Supporting Information

Pyrene-Tagged Ionic Liquids: Separable Organic Catalysts for S_N2 Fluorination

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1. General remarks

Unless otherwise noted, all reagents and solvents were commercially available. Reaction progress was followed by TLC on 0.25 mm silica gel glass plates containing F-254 indicator. Visualization on TLC was monitored by UV light (254 nm). Flash chromatography was performed with 230-400 mesh silica gel. ^{1}H and ^{13}C NMR spectra were recorded on a 400 MHz spectrometer, and chemical shifts were reported in δ units (ppm) relative to tetramethylsilane. FT-IR spectra were collected using a Bruker Vertex 80v FTIR spectrometer. Low- and high-resolution electron impact (EI, 70 eV) spectra were obtained on high resolution mass spectrometer (Korea Basic Science Institute). MALDI-TOF mass spectra were performed on a Voyager-DE STR mass spectrometer (Applied Biosystems, Framingham, MA, USA) in positive ion mode with a 337nm pulsed nitrogen laser. Elemental analysis was performed using a FLASH EA 1112 elemental analyzer (Thermo Electron Corporation).

2. Synthesis of PILs in Scheme 1.

Synthesis of pyrene-tagged ionic liquid (PIL). 4-(1-Pyrenyl)butyl methanesulfonate (**2**) was synthesized according to the literature procedure.[1] Methanesulfonyl chloride (0.62 g, 5.4 mmol) was added dropwise to the solution of 1-pyrene-butanol (**1**, 1.0 g, 3.6 mmol) and triethylamine (1.28 g, 12.6 mmol) in dichloromethane (25 mL) at 0 ^{o}C. The mixture was stirred at 0 ^{o}C for 12 h, and then the reaction solution was washed with saturated $NaHCO_3$ solution and brine. The organic layer was dried over (sodium sulfate) and evaporated under reduced pressure. The crude product was purified by flash column chromatography (CH_2Cl_2/petroleum ether; 1:1) to obtain **2** as a colorless oil (1.22 g, 96%). 1-Methylimidazole (0.16 g, 2 mmol) was added drop-wise to the solution of **2** (0.70 g, 2 mmol) in acetonitrile (18 mL). The reaction mixture was stirred at 90 °C for 24 h and evaporated under reduced pressure to remove acetonitrile. The residue was repeatedly washed with diethyl ether (6 mL × 7) and dried under high vacuum for 12 h at room temperature to obtain PIL (0.8 g, 92%) as a colorless thick liquid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 1.75-1.97 (m, 4H), 2.73 (s, 3H) 3.29 (t, J = 7.2 Hz, 2H), 3.80 (s, 3H) 4.10 (t, J = 7.2 Hz, 2H) 6.98 (d, J = 1.6 Hz, 1H) 7.05 (d, J = 1.6 Hz, 1H), 7.77 (d, J = 8.0 Hz, 1H), 7.96 (m, 3H), 8.06 (m, 2H), 8.12 (m, 3H), 9.73 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 27.8, 29.7, 32.4, 36.1, 39.7, 49.6, 121.5, 123, 123.1, 124.1, 124.8, 125.2, 125.9, 126.3, 126.8, 127.3, 127.4, 127.5, 128.5, 129.1, 129.9, 130.7, 131.3, 135.4, 137.9. IR (KBr) cm^{-1}: 3400 (w), 3028 (w), 2937 (w), 1602 (m), 1558

(s), 1460 (m), 1211 (s), 1058 (s), 850 (s). MALDI-TOF-MS *m/z* calcd for $C_{24}H_{23}N_2$ $(M\text{-}X)^+$ 339.1861, found 339.1862 (X = [OMs]).

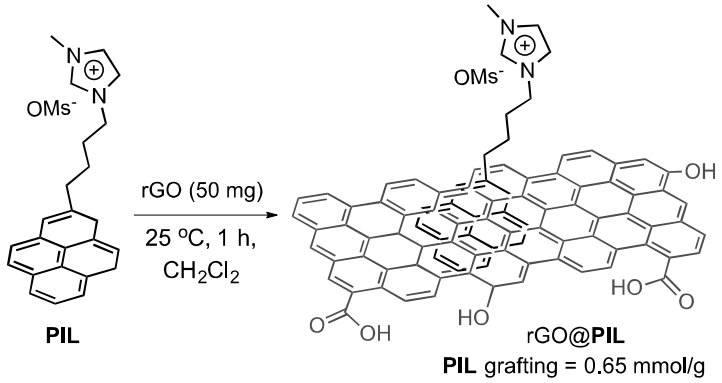
Synthesis of 1-(4-(pyren-1-yl)butyl)-1*H*-imidazole (4). 1-(4-Bromobutyl)pyrene (**3**) was synthesized according to the literature procedure.[2] Potassium carbonate (498 mg, 3.6 mmol) was added to the mixture solution of imidazole (204 mg, 3.0 mmol) and **3** (1.0 g, 3.0 mmol) in acetonitrile (18 mL) at room temperature. The reaction mixture was then stirred at 90 ºC for 24 h. The heterogeneous reaction solution was filtered and concentrated under reduced pressure. The crude product was purified by flash column chromatography (1% MeOH/CH_2Cl_2) to afford the compound **4** (214 mg, 22%) as a colorless thick liquid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 1.82-1.84 (m, 4H), 3.34 (t, J = 7.2 Hz, 2H), 3.65 (t, J = 6.4 Hz, 2H), 6.05 (s, 1H), 7.82 (d, J = 8.0 Hz, 1H), 7.94-8.20 (m, 10H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 28.7, 29.5, 33.0, 43.3, 110.6, 118.6, 123.4, 124.7, 124.8, 124.9, 125.0, 125.1, 125.8, 126.6, 126.8, 127.3, 127.5, 128.5,128.6, 129.9, 130.9, 131.4, 136.3. HRMS (EI) *m/z* calcd for $C_{23}H_{20}N_2$ (M^+) 324.1626, found 324.1627.

Synthesis of bis-pyrene-tagged ionic liquid (BPIL). 1-(4-(Pyren-1-yl)butyl)-1*H*-imidazole (**4**) (370 mg, 1.14 mmol) was added drop-wise to the solution of **2** (402 mg, 1.14 mmol) in CH_3CN (18 mL). The reaction mixture was stirred at 90 °C for 48 h and evaporated under reduced pressure to remove CH_3CN. The residue was repeatedly washed with diethyl ether (7 mL × 6) and dried under high vacuum for 12 h at room temperature to obtain BPIL (400 mg, 88 %) as a colorless thick liquid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 1.77-1.88 (m, 8H), 2.79 (s, 3H), 3.30 (t, J = 7.2 Hz, 4H), 4.11 (t, J = 7.2 Hz, 4H), 6.77 (d, J = 1.6 Hz, 2H), 7.76-8.11 (m, 18H), 9.81 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 137.84-118.71 (35C, arom), 49.79 (2C), 39.71, 32.48 (2C), 29.69 (2C), 27.90 (2C). IR (KBr) cm^{-1}: 3415 (w), 3043 (w), 2939 (w), 1606 (m), 1587 (s), 1436 (m), 1191 (s), 1058 (s), 850 (s). MALDI-TOF-MS *m/z* calcd for $C_{43}H_{40}N_2$ $(M\text{-}X)^+$ 584.3191, found 584.3190 (X = [OMs]).

3. IL grafting procedure

rGO (50 mg) was added to the solution of PIL (20 mg) in CH_2Cl_2 (6 mL). The mixture solution was sonicated for 20 min and was stirred at room temperature (25 ^{o}C) for 1 h until the solution became clear. rGO@PIL as a black solid was obtained by filtration and washing with CH_2Cl_2 (8 mL × 3). The filtrate was combined and evaporated to dryness under reduced pressure to

measure the unsupported PIL by ^{1}H NMR integration (NCH_2 at imidazolium) compared with the integration of anisole (−OMe) as internal standard. It was also analyzed by UV-vis analysis. The grafting amount of PIL onto rGO was 0.65 mmol/g (measured by elemental analysis). Anal.: N 1.84 (0.65 mmol imidazolium portion/g).



Scheme 1S. Grafting of PIL onto the surface of reduced graphene oxide (rGO).

4. Typical procedure of the fluorination (Figure 2 and Table 1)

Typical procedure (entry 1 in Table 1). CsF (456 mg, 3 mmol) was added to the mixture solution of a mesylate **5** (260 mg, 1.0 mmol), PIL (217 mg, 0.5 mmol), and CH_3CN (4 mL) in a reaction vial. The reaction mixture was stirred for 1.5 h at 100 ºC. The reaction time was determined by checking TLC. After cooling, rGO (50 mg) was added to the reaction mixture solution diluted with CH_2Cl_2. The solution was sonicated for 20 min and stirred for 1 h at room temperature. After filtration, the filtrate was evaporated under reduced to obtain 1-(3-fluoropropoxy)-4-methoxybenzene (**6**, 181 mg, 98 %) as a colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ 2.09-2.20 (m, 2H), 3.76 (s, 3H), 4.04 (t, J = 6.4 Hz, 2H), 4.71 (dt, J = 35.2, 6.0 Hz, 2H), 6.83 (m, 4H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 30.6 (d, J = 20.2 Hz), 55.9, 64.3 (d, J = 4.7 Hz), 80.2 (d, J = 162.9 Hz), 114.8, 114.8, 115.7, 115.9, 153.1, 154.1; HRMS (EI) *m/z* calcd for $C_{10}H_{13}FO_2$ (M^+) 184.0900, found 184.0901.

5. General procedure for the S_N2 fluorination reaction in Table 2

CsF (456 mg, 3 mmol) was added to the mixture of a substrate (1.0 mmol) and PIL (217 mg, 0.5 mmol) and solvent (4 mL) in a reaction vial. The reaction mixture was stirred at 100 ºC. We determined the reaction time by monitoring TLC. After completion of the reaction it was diluted with CH_2Cl_2 and then added rGO. The mixture was sonicated for 20 min and stirred for 1 h at

room temperature (RT). After cooling, rGO (50 mg) was added to the reaction mixture solution diluted with CH_2Cl_2. The solution was sonicated for 20 min and stirred for 1 h at room temperature. After filtration, the filtrate was evaporated under reduced to obtain the corresponding crude product. The by-products (e.g., an alkene) was separated using flash column chromatography to obtain the pure corresponding product.

1,2:3,4-Di-*O*-isopropylidene-6-fluoro-6-deoxy-a-D-galactopyranose (8). According to the general procedure in Table 2, **8** (252 mg, 96 %) was obtained as a colorless oil after flash column chromatography (15% EtOAc/hexane); ^{1}H NMR (600 MHz, $CDCl_3$) δ 1.34 (s, 6H), 1.45 (m, 3H), 1.55 (m, 3H), 4.06-4.10 (m, 1H), 4.26-4.28 (m, 1H), 4.34-4.37 (m, 1H), 4.48-4.65 (m, 3H), 5.56 (d, J = 5.5 Hz, 1H); ^{13}C NMR (150 MHz, $CDCl_3$) δ 24.48, 24.98, 25.98, 26.10, 66.69 (d, J = 21.5 Hz), 70.47, 70.59 (d, J = 5.8 Hz), 70.64, 82.15 (d, J = 168.00 Hz), 96.25, 108.88, 109.73; HRMS (EI) *m/z* calcd for [$C_{12}H_{19}FO_5$ + H] (M^{+H}) *m/z* 263.1295. Found *m/z* 263.1298.

1-(*tert*-Butyl) 2-methyl (2S,4R)-4-fluoropyrrolidine-1,2-dicarboxylate (10). According to the general procedure in Table 2, **10** (163 mg, 66 %) was obtained as a colorless oil after flash column chromatography (30% EtOAc/hexane); ^{1}H NMR (400 MHz, $CDCl_3$) δ 1.46 (s, 9H), 2.42-2.29 (m, 2H), 3.52-3.77 (m, 5H), 5.19-5.26 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 28.4, 28.5, 28.6, 52.4 (d, J = 6.7 Hz), 53.7 (d, J = 23.0 Hz), 66.7 (d, J = 37.3 Hz), 80.3, 124.9 (d, J = 11.5 Hz), 129.6 (d, J = 12.4 Hz), 153.5 (d, J = 49.9 Hz), 171.3 (d, J = 31.6 Hz); HRMS (EI) *m/z* calcd for $C_{11}H_{18}FNO_4$ (M^+) 247.1219, found 247.1220.

3-*O*-(3-Fluoropropyl)estrone (12). According to the general procedure in Table 2, **12** (301 mg, 91 %) was obtained as a white solid after flash column chromatography (30% EtOAc/hexane); ^{1}H NMR (600 MHz, $CDCl_3$) δ 0.91 (s, 3H), 1.41-1.66 (m, 6H), 1.94-1.96 (m, 1H), 1.99-2.08 (m, 3H), 2.11-2.19 (m, 3H), 2.25 (t, J = 11.0 Hz, 1H), 2.38-2.41 (m, 1H), 2.55 (dd, J = 27.5 and 8.9 Hz, 1H), 2.86-2.91 (m, 2H), 4.07 (t, J = 6.2 Hz, 2H), 4.64 (dt, J = 47.0, 6.2 Hz, 2H), 6.65 (d, J = 2.8 Hz, 1H), 6.72 (dd, J = 10.9 and 2.7 Hz, 1H), 7.20 (d, J = 8.3 Hz, 1H); ^{13}C NMR (150 MHz, $CDCl_3$) δ 13.9, 21.7, 26.0, 26.6, 29.7, 30.5 (d, J = 20.2 Hz), 31.6, 35.9, 38.4, 44.0, 48.1, 50.5, 63.5 (d, J = 4.7 Hz), 80.9 (d, J = 163.2 Hz), 112.2, 114.6, 126.4, 132.2, 137.9, 156.8, 221.1; HRMS (EI) calcd for $C_{21}H_{27}FO_2$ (M^+) 330.1995, found 330.1993.

***N*$_4$'-3-Fluoropropylciprofloxacin methyl ester (14).** According to the general procedure in Table 2, **14** (389 mg, 96 %) was obtained as a white solid after flash column chromatography (5%

MeOH/CH_2Cl_2); ^{1}H NMR (600 MHz, $CDCl_3$) δ 1.12-1.15 (m, 2H), 1.30-1.33 (m, 2H), 1.89-1.98 (m, 2H), 2.57 (t, J = 14.4 Hz, 2H), 2.67-2.69 (m, 4H), 3.28-3.29 (m, 4H), 3.40-3.44 (m, 1H), 3.91 (s, 3H), 4.55 (dt, J = 46.7, 5.8 Hz, 2H), 7.27 (d, J = 7.5 Hz, 1H), 8.05 (d, J = 13.1 Hz, 1H), 8.55 (s, 1H); ^{13}C NMR (150 MHz, $CDCl_3$) δ 8.2, 28.0 (d, J = 20.1 Hz), 34.6, 50.0 (d, J = 4.3 Hz), 52.1, 53.0, 54.2 (d, J = 5.7 Hz), 84.4 (d, J = 163.7 Hz), 104.8 (d, J = 3.8 Hz), 110.2, 113.4 (d, J = 23.0 Hz), 123.1 (d, J = 7.2 Hz), 138.1, 144.6 (d, J = 11.5 Hz), 148.4, 153.5 (d, J = 248.0 Hz), 166.6, 173.2; MS (EI) *m/z* 405 (M+, 100), 358 (100); HRMS (EI) *m/z* calcd for $C_{21}H_{25}N_3O_3F_2$ (M+) 405.1864, found 405.1868.

1-Azido-14-fluoro-3,6,9,12-tetraoxatetradecane (16). According to the general procedure in Table 2, **16** (257 mg, 97 %) was obtained as a colorless oil after flash column chromatography (5% MeOH/CH_2Cl_2); ^{1}H NMR (400 MHz, $CDCl_3$) δ 3.38 (t, J = 5.2 Hz, 2H), 3.67-3.72 (m, 14H), 3.78 (t, J = 4.4 Hz, 2H), 4.61 (dt, J = 39.2, 4.4 Hz, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 50.8, 70.2, 70.4, 70.6, 70.8, 70.8, 70.8, 70.9, 71.0, 82.5 (d, J = 167.7 Hz); HRMS (EI) *m/z* calcd for $C_{10}H_{20}FN_3O_4$ (M^+) 265.1437, found 265.1436.

Fluorinated ADIBO derivative (18). According to the general procedure in Table 2, **18** (408 mg, 88 %) was obtained as a colorless oil after flash column chromatography (6% MeOH/CH_2Cl_2); ^{1}H NMR (400 MHz, $CDCl_3$) δ 1.41-1.51 (m, 4H), 1.64-1.78 (m, 3H), 2.32-2.38 (m, 5H), 3.20 (t, J = 1.6 Hz, 2H), 3.71(d, J = 13.6 Hz, 1H), 4.09-4.14 (m, 2H), 4.47 (dt, J = 39.6, 6.0 Hz, 2H), 5.15 (d, J = 13.6 Hz, 1H), 6.13 (s. 1H), 6.23 (s, 1H), 7.28-7.40 (m, 7H), 7.68 (d, J = 7.6 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 19.7, 24.0, 28.7, 29.0, 29.1, 30.1, 31.8, 36.4, 39.3, 53.5, 58.8, 84.7 (d, J = 163.9 Hz), 107.7, 114.9, 122.5, 125.7, 126.0, 127.9, 128.4, 128.6, 129.1, 132.1, 147.9, 151.0, 172.1, 172.2, 172.3; HRMS (EI) *m/z* calcd for $C_{27}H_{30}FN_3O_3$ (M^+) 463.2271, found 463.2270.

2-Fluoro-1-(naphthalen-2-yl)ethan-1-one (20). According to the general procedure in Table 2, **20** (175 mg, 93 %) was obtained as a white solid after flash column chromatography (10% EtOAc/hexane); ^{1}H NMR (600 MHz, $CDCl_3$) δ 5.59 (d, J = 36.4 Hz, 2H), 7.52 (t, J = 8.2 Hz, 1H), 7.57 (t, J = 8.2 Hz, 1H), 7.83 (d, J = 8.2 Hz, 1H), 7.86-7.93 (m, 3H), 8.35 (s, 1H); ^{13}C NMR (150 MHz, $CDCl_3$) 83.80 (d, J = 182.4 Hz), 123.3, 127.2, 128.0, 129.1 (d, J = 18.7 Hz), 129.7, 129.9, 129.9, 131.1, 132.5, 136.1, 193.5 (d, J = 15.8 Hz); HRMS (EI) *m/z* calcd for $C_{12}H_9FO$ (M^+) 188.0637, found 188.0635.

1-(3-Fluoropropyl)-4-nitro-1*H*-imidazole (22). According to the general procedure in Table 2, **22** (149 mg, 86 %) was obtained as a colorless oil after flash column chromatography (80% EtOAc/hexane); ^{1}H NMR (600 MHz, $CDCl_3$) δ 2.20-2.28 (m, 2H), 4.24 (t, J = 6.8 Hz, 2H), 4.50 (dt, J = 46.68 and 5.52 Hz, 2H), 7.49 (s, 1H), 7.81 (s, 1H); ^{13}C NMR (150 MHz, CDCl3) δ 31.5 (d, J = 20.1 Hz), 44.4, (d, J = 4.3 Hz), 79.6 (d, J = 166.6 Hz), 119.2, 136.2,148.4; MS (EI) *m/z* 173 (M+, 100), 127, 61; HRMS (EI) *m/z* calcd for $C_6H_8FN_3O_2$ (M+) 173.0601, found173.0598.

2-(2-Fluoropropoxy)naphthalene (24). According to the general procedure in Table 2, **24** (188 mg, 92 %) was obtained as a white solid after flash column chromatography (10% EtOAc/hexane); ^{1}H NMR (600 MHz, $CDCl_3$) δ 1.43 (dd, J = 30.6, 7.2 Hz, 3H), 4.03-4.15 (m, 2H), 4.93-4.99 (m, 0.5H), 5.03-5.07 (m, 0.5H), 7.05 (s, 1H), 7.12 (dd, J = 12, 3 Hz, 1H), 7.27 (t, J = 15 Hz, 1H), 7.37 (t, J = 15 Hz, 1H), 7.64-7.70 (m, 3H) ; ^{13}C NMR (150 MHz, $CDCl_3$) δ 17.6 (d, J = 86.2 Hz), 70.8 (d, J = 97.62), 88.5 (d, J = 672.1), 106.8, 118.9, 123.9, 126.6, 126.9, 127.8, 129.3, 129.7, 134.5, 156.5; MS (EI) 204 (M+); HRMS(EI) calcd for $C_{13}H_{13}FO$ (M+) 204.0950, found 204.0952.

1-(2-Fluoroethyl)naphthalene (26). According to the general procedure in Table 2, **26** (153 mg, 88 %) was obtained as a colorless oil after flash column chromatography (30% EtOAc/hexane); ^{1}H NMR (600 MHz, $CDCl_3$) δ 3.44 (dt, J = 13.7, 6.9 Hz, 2H), 4.75 (dt, J = 47.5, 6.9 Hz, 2H), 7.30-7.37 (m, 2H), 7.41-7.49 (m, 2H), 7.70 (d, J = 8.2 Hz, 1H), 7.80 (d, J = 8.2 Hz, 1H), 7.95 (d, J = 8.2 Hz, 1H); ^{13}C NMR (150 MHz, $CDCl_3$) δ 33.9 (d, J = 20.1 Hz), 83.6 (d, J = 168.0 Hz), 123.4, 125.6, 125.7, 126.3, 127.3, 127.7, 128.9, 132.0, 132.8 (d, J = 8.5 Hz), 133.9; MS (EI) *m/z* 174 (M+), 141 (100); HRMS (EI) *m/z* calcd for $C_{12}H_{11}F$ (M^+) 174.0845, found 174.0843.

6. Catalyst separation and recycling of graphene materials

After completion of the fluorination reaction, the black solid mixture contained rGO@PIL was separated from the reaction mixture solution by simple filtration. Then, the separated graphene materials were washed with hot THF, water and ethanol to remove PIL from the rGO. The purified rGO was re-used for the next reaction without changing any conditions.

7. Procedure of radio-fluorination in Scheme 2

394 MBq of fluorine-18 (produced from [^{18}O]H_2O by proton bombardment[3]) in [^{18}O]H_2O (200 μL) was added to the mixture of PIL (4.5 mg, 10 μmol) and Cs_2CO_3 (5 mg, 15 μmol) in glass vial (1.8 mL) at room temperature. After removal of [^{18}O]H_2O by azeotropic distillation using CH_3CN (500 μL) at 100 ^{o}C under a stream of nitrogen, 2-(3-methanesulfonyloxypropoxy)naphthalene (**27**, 5.6 mg, 20 μmol) in CH_3CN (200 μL) was added to the reaction mixture and stirred at 100 ºC for 20 min. The reaction solution was cooled in water bath for 1 min. Then, the reaction mixture was purified by short column chromatography (5% EtOAc/hexanes) to obtain 2-(3-[^{18}F]fluoropropoxy)naphthalene ([^{18}F]**28**, 277 MBq, radioTLC ratio: 97%, decay-corrected yield: 88%, 35 min total reaction time). In this radiofluorination reaction, we separated PIL using short column chromatography (we did not use rGO to remove PIL).

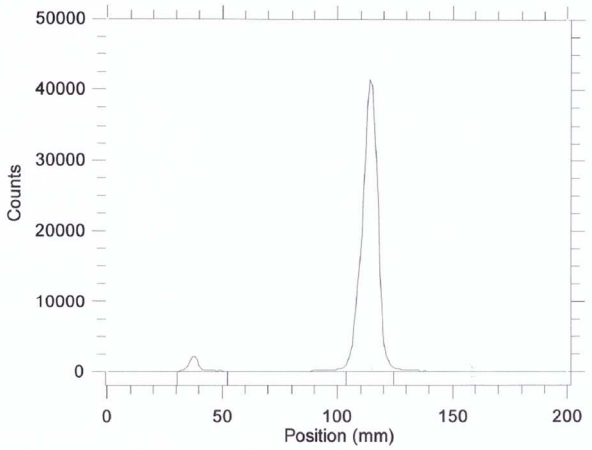
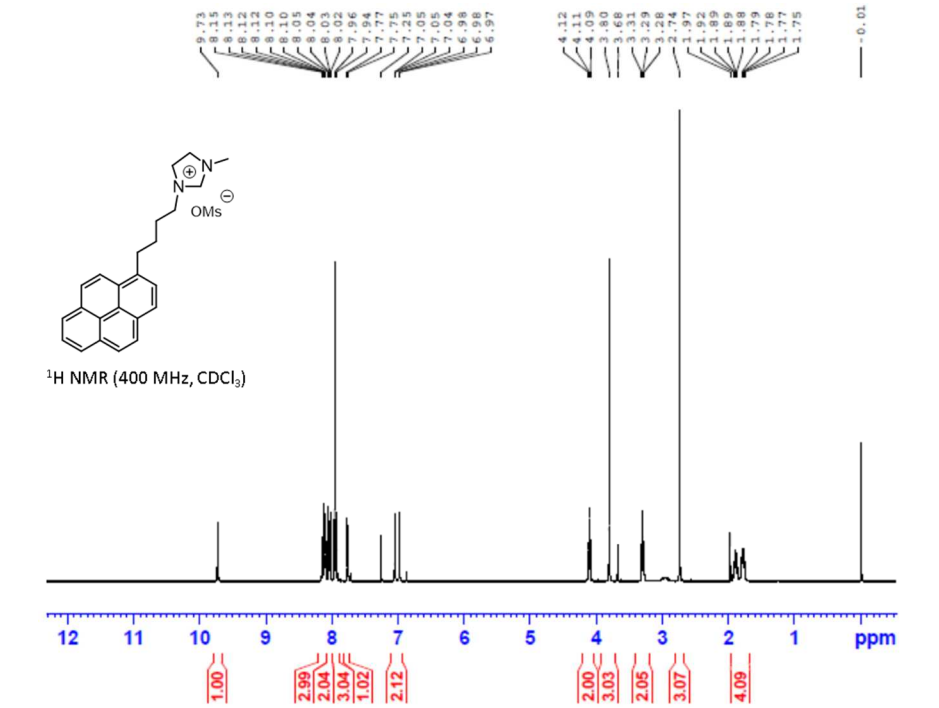
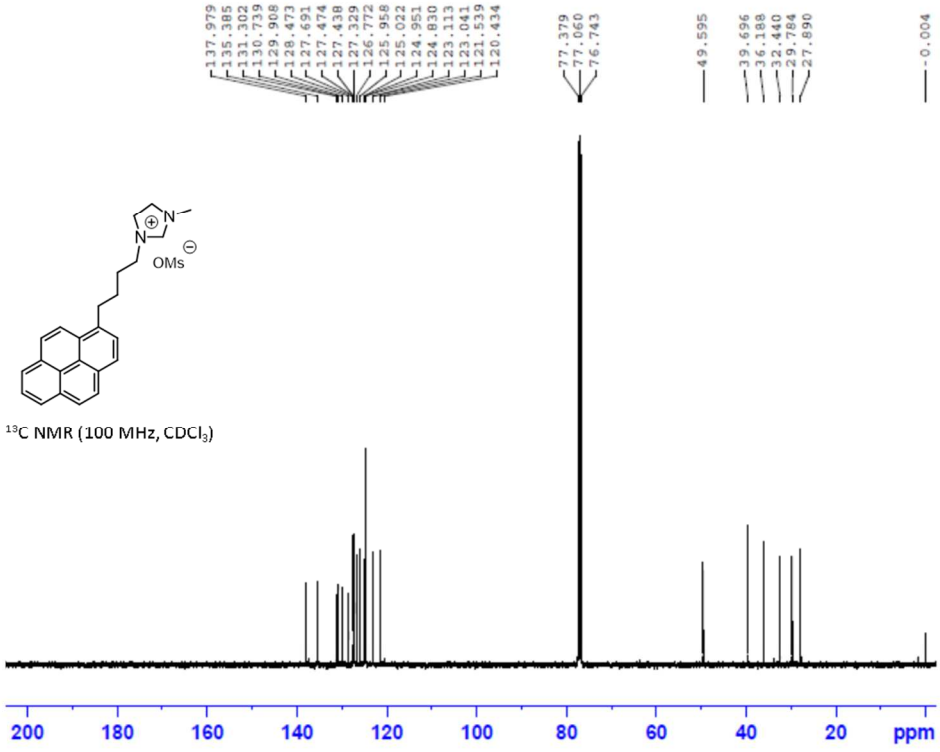


Fig. S1 The radio TLC of the reaction mixture in Scheme 2.

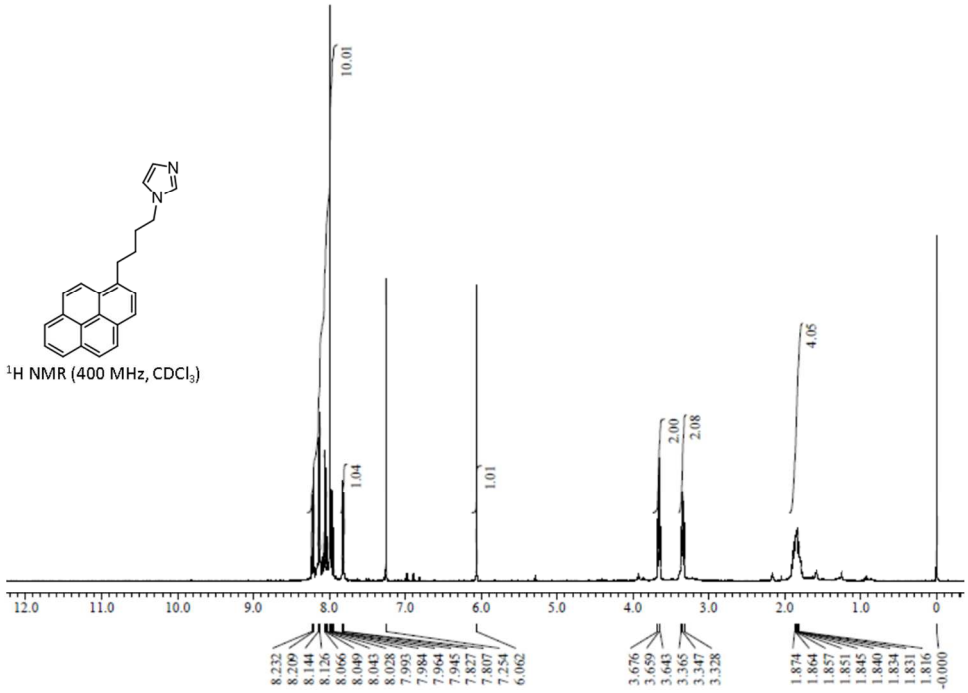
8. ^{1}H and ^{13}C NMR spectra of Scheme 1.

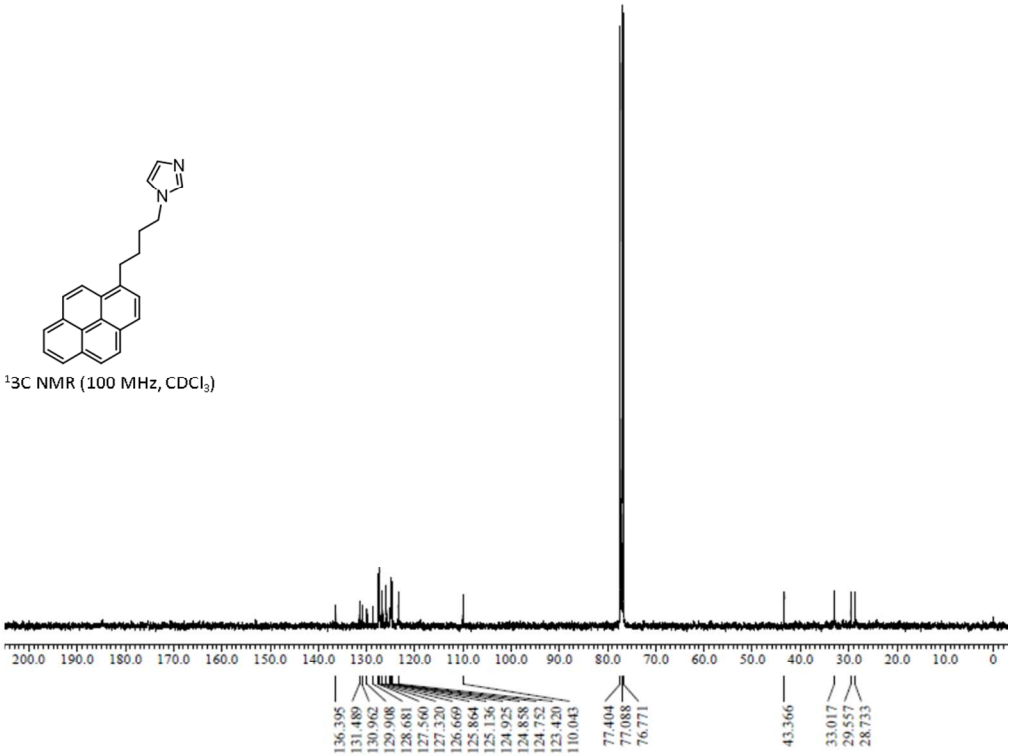
PIL



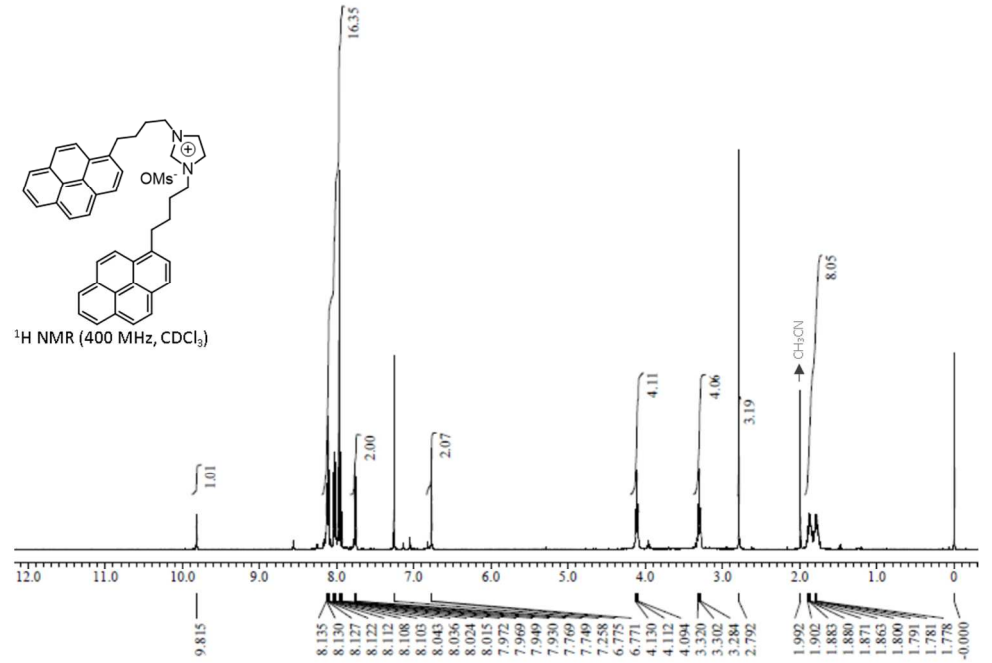


1-(4-(Pyren-1-yl)butyl)-1*H*-imidazole (4)





BPIL


OMs-
^{1}H NMR (400 MHz, CDCl$_3$)
16.35
1.01
2.00
2.07
4.11
4.06
3.19
CH3CN
8.05
12.0 11.0 10.0 9.0 8.0 7.0 6.0 5.0 4.0 3.0 2.0 1.0 0
9.815
8.135 8.130 8.127 8.122 8.112 8.108 8.103 8.043 8.036 8.024 8.015 7.972 7.969 7.949 7.930 7.769 7.749 7.258 6.775 6.771 4.130 4.112 4.094 3.320 3.302 3.284 2.792
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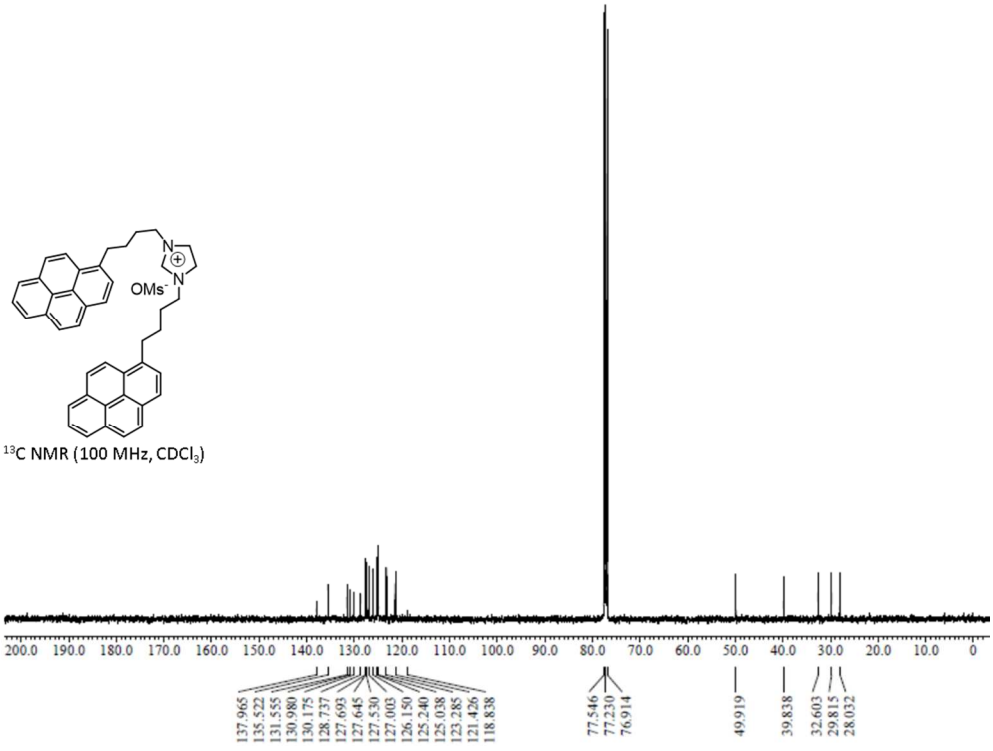
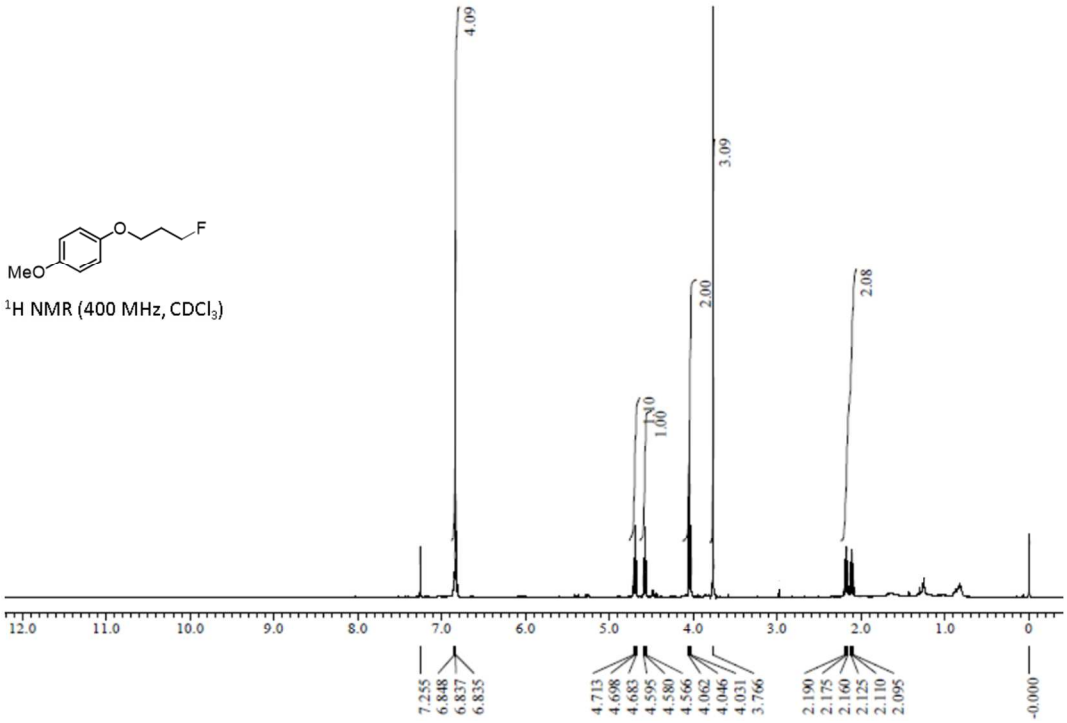
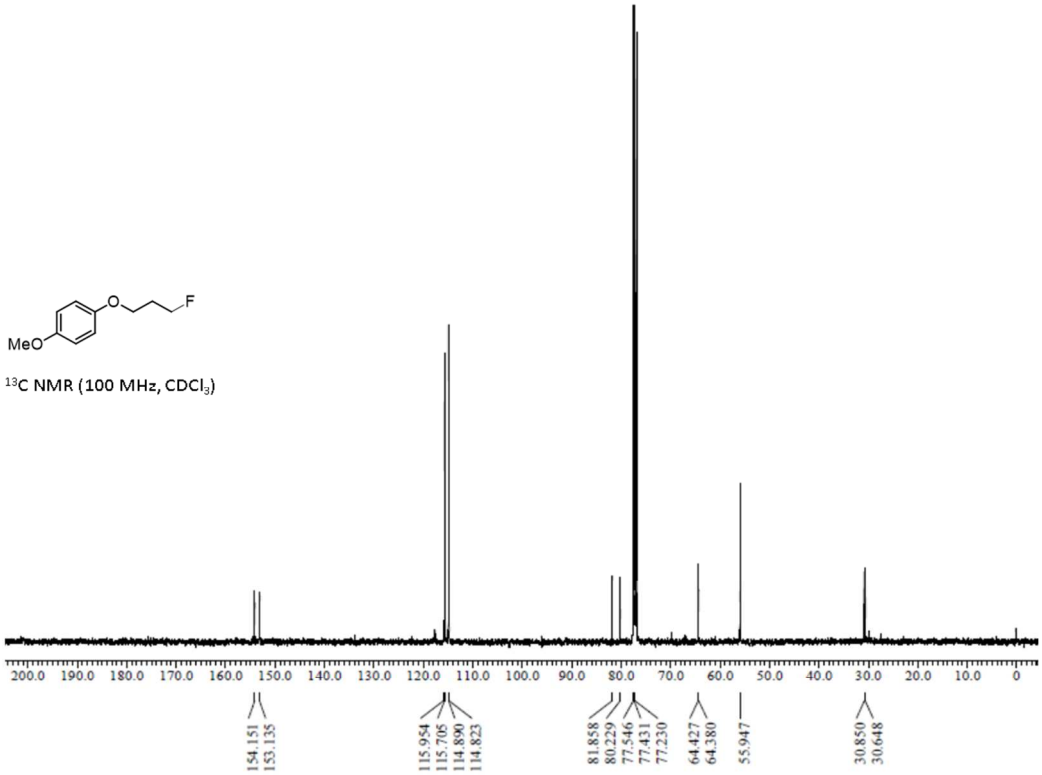

OMs-
^{13}C NMR (100 MHz, CDCl$_3$)
200.0 190.0 180.0 170.0 160.0 150.0 140.0 130.0 120.0 110.0 100.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 0
137.965 135.522 131.555 130.980 130.175 128.737 127.693 127.645 127.530 127.003 126.150 125.240 125.038 123.285 121.426 118.838
77.546 77.230 76.914
49.919
39.838
32.603 29.815 28.032

9. ^{1}H NMR ^{13}C NMR of 1-(3-fluoropropoxy)-4-methoxybenzene 6 in Table 1

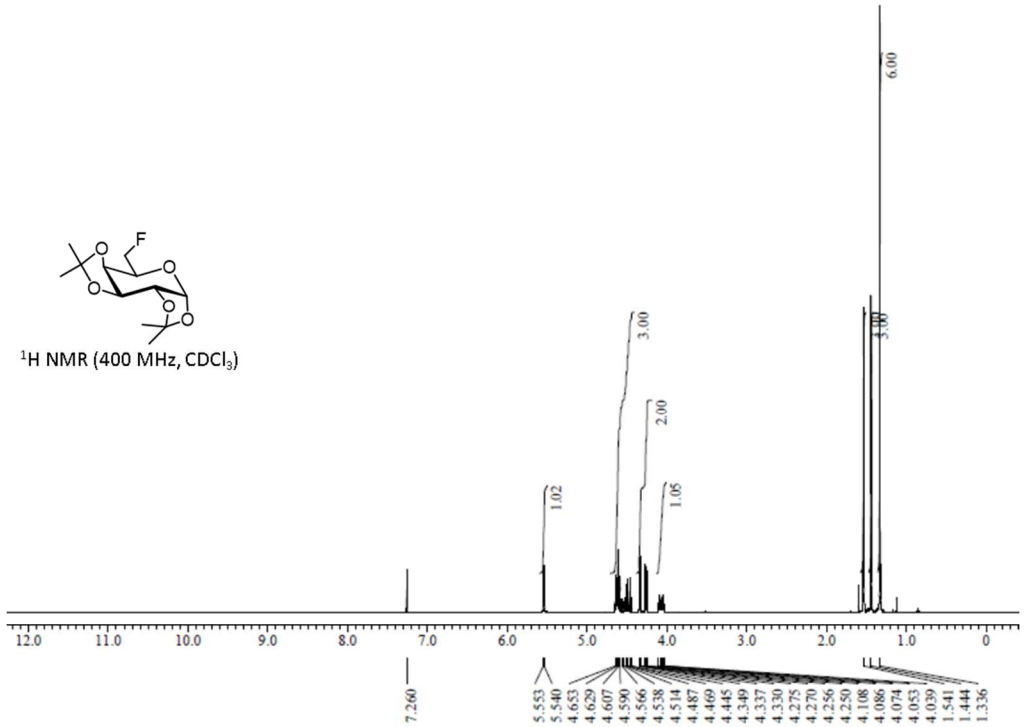
1-(3-Fluoropropoxy)-4-methoxybenzene (6)

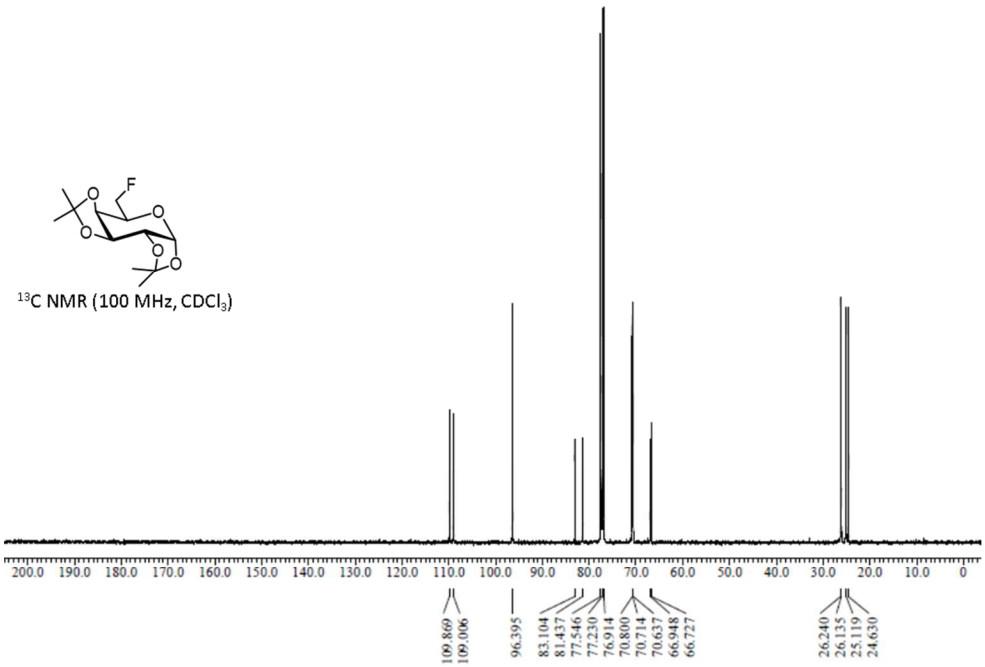




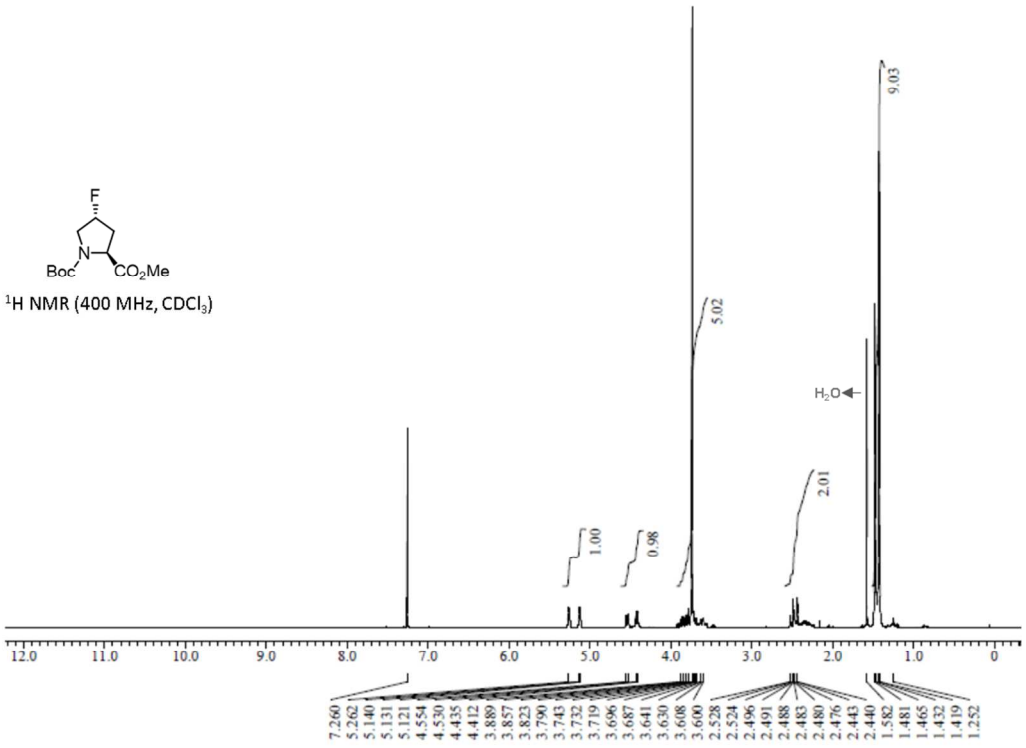
10. ^{1}H NMR ^{13}C NMR of fluorinated products in Table 2

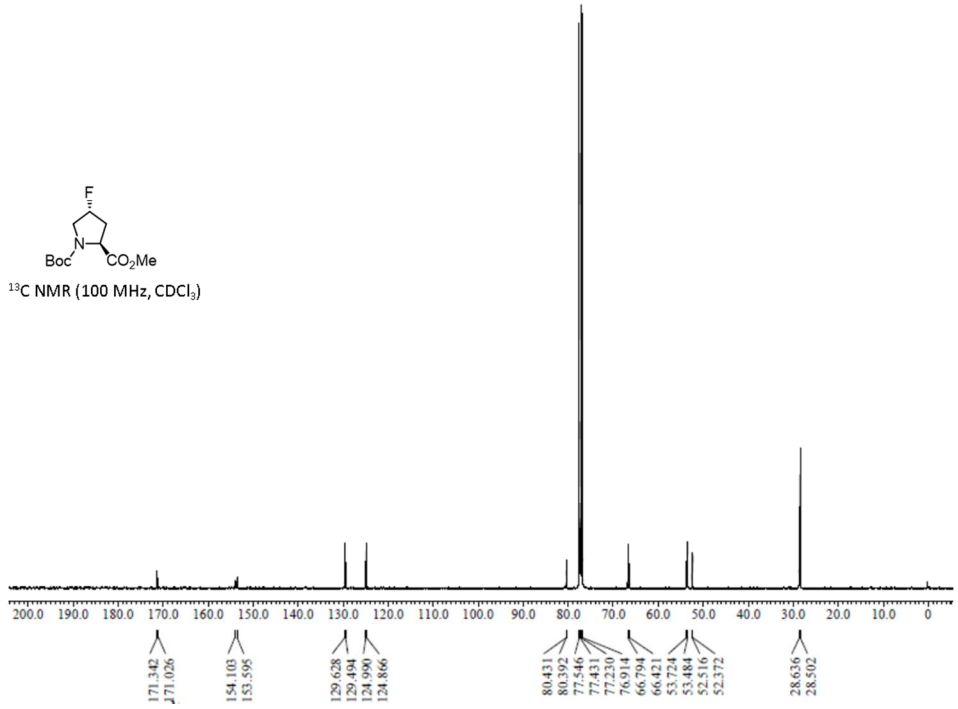
1,2:3,4-Di-*O*-isopropylidene-6-fluoro-6-deoxy-a-D-galactopyranose (8)



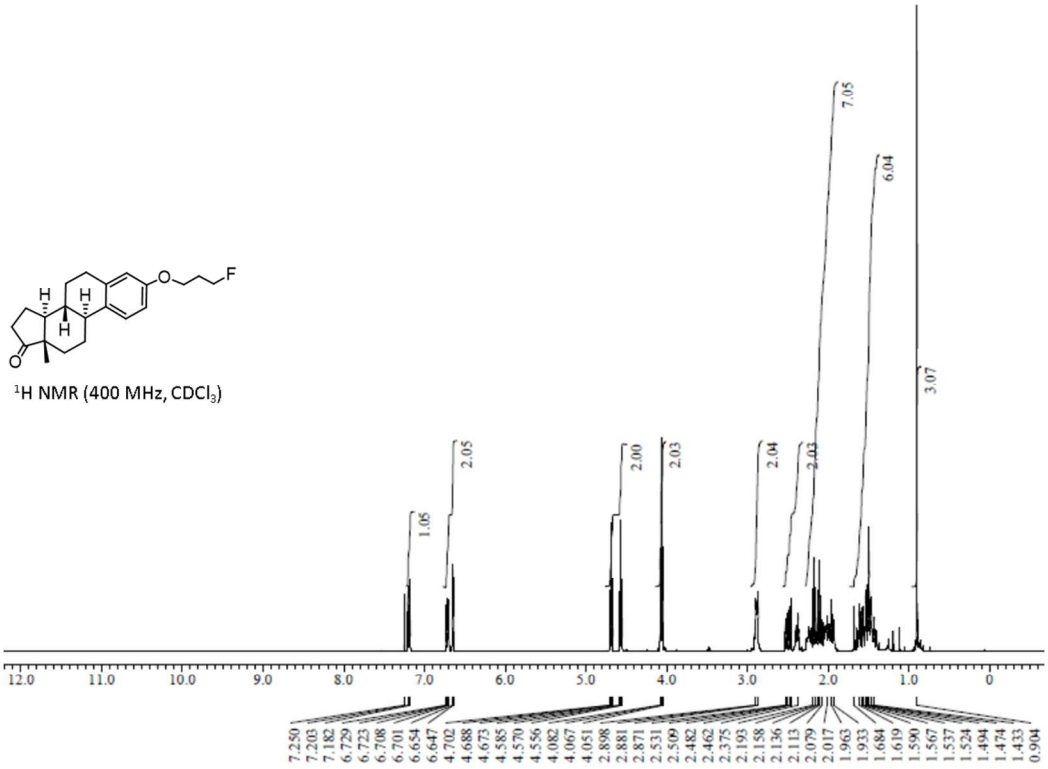


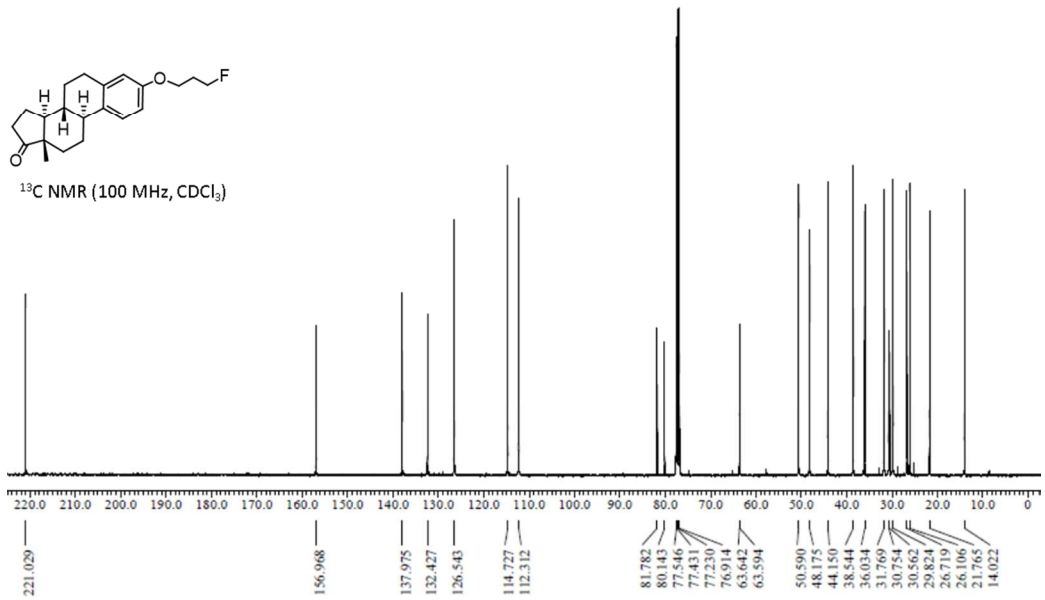
1-(*tert*-Butyl) 2-methyl (2S,4R)-4-fluoropyrrolidine-1,2-dicarboxylate (10)



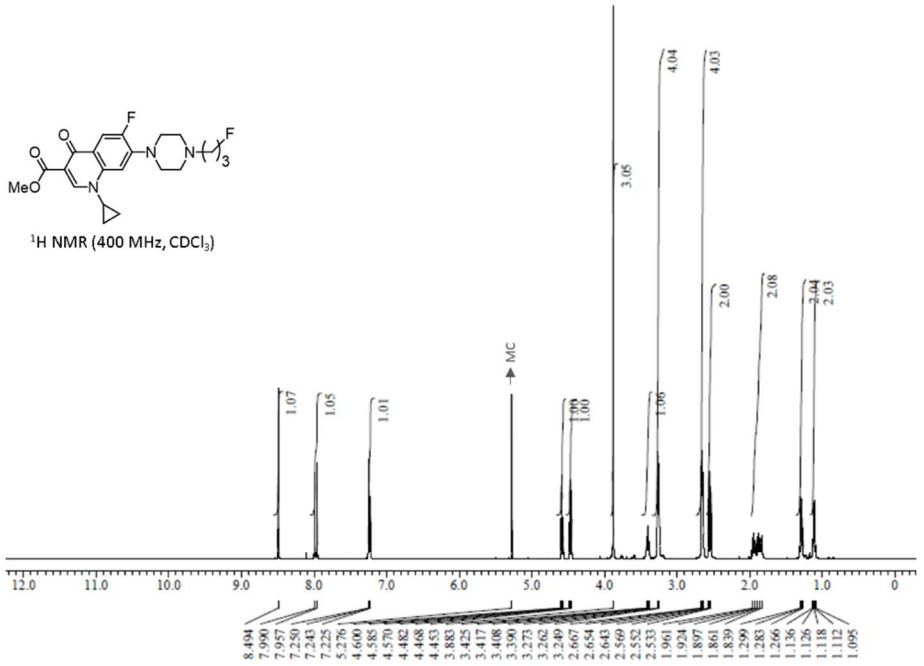


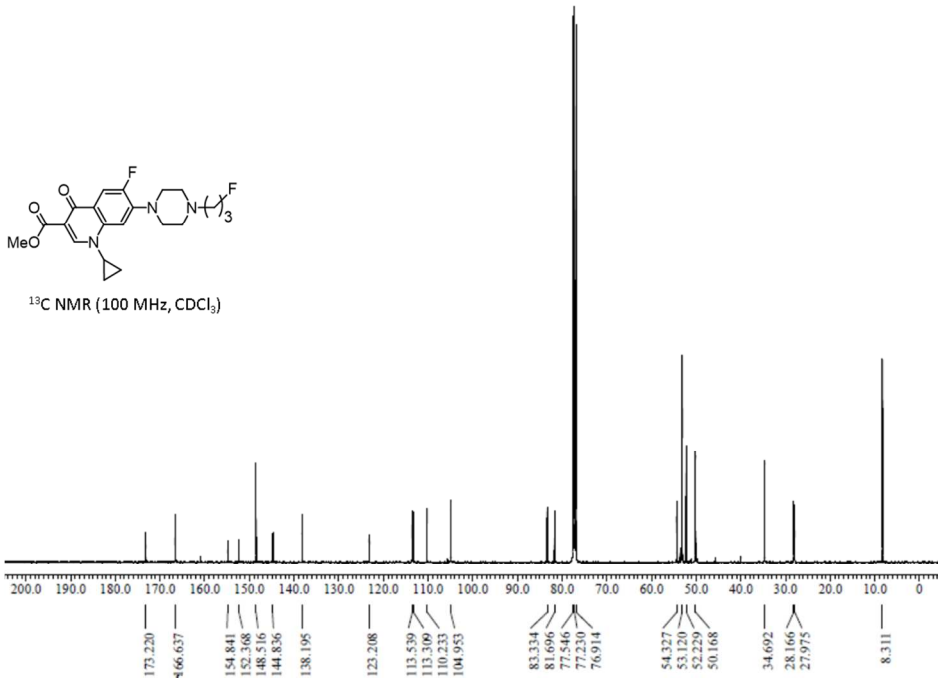
3-*O*-(3-Fluoropropyl)estrone (12)



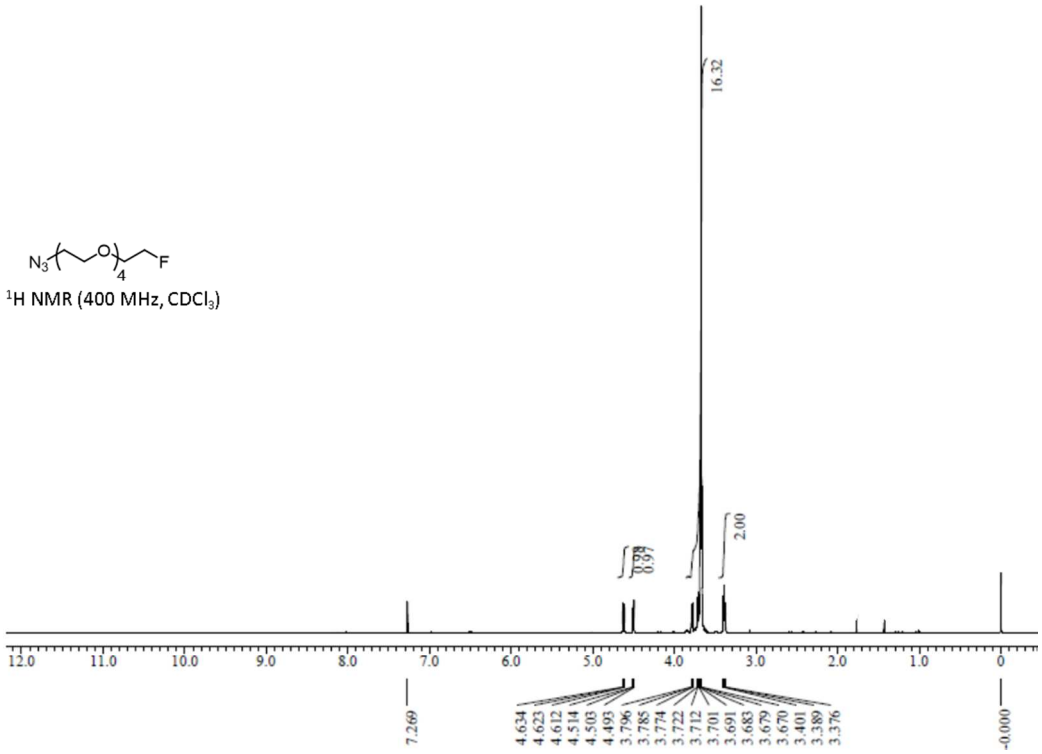


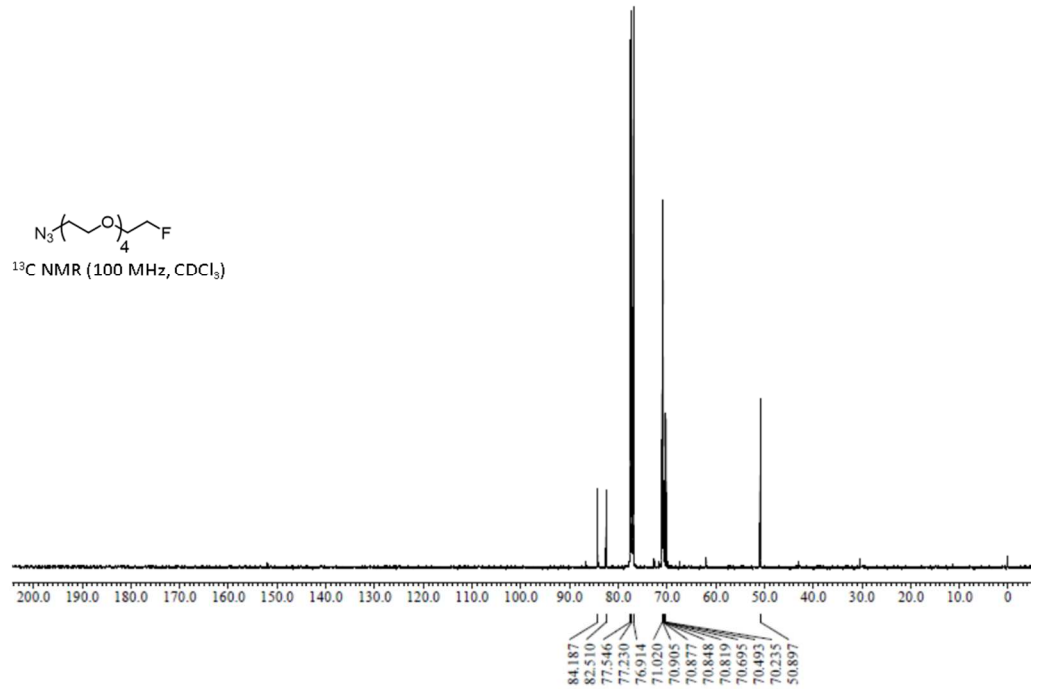
N_4'-3-Fluoropropylciprofloxacin methyl ester (14).



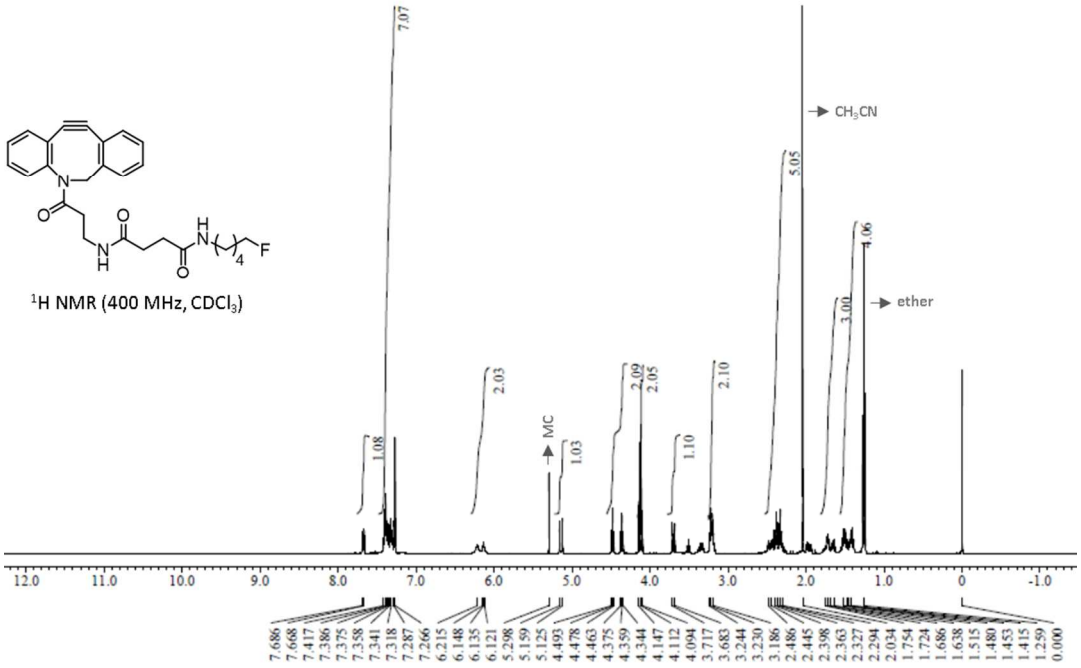


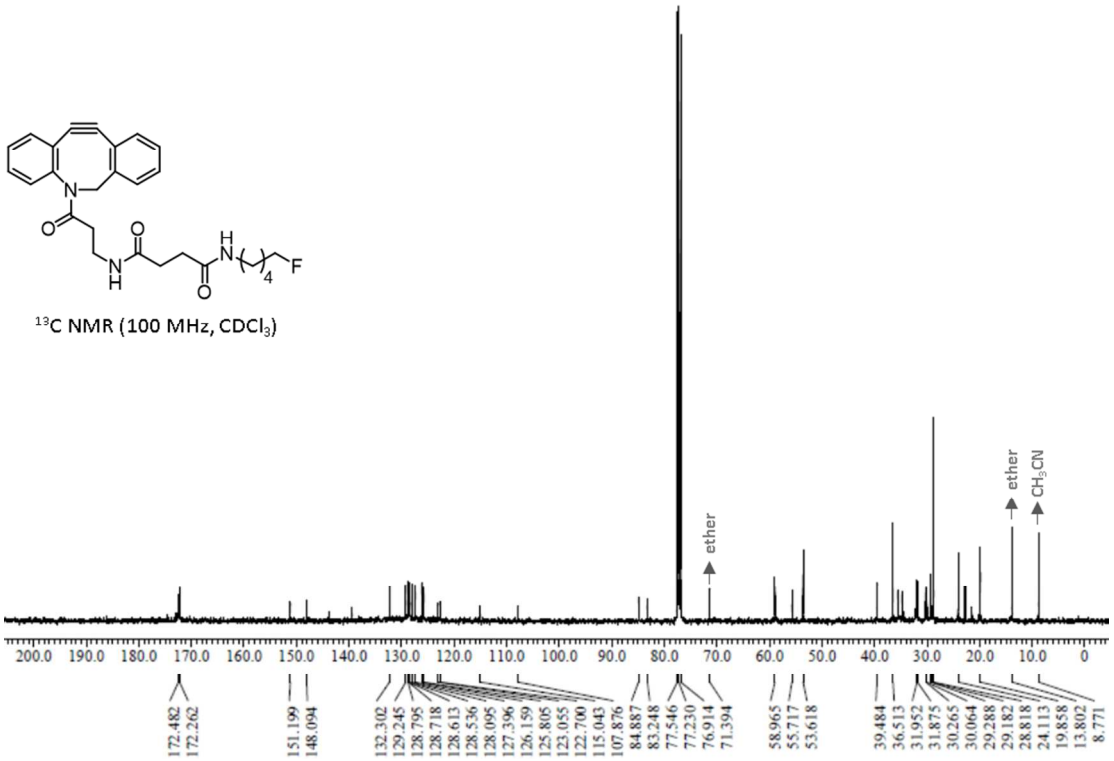
1-Azido-14-fluoro-3,6,9,12-tetraoxatetradecane (16)



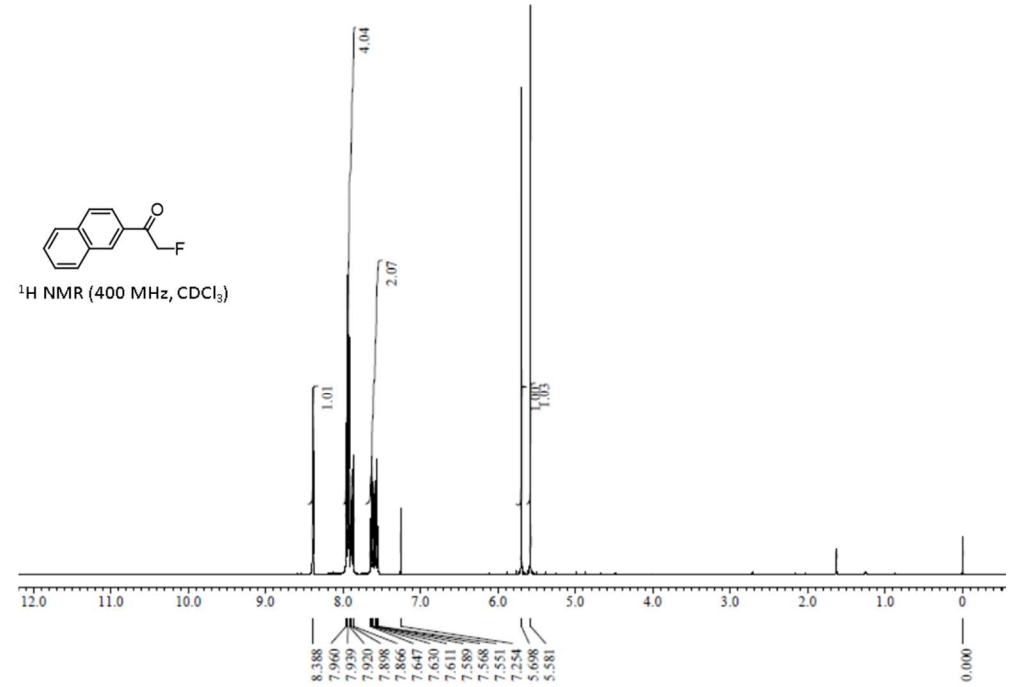


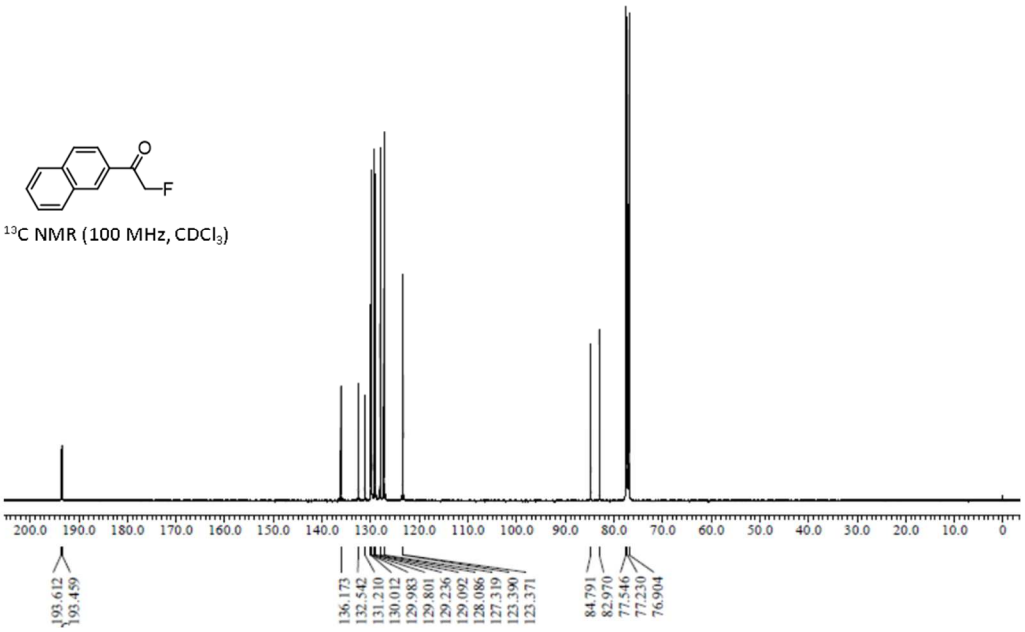
Fluorinated ADIBO derivative (18)



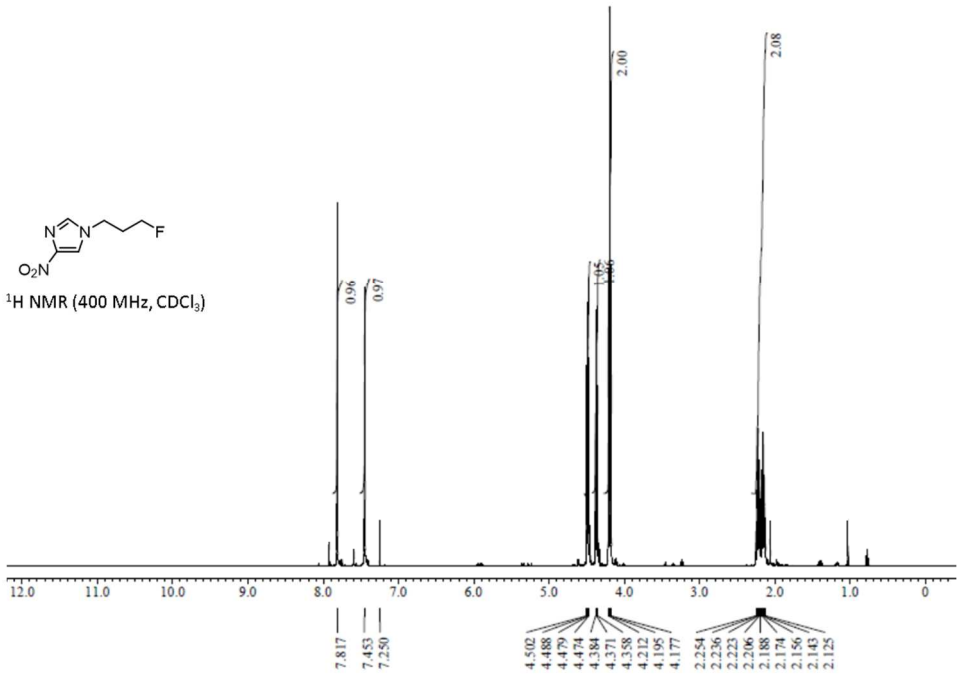


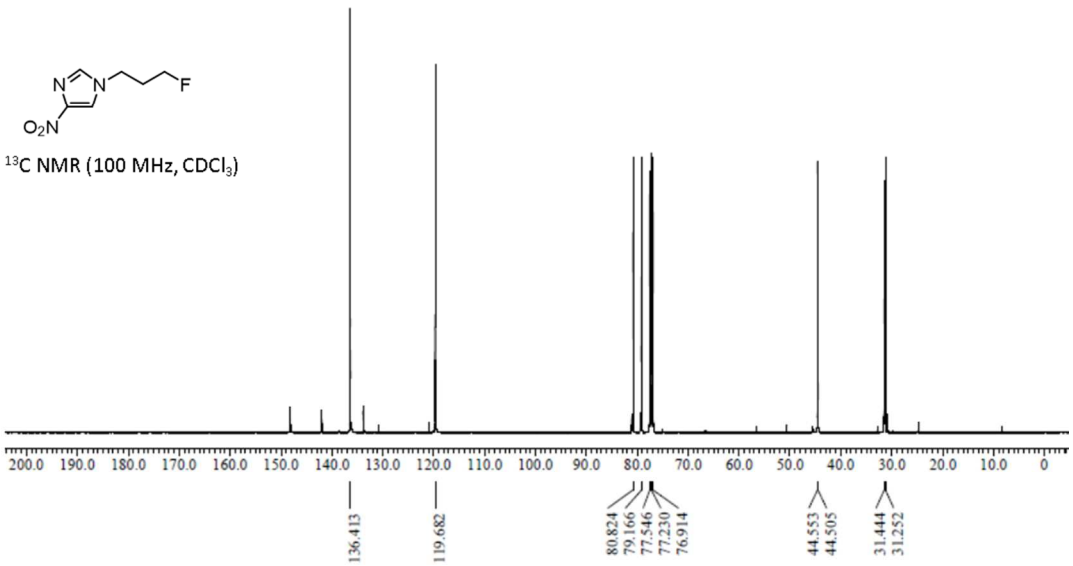
2-Fluoro-1-(naphthalen-2-yl)ethan-1-one (20).



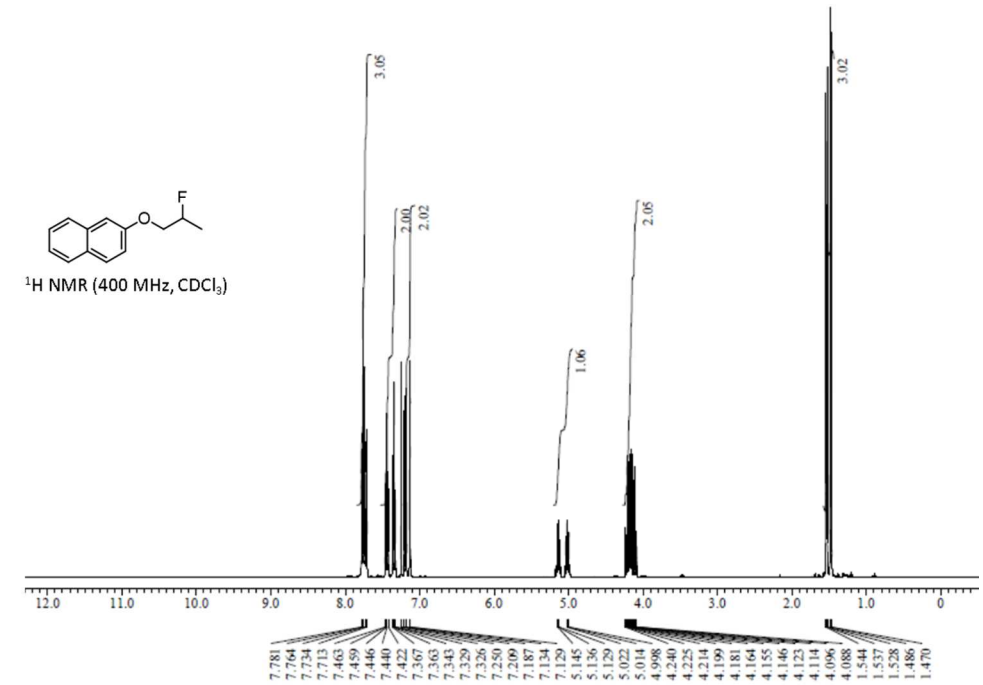


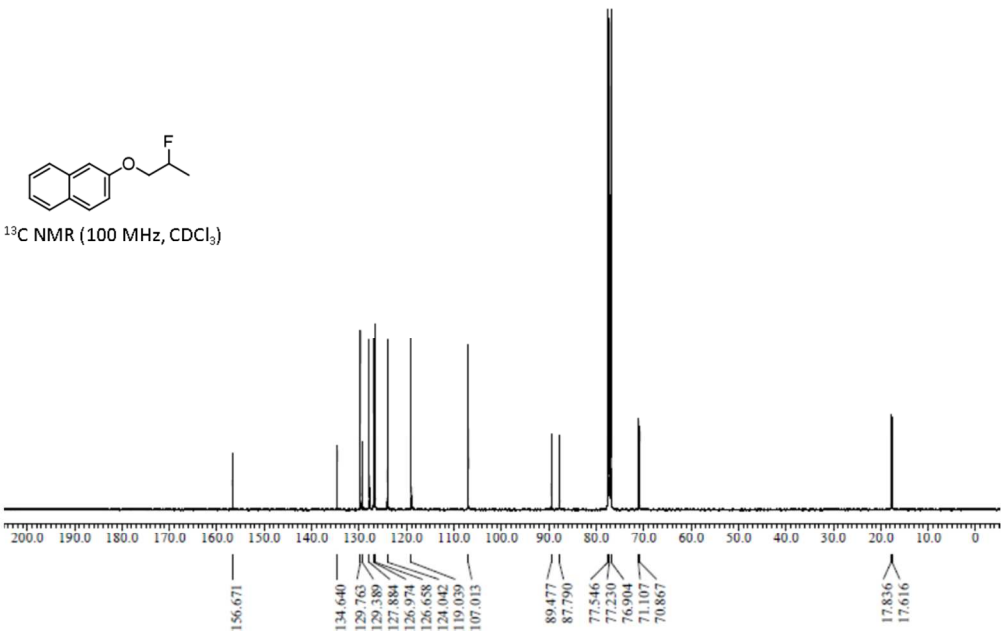
1-(3-Fluoropropyl)-4-nitro-1*H*-imidazole (22)



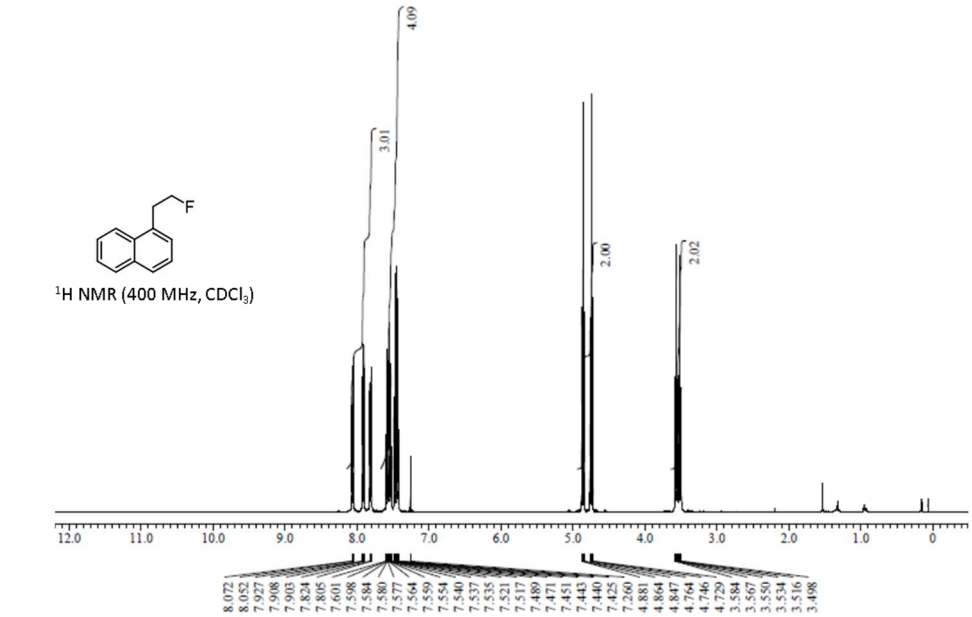


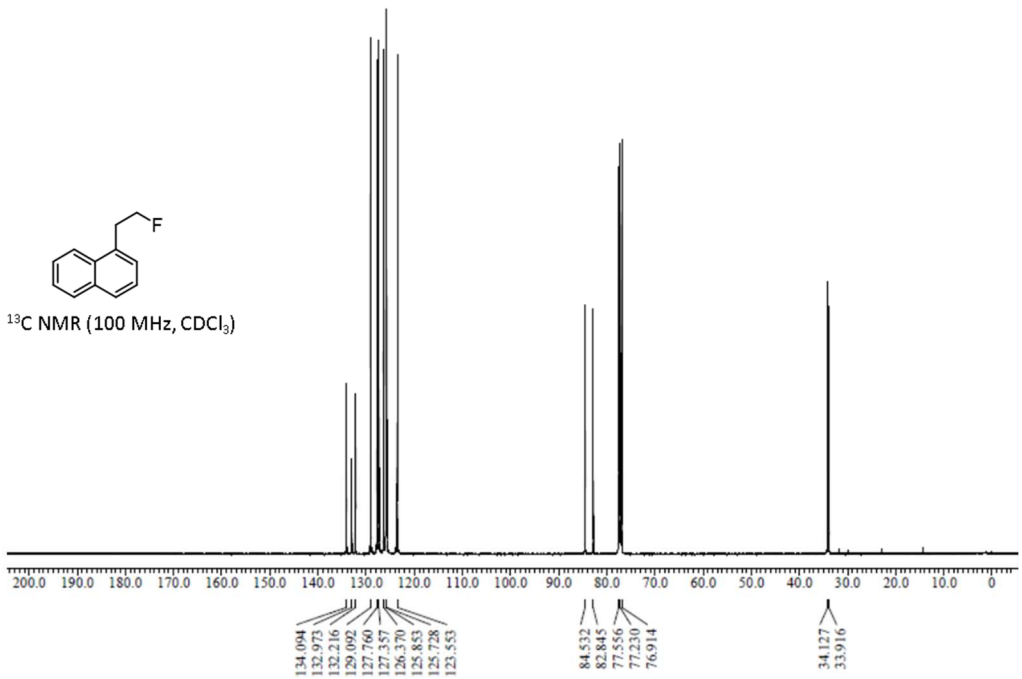
2-(2-Fluoropropoxy)naphthalene (24)





1-(2-Fluoroethyl)naphthalene (26)





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2. K. Furuta, K. Tomokiyo, M. T. Kuo, T. Ishikawa, M. Suzuki, *Tetrahedron* **1999**, *55*, 7529-7540.
3. M. R. Kilbourn, P. A. Jarabek, M. J. Welch, *Int. J. Appl. Radiat. Isot.* **1985**, *36*, 327-328.