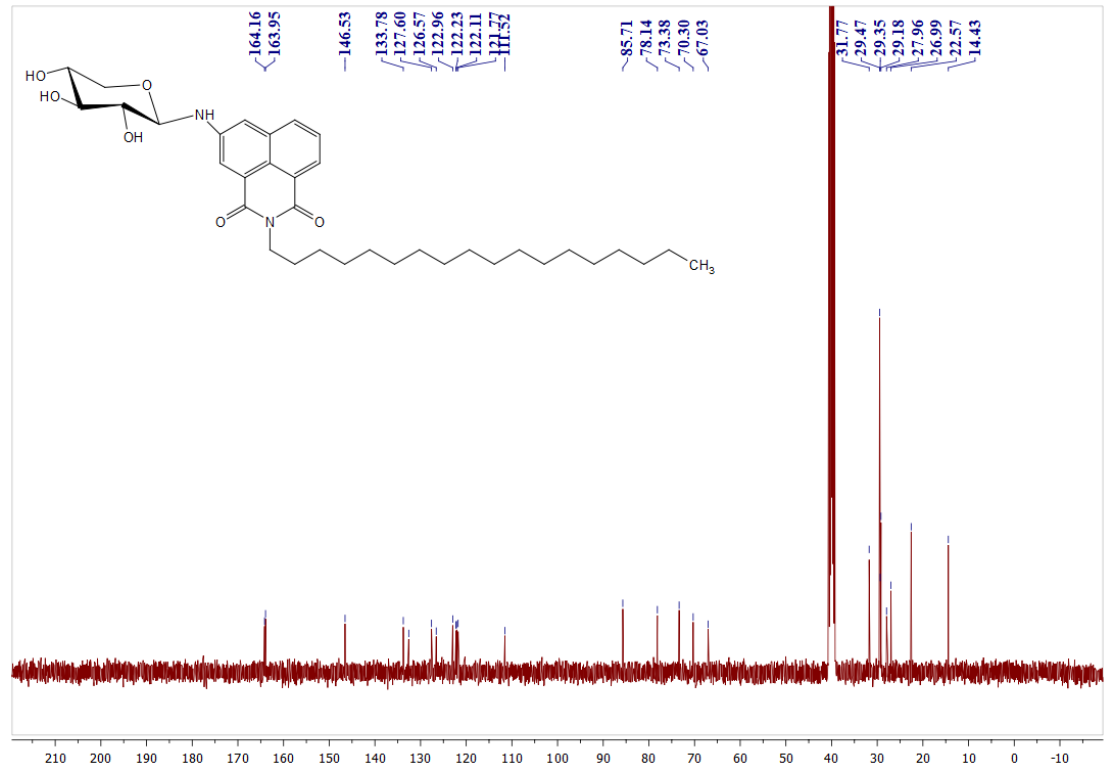


Figure S55. ^{13}C NMR Spectrum of compound 7g (101 MHz, DMSO-d_6)

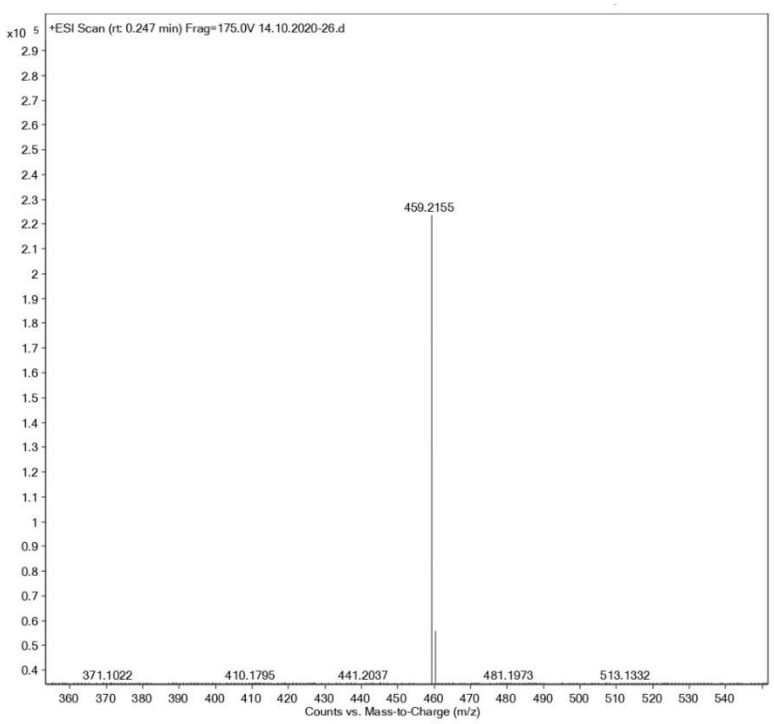


Figure S56. HRMS Spectrum of compound 5a

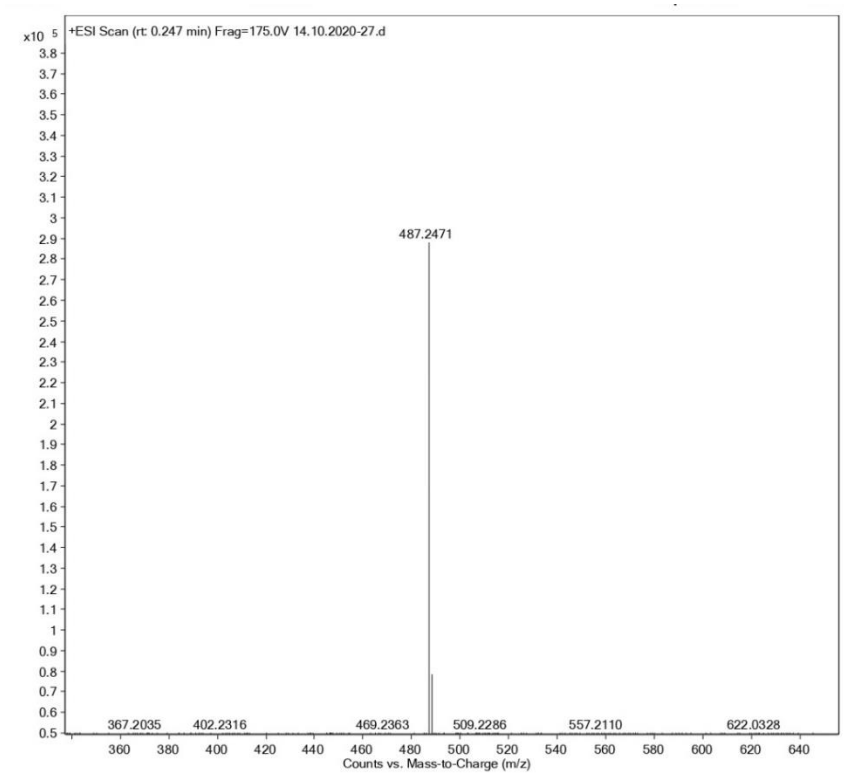


Figure S57. HRMS Spectrum of compound 5b

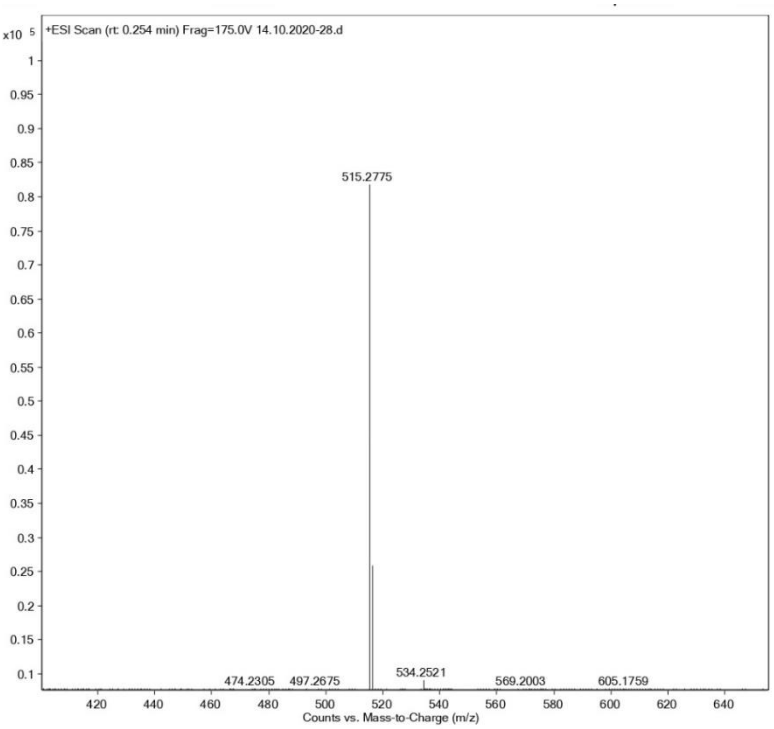


Figure S58. HRMS Spectrum of compound 5c

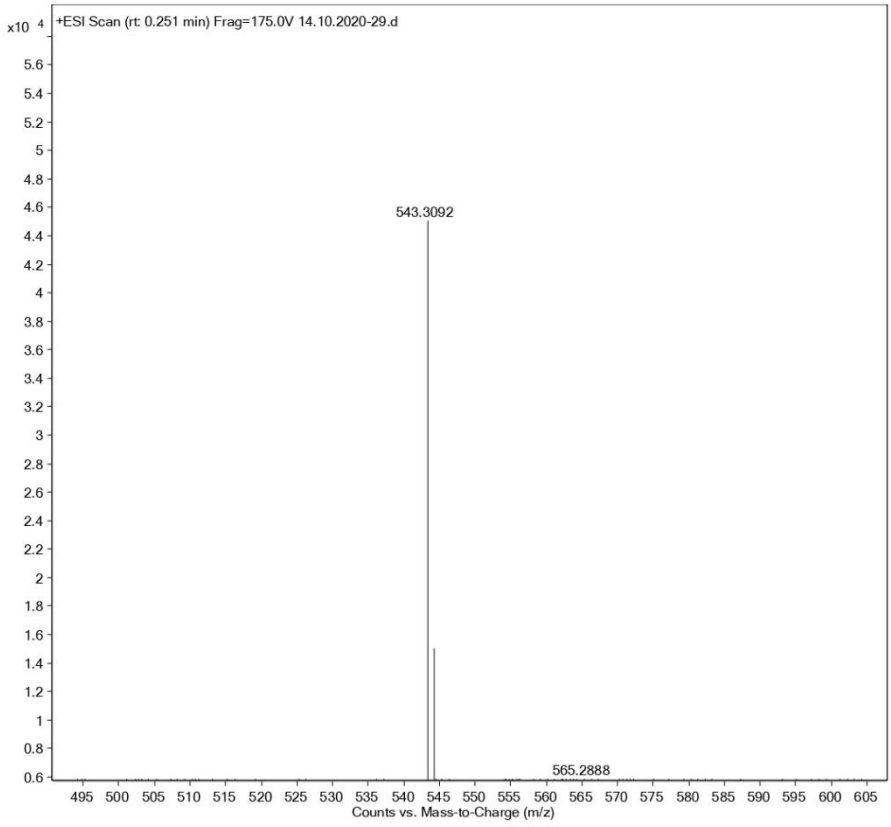


Figure S59. HRMS Spectrum of compound 5d

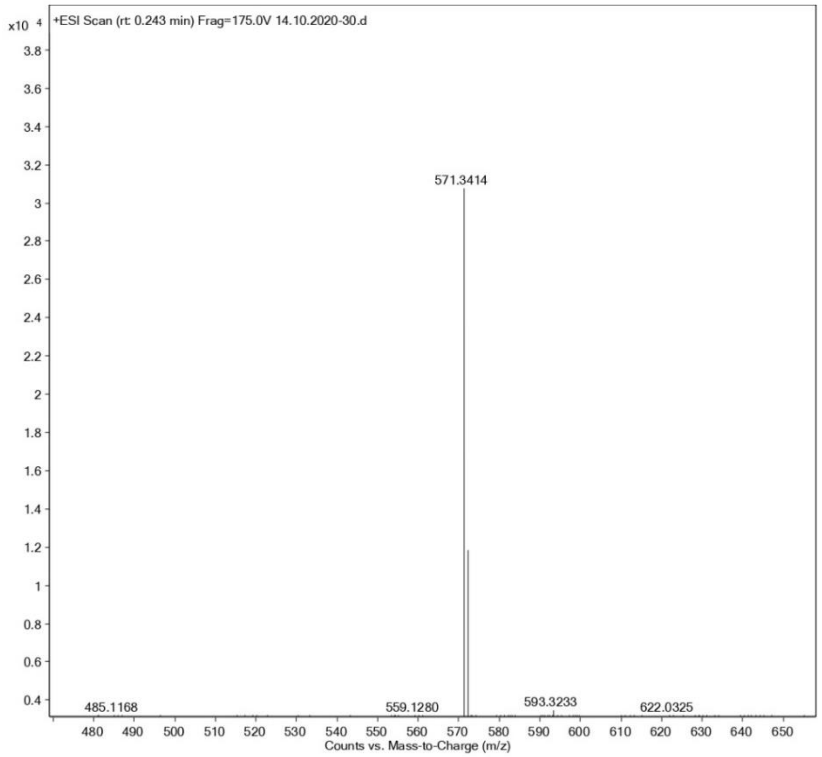


Figure S60. HRMS Spectrum of compound 5e

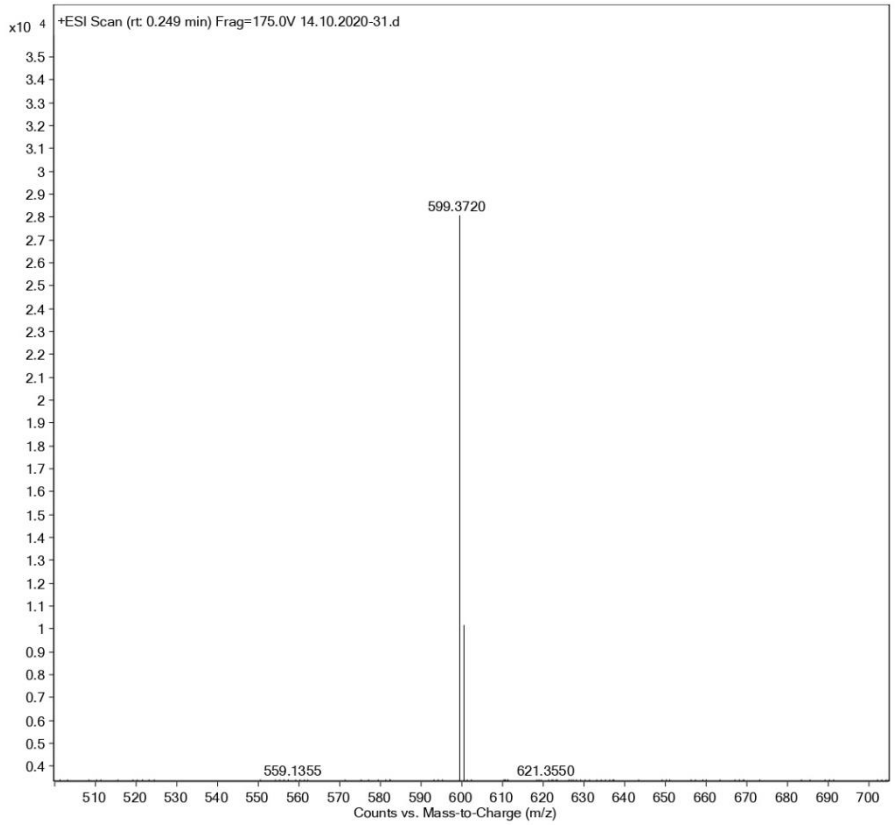


Figure S61. HRMS Spectrum of compound 5f

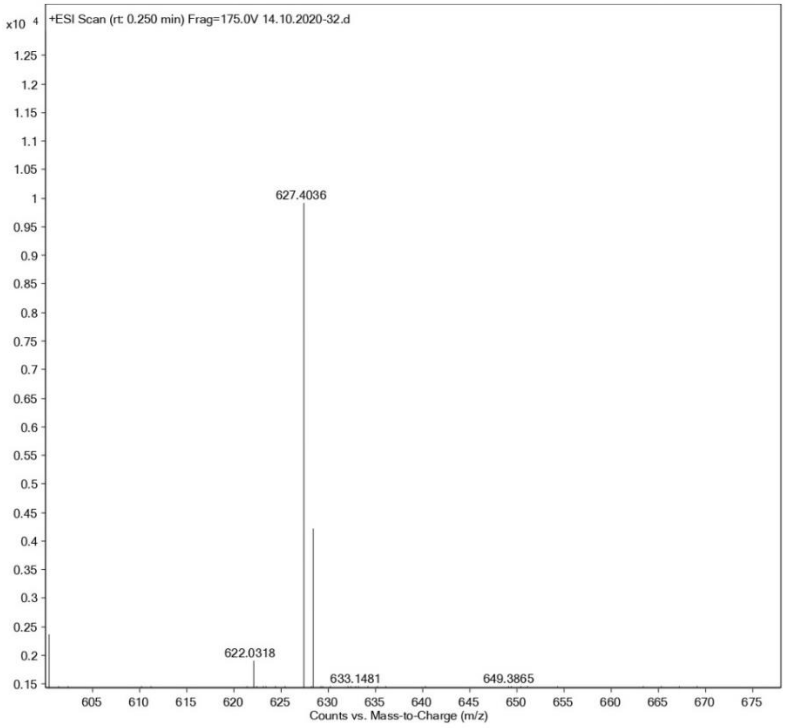


Figure S62. HRMS Spectrum of compound 5g

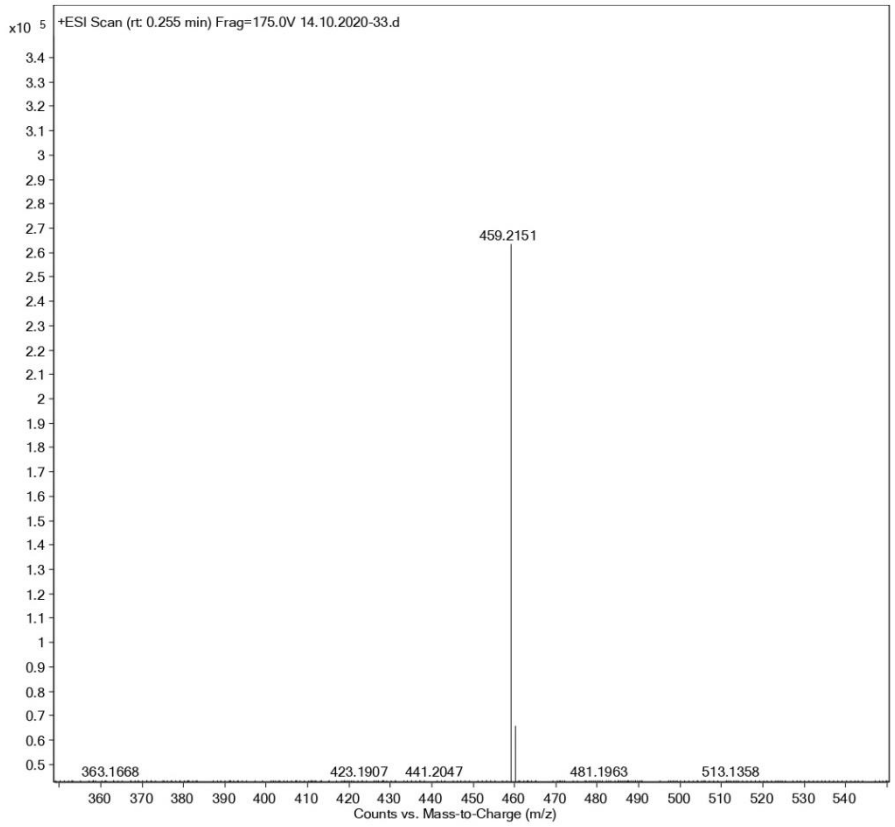


Figure S63. HRMS Spectrum of compound 6a

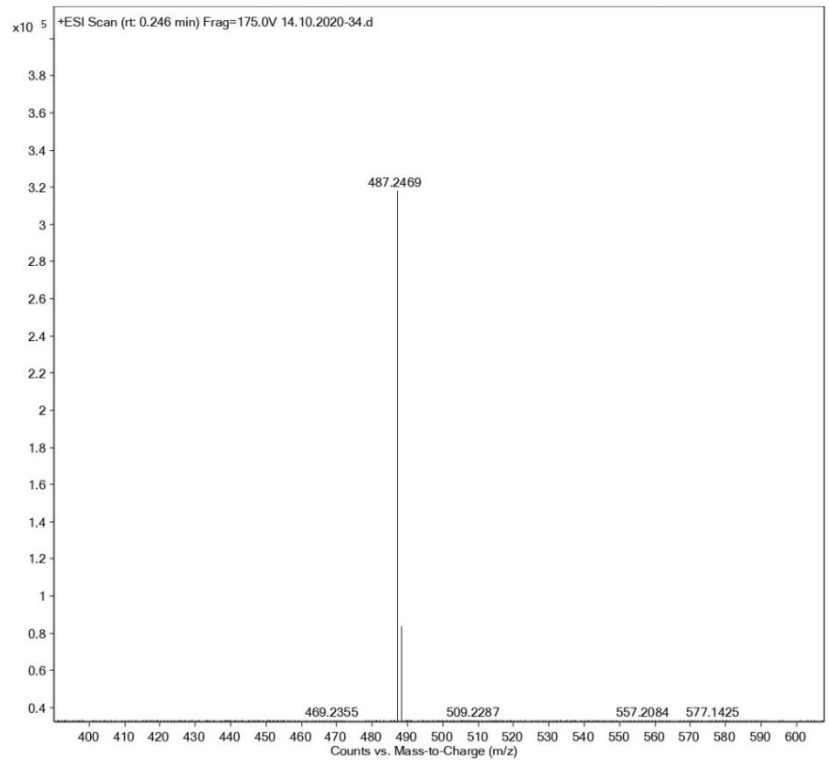


Figure S64. HRMS Spectrum of compound 6b

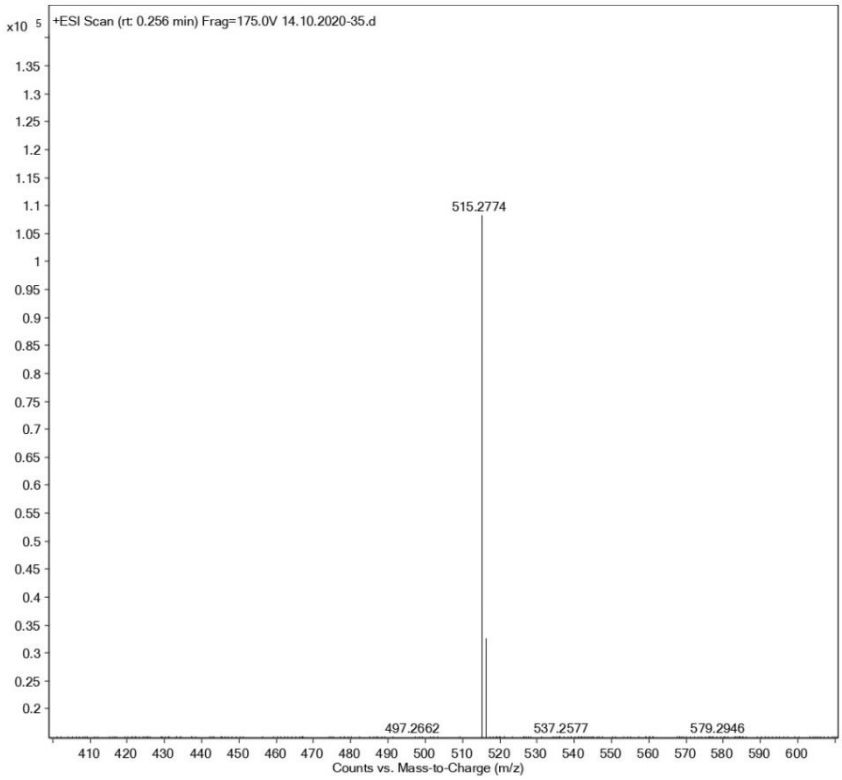


Figure S65. HRMS Spectrum of compound 6c

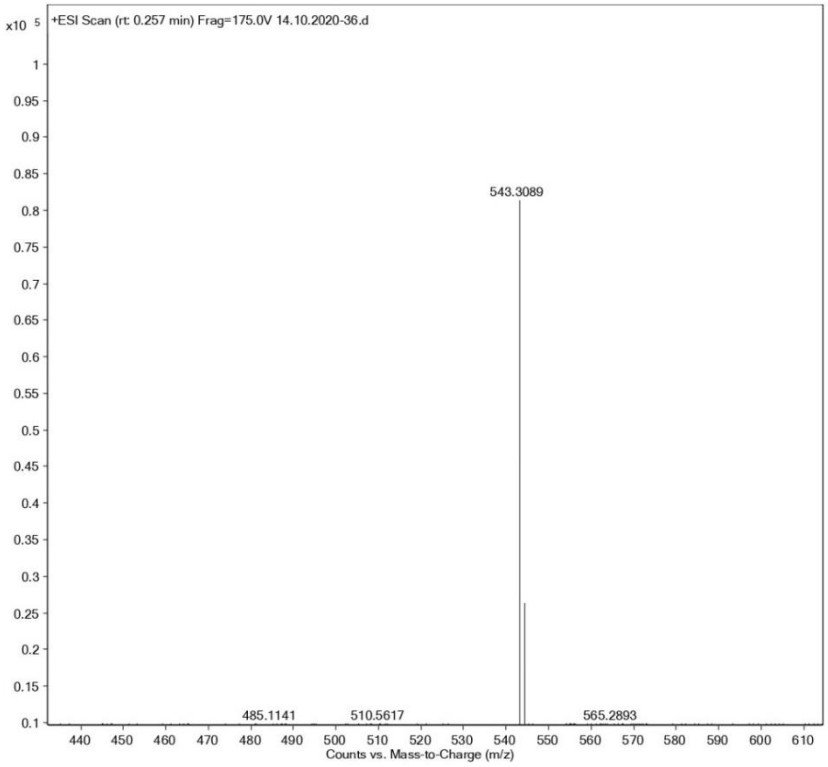


Figure S66. HRMS Spectrum of compound 6d

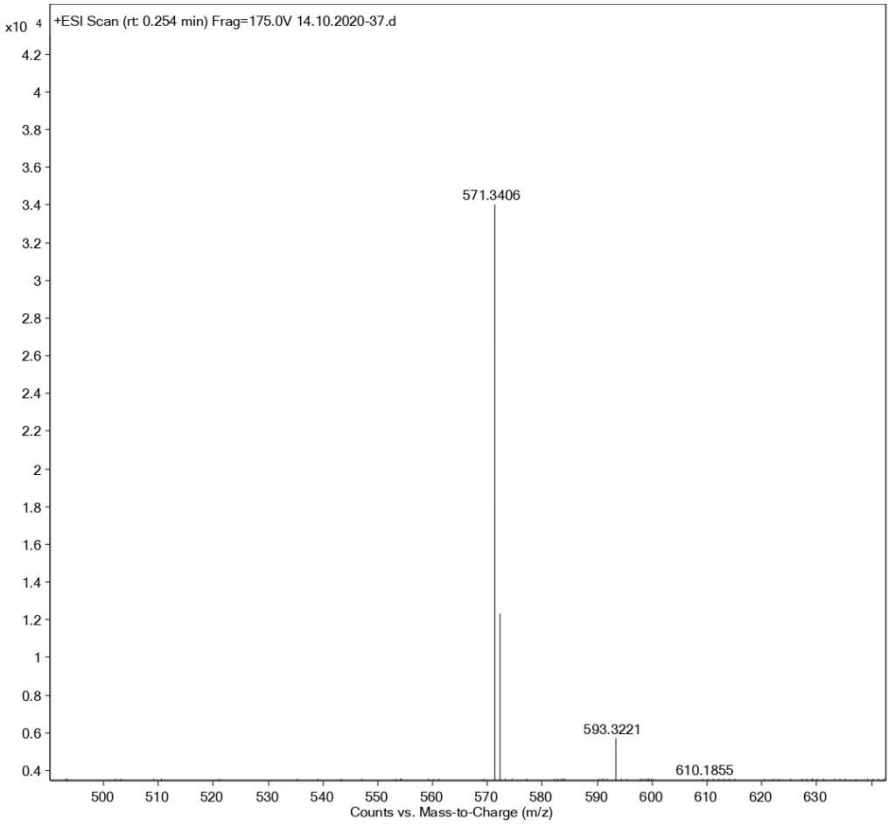


Figure S67. HRMS Spectrum of compound 6e

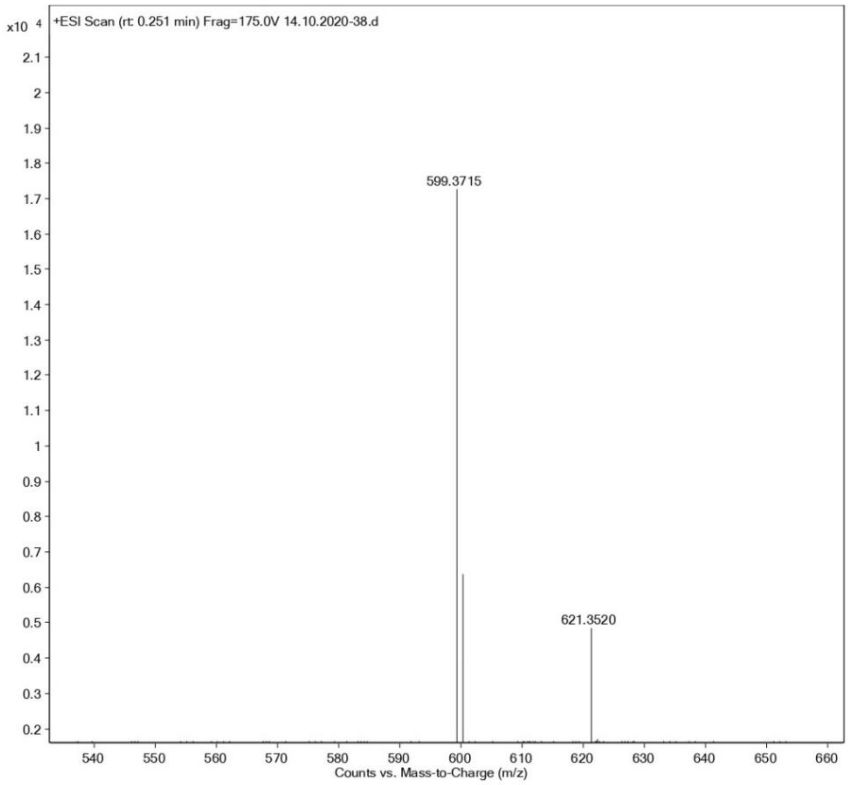


Figure S68. HRMS Spectrum of compound 6f

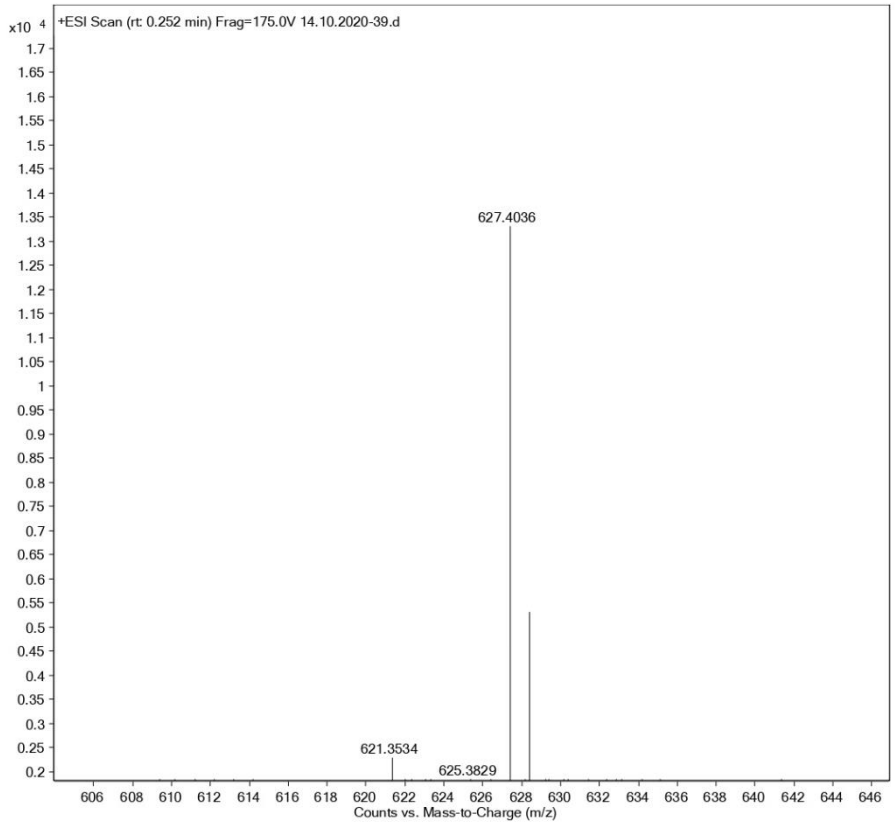


Figure S69. HRMS Spectrum of compound 6g

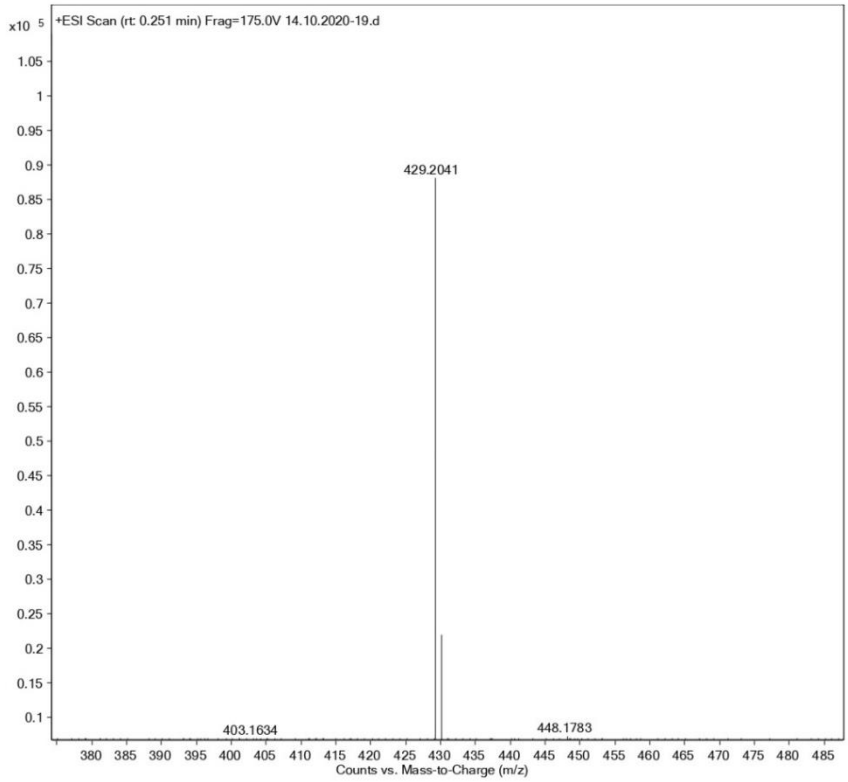


Figure S70. HRMS Spectrum of compound 7a

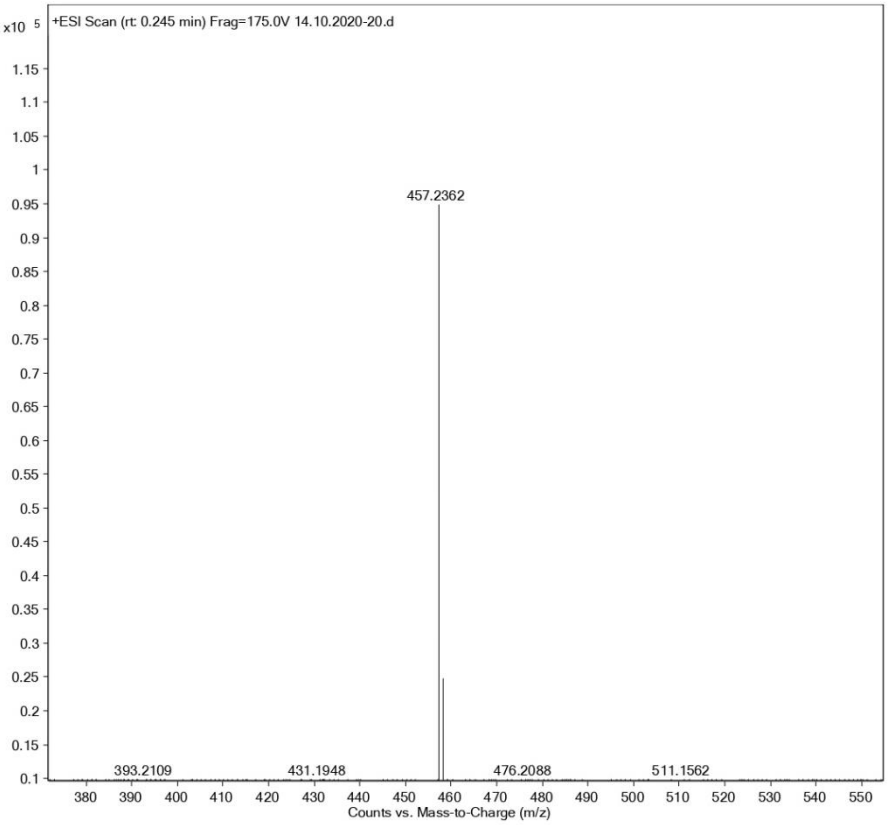


Figure S71. HRMS Spectrum of compound 7b

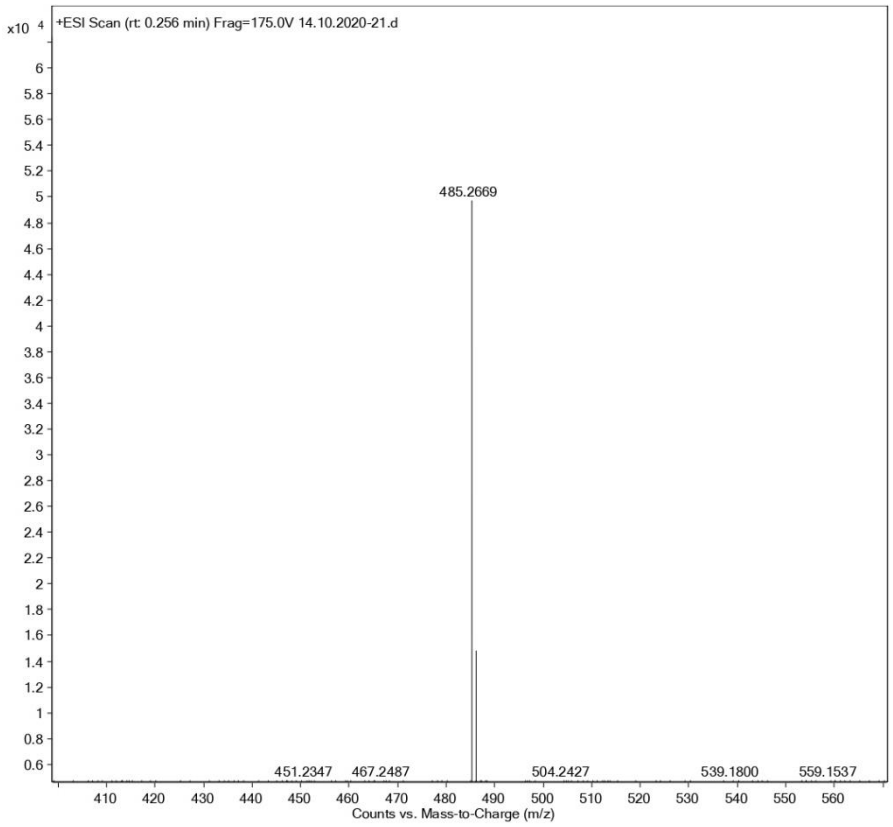


Figure S72. HRMS Spectrum of compound 7c

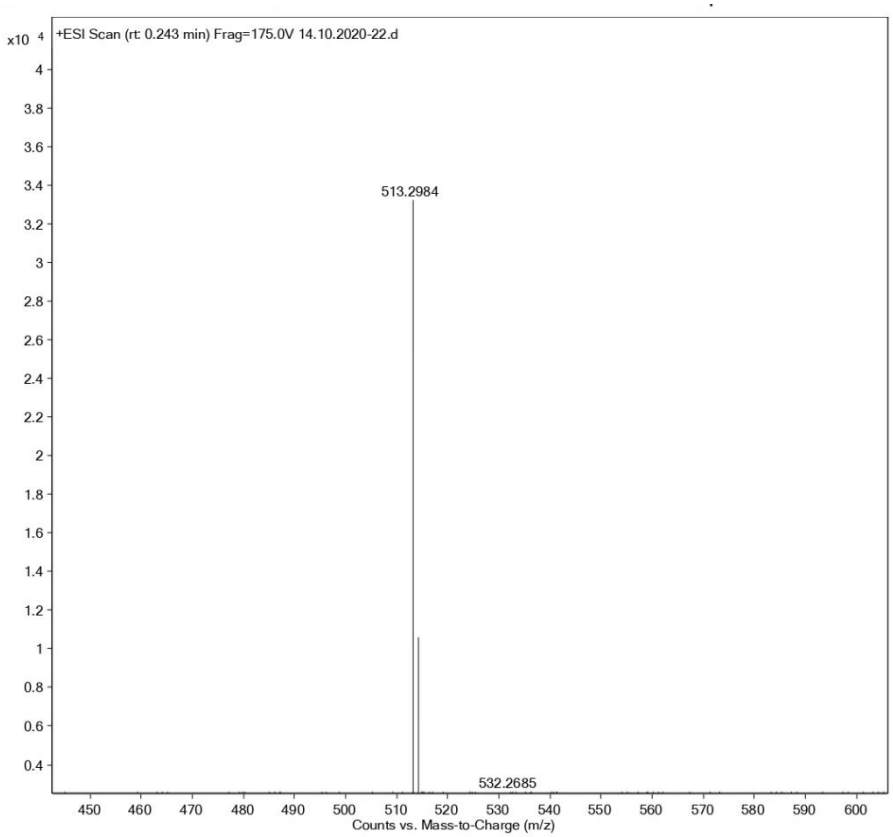


Figure S73. HRMS Spectrum of compound 7d

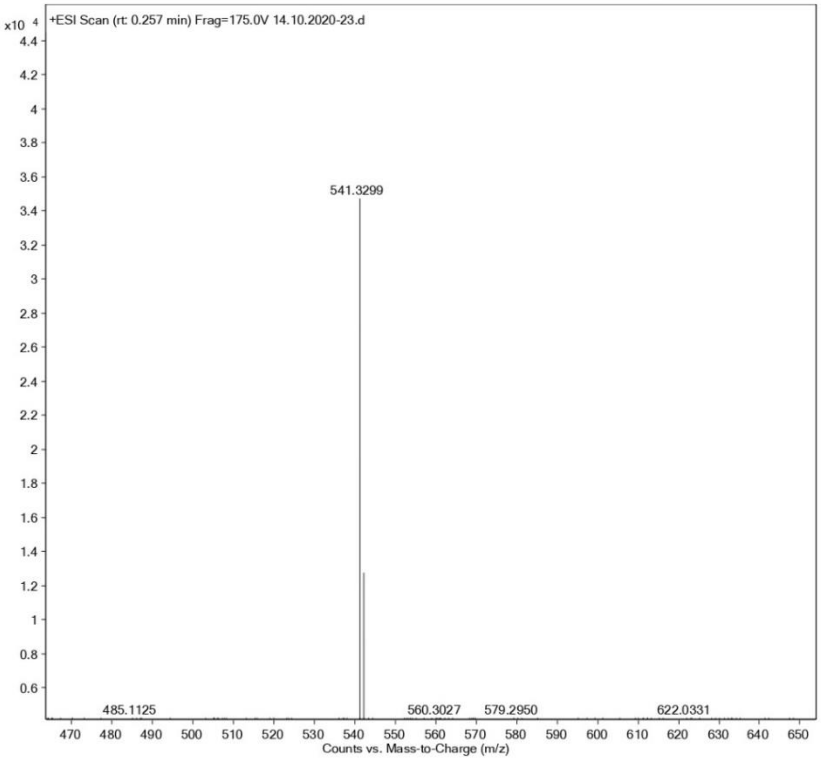


Figure S74. HRMS Spectrum of compound 7e

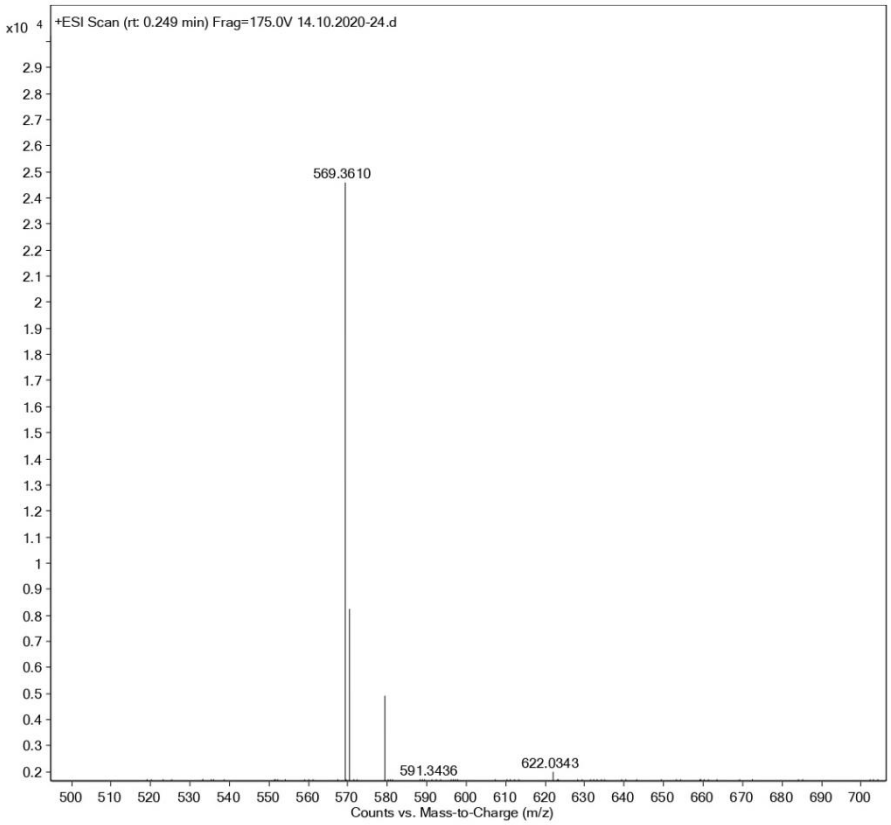


Figure S75. HRMS Spectrum of compound 7f

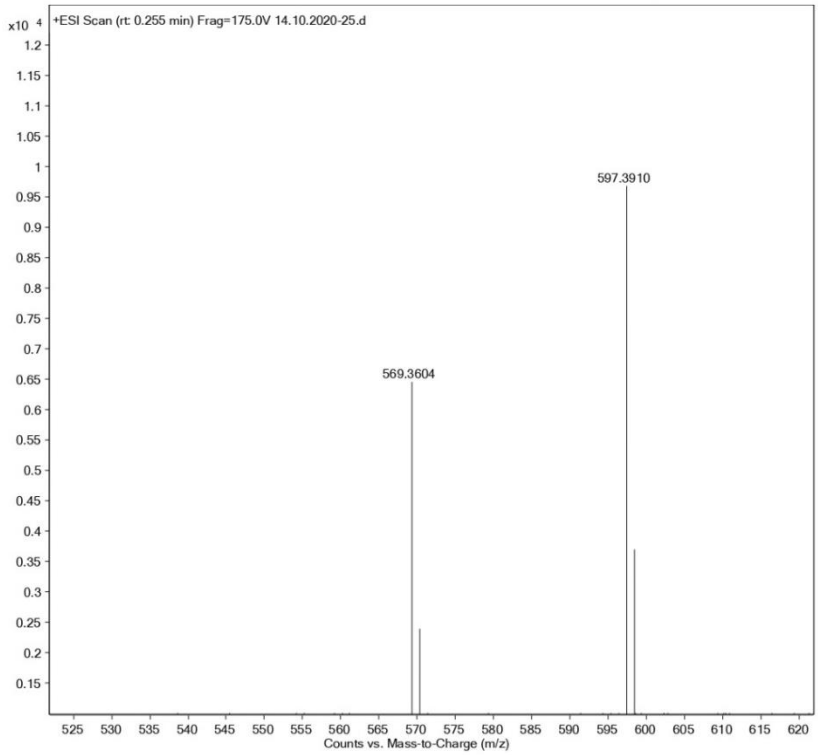


Figure S76. HRMS Spectrum of compound 7g

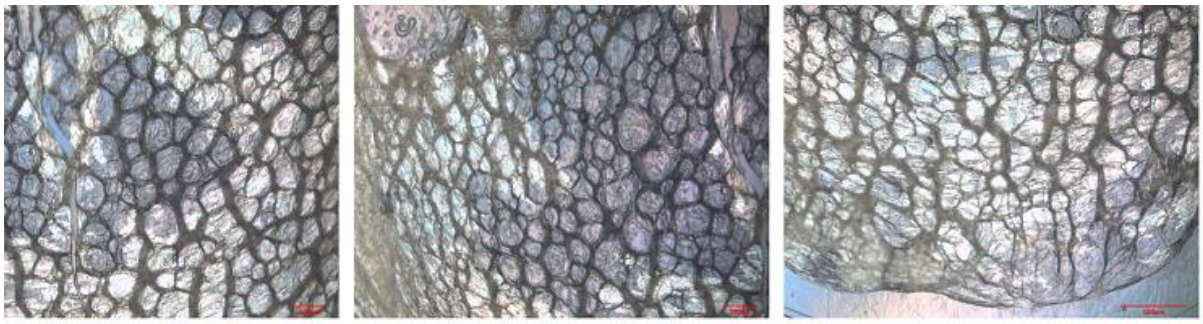


Figure S77. Optical microscopic images of the gel formed by 5d in $CHCl_3$