Supporting Information

Title: **An Efficient Copper-Catalyzed Synthesis of Anilines by Employing Aqueous Ammonia**

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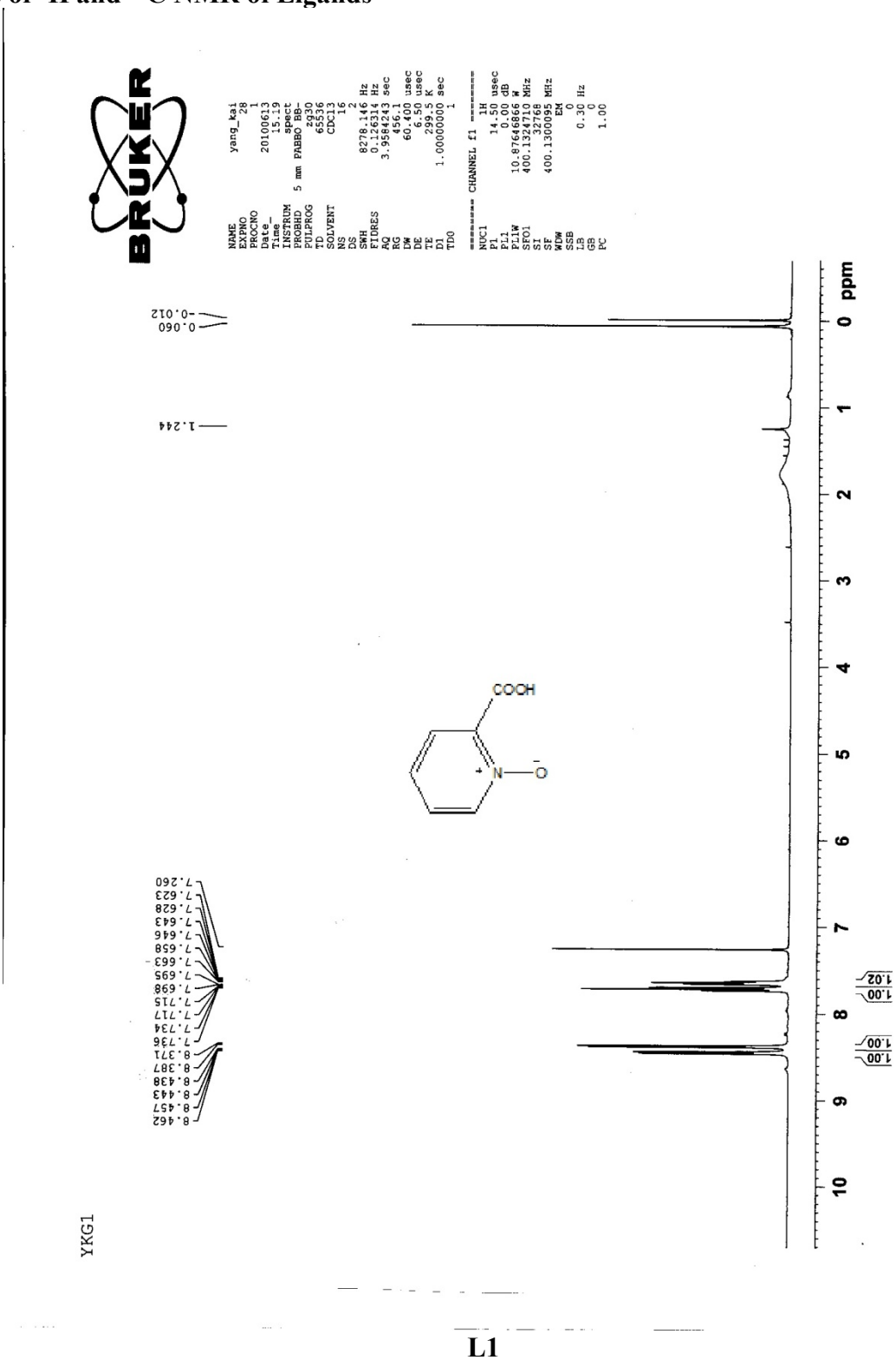
1**. General Experimental Methods**: ^{1}H NMR and ^{13}C NMR spectra were recorded on Bruker Avance ARX- 400. Mass spectra were performed on Kompact Axima-CFR MALDI mass spectrometers. Optical rotations were recorded on a Perkin Elmer 341 polarimeter. Anhydrous solvents were obtained as follows: DMSO from CaH_2. All other solvents were reagent grade. All moisture sensitive reactions were carried out in flame dried flask under argon atmosphere.

2. Copies of ^{1}H and ^{13}C NMR of Ligands



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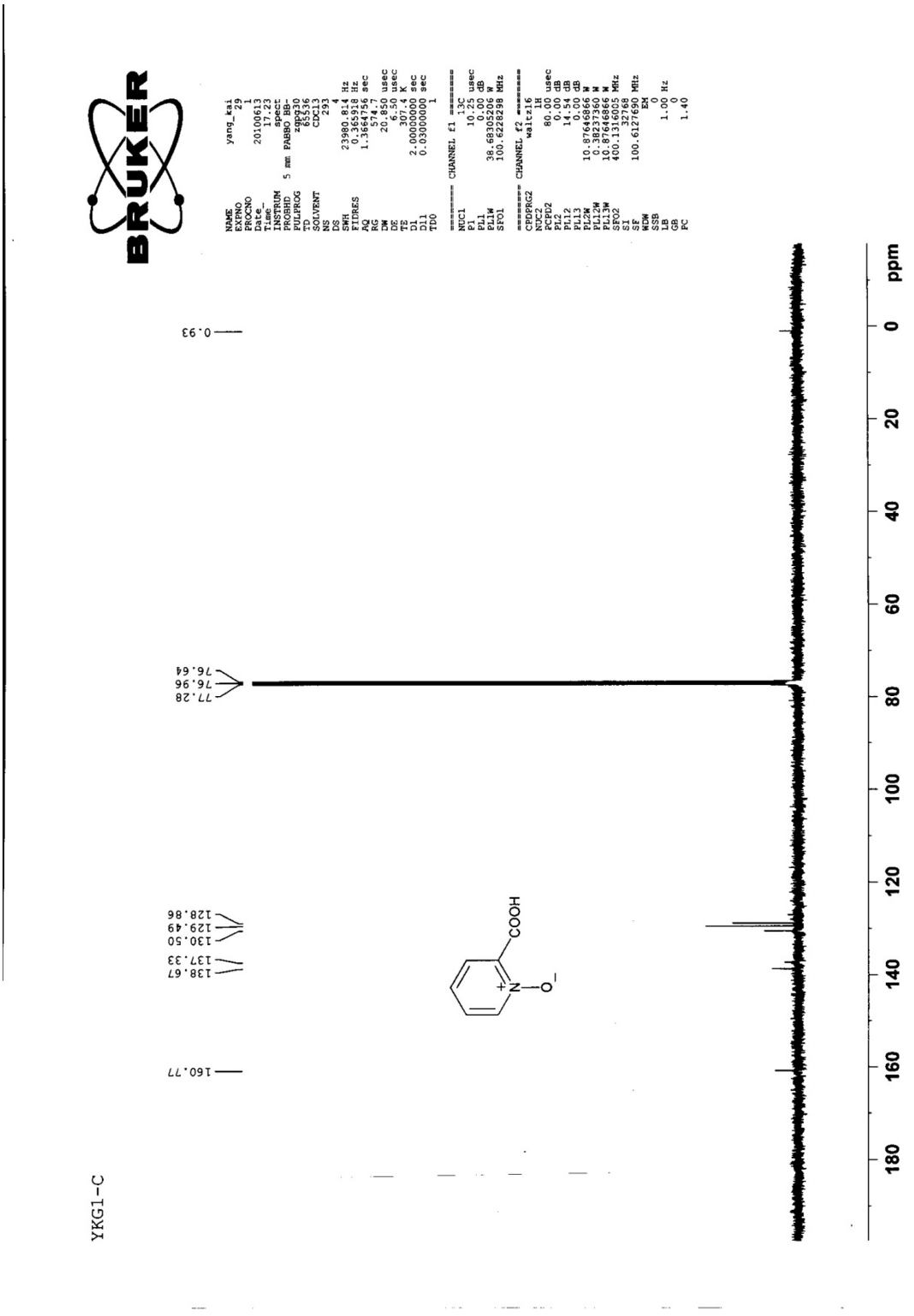

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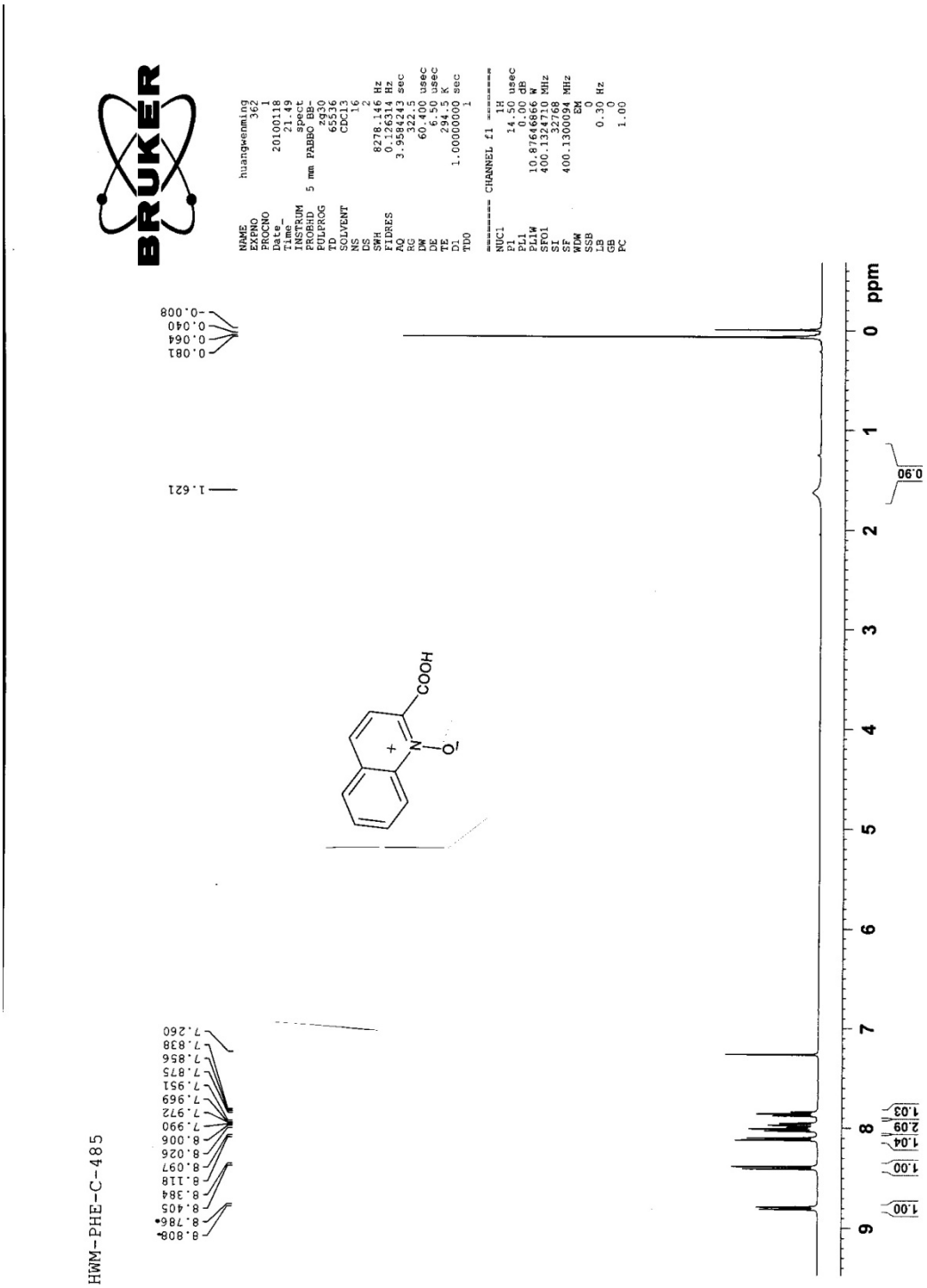

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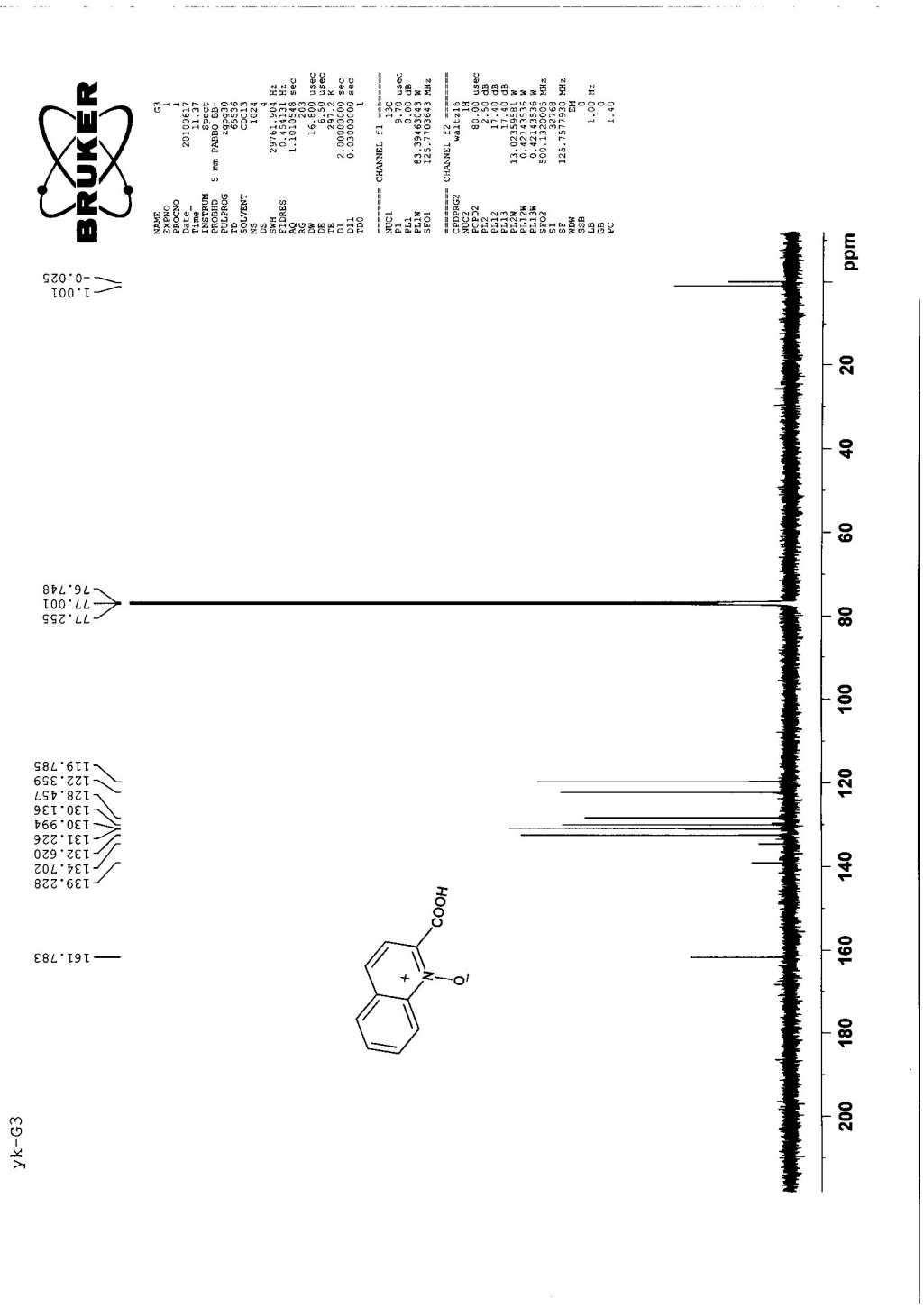

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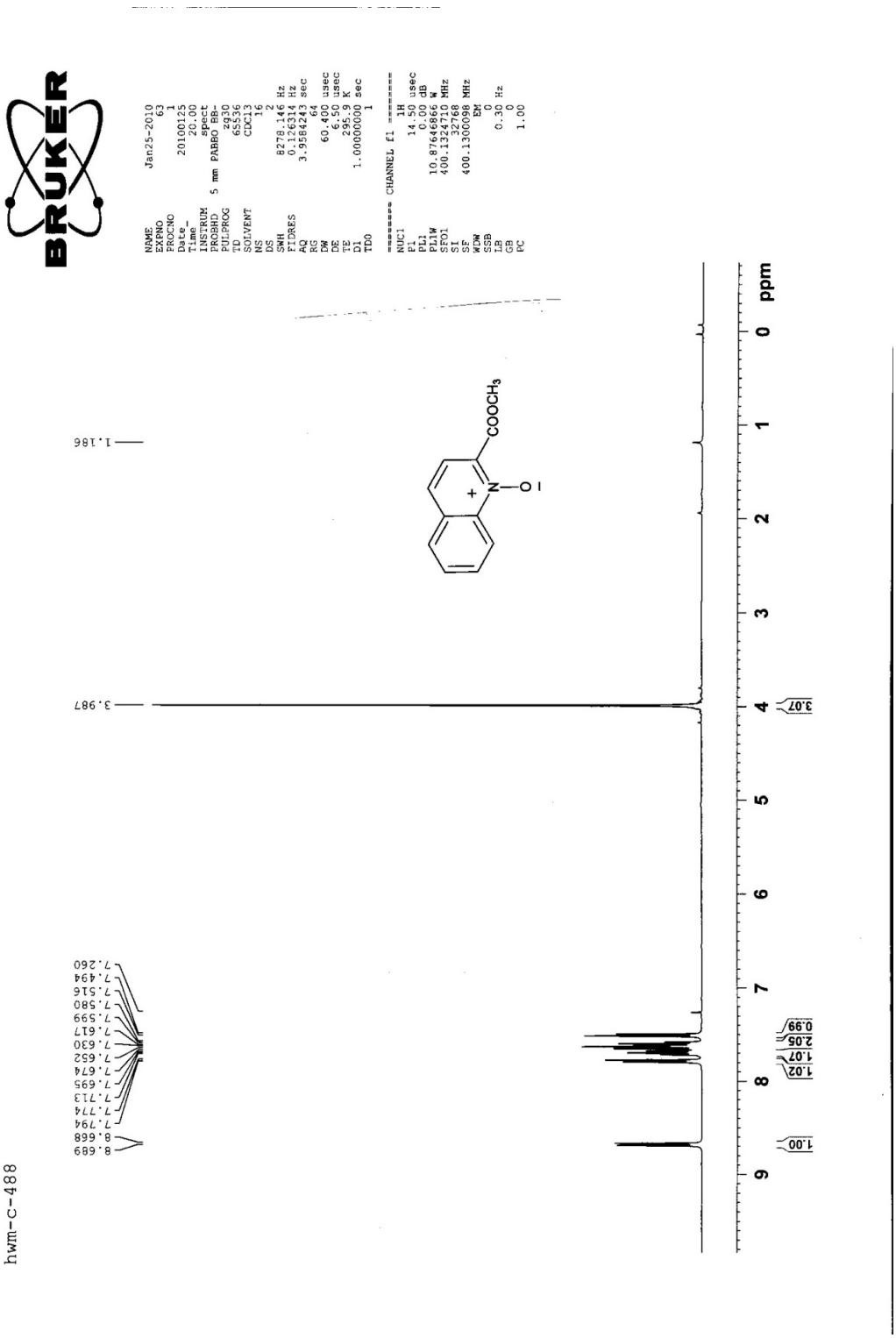
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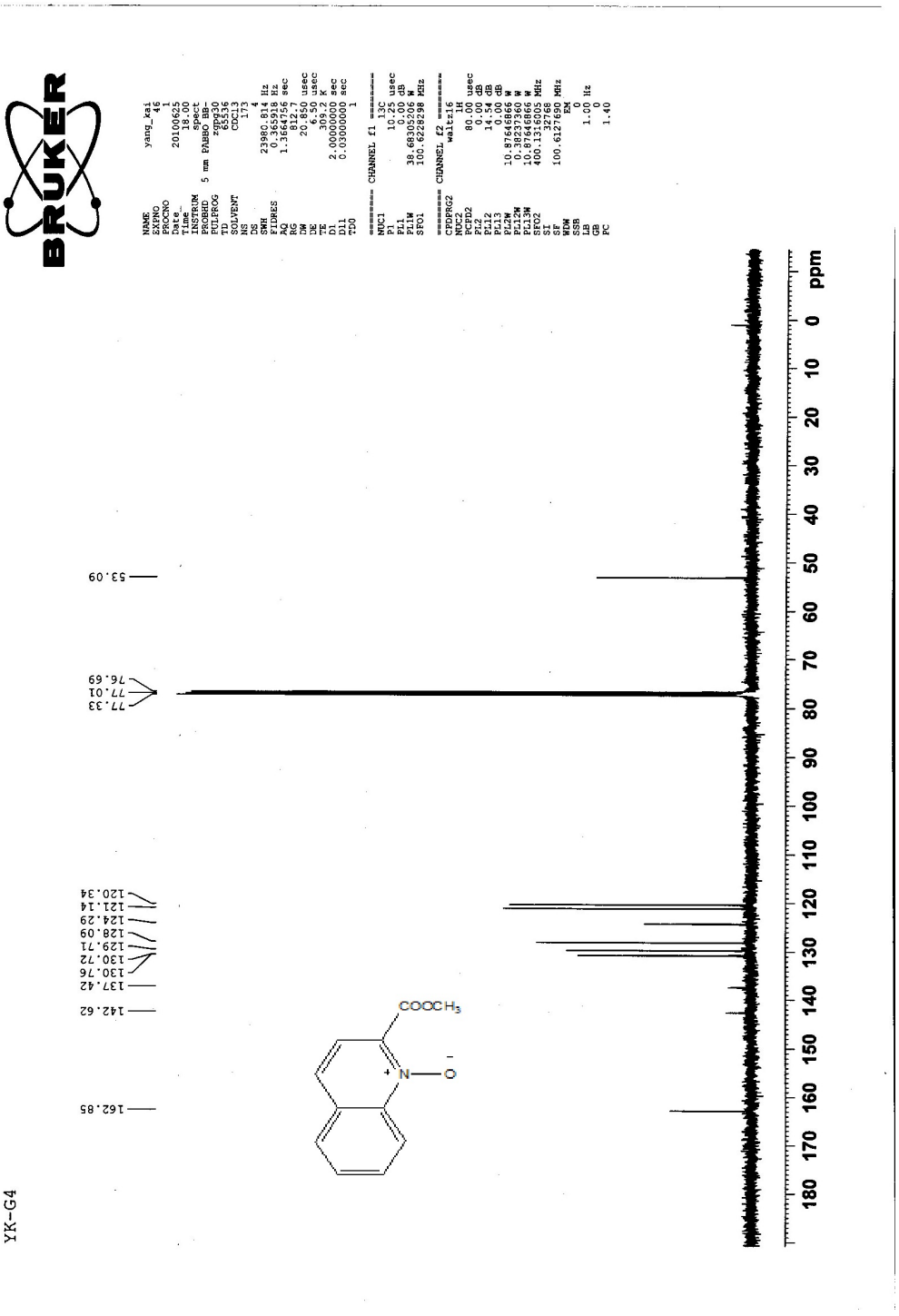
L3



L3

3. General Procedure A and B

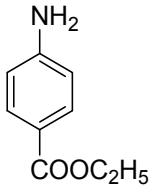
General Procedure A: the Coupling of Aryl Iodides with Aqueous Ammonia

A mixture of aryl iodide (1 mmol), aqueous ammonia (28%, 0.3 mL, 5.0 mmol), CuI (38 mg, 0.2 mmol), 2-carboxylic acid-quinoline-*N*-oxide (75.7 mg, 0.4 mmol), and K_2CO_3 (346 mg, 2.5 mmol) in 2 mL of DMSO was heated at 50 °C for 23 h. Then the cooled mixture was partitioned between water and ethyl acetate. The organic layer was separated, and the aqueous layer was extracted with ethyl acetate (3 x 10 mL). The combined organic layers were washed with brine, dried over Na_2SO_4, and concentrated under vacuum. The residue was purified by chromatography on silicon gel with petroleum ether and ethyl acetate as eluent to provide the primary aryl amine.

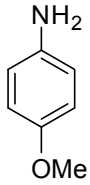
General Procedure B: the Coupling of Aryl and Heteroaryl Bromides with Aqueous Ammonia

A mixture of aryl iodide (1 mmol), aqueous ammonia (28%, 0.3 mL, 5.0 mmol), CuI (38 mg, 0.2 mmol), 2-carboxylic acid-quinoline-*N*-oxide (75.7 mg, 0.4 mmol), and K_2CO_3 (346 mg, 2.5 mmol) in 2 mL of DMSO was heated at 80 °C for 23 h. Then the cooled mixture was partitioned between water and ethyl acetate. The organic layer was separated, and the aqueous layer was extracted with ethyl acetate (3 x 10 mL). The combined organic layers were washed with brine, dried over Na_2SO_4, and concentrated under vacuum. The residue was purified by chromatography on silicon gel with petroleum ether and ethyl acetate as eluent to provide the primary aryl amine.

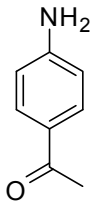
4. The Coupling of Aryl Iodides with Aqueous Ammonia: Table 2



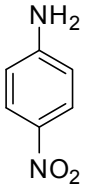
Ethyl p-aminobenzoate (entry 1)[1]: Following Procedure A, the crude oil was purified by flash chromatography on silica gel to provide 91% yield of the desired product as a white solid. Mp 88-90 °C; ^{1}H NMR (400 MHz, $CDCl_3$): δ 1.36(t, J = 7.2 Hz, 3H), 4.04 (br s, 2H), 4.32 (d, J = 14.2 Hz, 2H), 6.64 (m, J = 11.0, 8.8 Hz, 2H), 7.85 (m, J = 9.0 Hz, 2H) ppm. MS (EI, *m/z*): 165 (M^+). HRMS (ESI): $C_9H_{12}NO_2$ calculated $[M+H]^+$ 166.0868, found 166.0870.



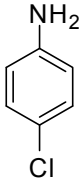
4-Methoxyaniline (entry 2)[2]: Following Procedure A, the crude oil was purified by flash chromatography on silica gel to provide 90% yield of the desired product as light yellow solid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 3.44 (br s, 2H), 3.77 (s, 3H), 6.65 (d, J = 8.8 Hz, 2H), 6.71 (d, J = 8.8 Hz, 2H) ppm. ^{13}C NMR (125 MHz, $CDCl_3$): δ 55.7, 114.8, 116.4, 139.9, 152.8 ppm. MS (EI, *m/z*): 124 (M^++1). HRMS (ESI): $C_7H_{10}NO$ calculated $[M+H]^+$ 124.0762, found 124.0759.



4-aminoacetophenone (entry 3)[1]: Following Procedure A, the crude oil was purified by flash chromatography on silica gel to provide 94% yield of the desired product as light yellow solid. Mp103-105 ^{o}C; ^{1}H NMR (400 MHz, $CDCl_3$): δ 2.25(s, 3H), 4.23 (brs, 2H), 6.67 (d, J = 8.8Hz, 2H), 7.83 (d, J =8.8, 2H) ppm. MS (EI, *m/z*): 136 (M^++1). HRMS (ESI): $C_8H_{10}NO$ calculated $[M+H]^+$ 136.0762, found 136.0765.

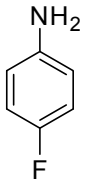


4-Nitroaniline (entry 4)[3]: Following Procedure A, the crude oil was purified by flash chromatography on silica gel to provide 89% yield of the desired product as pale yellow solid. Mp146-149 ^{o}C; ^{1}H NMR (400 MHz, $CDCl_3$): δ 3.33 (br s, 2H), 6.62 (d, J = 9.2 Hz, 2H), 7.11 (d, J = 9.2, 2H) ppm. MS (EI, *m/z*): 139 (M^++1). HRMS (ESI): $C_6H_7N_2O_2$ calculated $[M+H]^+$ 139.0508, found 139.0505.

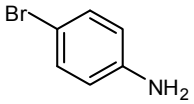


4-Chloroaniline (entry 5)[4]: Following Procedure A, the crude oil was purified by flash chromatography on silica gel to provide 92% yield of the desired product as white solid. Mp 70-72 ^{o}C. ^{1}H NMR (400 MHz,

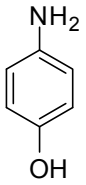
$CDCl_3$): δ 4.38 (br s, 2H), 6.62 (d, J =9.2, Hz, 2H), 8.06 (d, J =9.2Hz, 2H) ppm. MS (EI, *m/z*): 128 (M^++1). HRMS (ESI): C_6H_7NCl calculated $[M+H]^+$ 128.0267, found 128.0263.



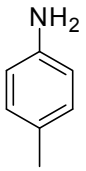
4-Fluoroaniline (entry 6) [3]: Following Procedure A, the crude oil was purified by flash chromatography on silica gel to provide 91% yield of the desired product as pale yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 6.62 (m, 2H), 6.85 (t, J = 8.8 Hz, 2H) ppm. ^{13}C NMR (125 MHz, $CDCl_3$): δ 157.2, 155.4, 142.4, 115.9 ppm. MS (EI, *m/z*): 112 (M^++1). HRMS (ESI): C_6H_7NF calculated $[M+H]^+$ 112.0563, found 112.0559.



4-Bromoaniline (entry 7) [1]: Following Procedure A, the crude oil was purified by flash chromatography on silica gel to provide 83% yield of the desired product as pale yellow solid. Mp 61-63 ^{o}C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 3.72 (br s, 2H), 6.58 (d, J = 8.8 Hz, 2H), 7.26 (d, J = 8.8 Hz, 2H) ppm. MS (EI, *m/z*): 171 (M^++1). HRMS (ESI): C_6H_7NBr calculated $[M+H]^+$ 171.9762, found 171.9760.

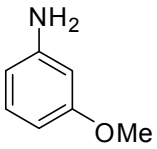


4-Aminophenol (entry 8) [1]: Following Procedure A, the crude oil was purified by flash chromatography on silica gel to provide 90% yield of the desired product as light yellow solid. Mp181-183 ^{o}C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 3.43 (br s,2H), 4.35 (br s,1H), 6.62 (d, J = 8.8 Hz, 2H), 6.69 (d, J = 8.8 Hz, 2H) ppm. MS (EI, *m/z*): 110 (M^++1). HRMS (ESI): C_6H_8NO calculated $[M+H]^+$ 110.0606, found 110.0603.

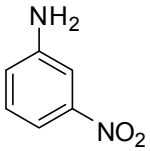


4-Toluidine (entry 9) [1]: Following Procedure A, the crude oil was purified by flash chromatography on silica gel to provide 94% yield of the desired product as colorless solid. Mp 42-44 ^{o}C. ^{1}H NMR (400

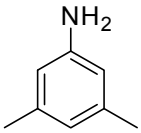
MHz, $CDCl_3$): δ 2.27(s,3H), 3.56 (br s, 2H), 6.63 (d, J = 8.4 Hz, 2H), 7.99 (d, J =8.4, 2H) ppm. MS (EI, *m/z*): 108 (M^++1). HRMS (ESI): $C_7H_{10}N$ calculated $[M+H]^+$ 108.0810, found 108.0813.



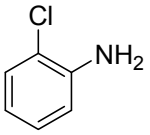
4-Methoxyaniline (entry 10)[2]: Following Procedure A, the crude oil was purified by flash chromatography on silica gel to provide 90% yield of the desired product as colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$): 3.77 (s, 3H), 6.25 (m, 1H), 6.30 (m, 1H), 6.34 (m, 1H), 7.07 (t, J = 8.0 Hz, 1H) ppm. ^{13}C NMR ($CDCl_3$) δ160.3, 147.2, 130.0, 107.6, 103.8, 101.0, 55.0. MS (EI, *m/z*): 124 (M^++1). HRMS (ESI): $C_7H_{10}NO$ calculated $[M+H]^+$ 124.0762, found 124.0765.



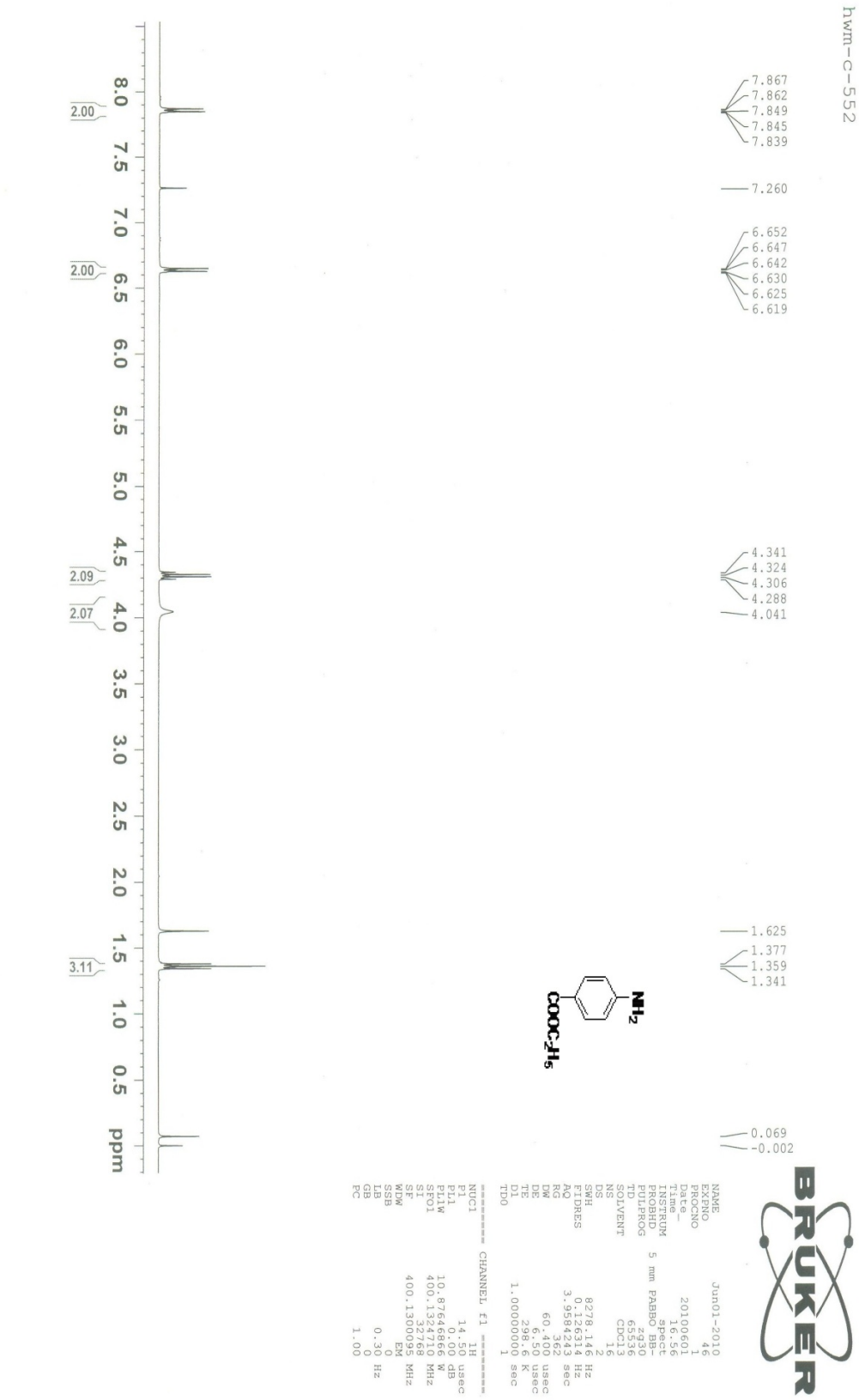
3-Nitroaniline (entry 11) [1]: Following Procedure A, the crude oil was purified by flash chromatography on silica gel to provide 92% yield of the desired product as light yellow solid. Mp 112-115 ^{o}C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 3.92 (br s, 2H), 6.87 (ddd, J = 8.0, 2.4,0.8 Hz, 1H), 7.20 (t, 8.0 HZ, 1H), 7.42(t, 2.0 HZ, 1H), 7.51 (ddd, J = 8.0, 2.4, 0.8 Hz, 2H) ppm. MS (EI, *m/z*): 139 (M^++1). HRMS (ESI): $C_6H_7N_2O_2$ calculated $[M+H]^+$ 139.0508, found 139.0510.



3,5-Dimethoxyaniline (entry 12)[1]: Following Procedure A, the crude oil was purified by flash chromatography on silica gel to provide 92% yield of the desired product as pale yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 2.27 (s, 6H), 3.51 (br s, 2H), 6.37 (s, 2H), 6.47 (s, 1H) ppm; ^{13}C NMR (125 MHz, $CDCl_3$): δ 21.2, 113.0, 120.4, 138.9, 146.3 ppm. MS (EI, *m/z*): 122 (M^++1). HRMS (ESI): $C_8H_{12}N$ calculated $[M+H]^+$ 122.0970, found 122.0966.



2-chloroaniline (entry 13)[4]: Following Procedure A, the crude oil was purified by flash chromatography on silica gel to provide 87% yield of the desired product as pale yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 3.71 (brs, 2H), 6.54 (dd, J = 8.0, 8.0 Hz, 1H), 6.67 (t, J = 2.2 Hz, 1H), 7.17 (dd, J = 2.0, 1.8 Hz, 1H), 7.06 (t, J = 8.0 Hz, 1H) ppm. ^{13}C NMR (125 MHz, $CDCl_3$): δ 142.9, 129.3, 127.6, 119.2, 119.0, 115.8 ppm. MS (EI, *m/z*): 128 (M^++1). HRMS (ESI): C_6H_7NCl calculated $[M+H]^+$ 128.0267, found 128.0270.



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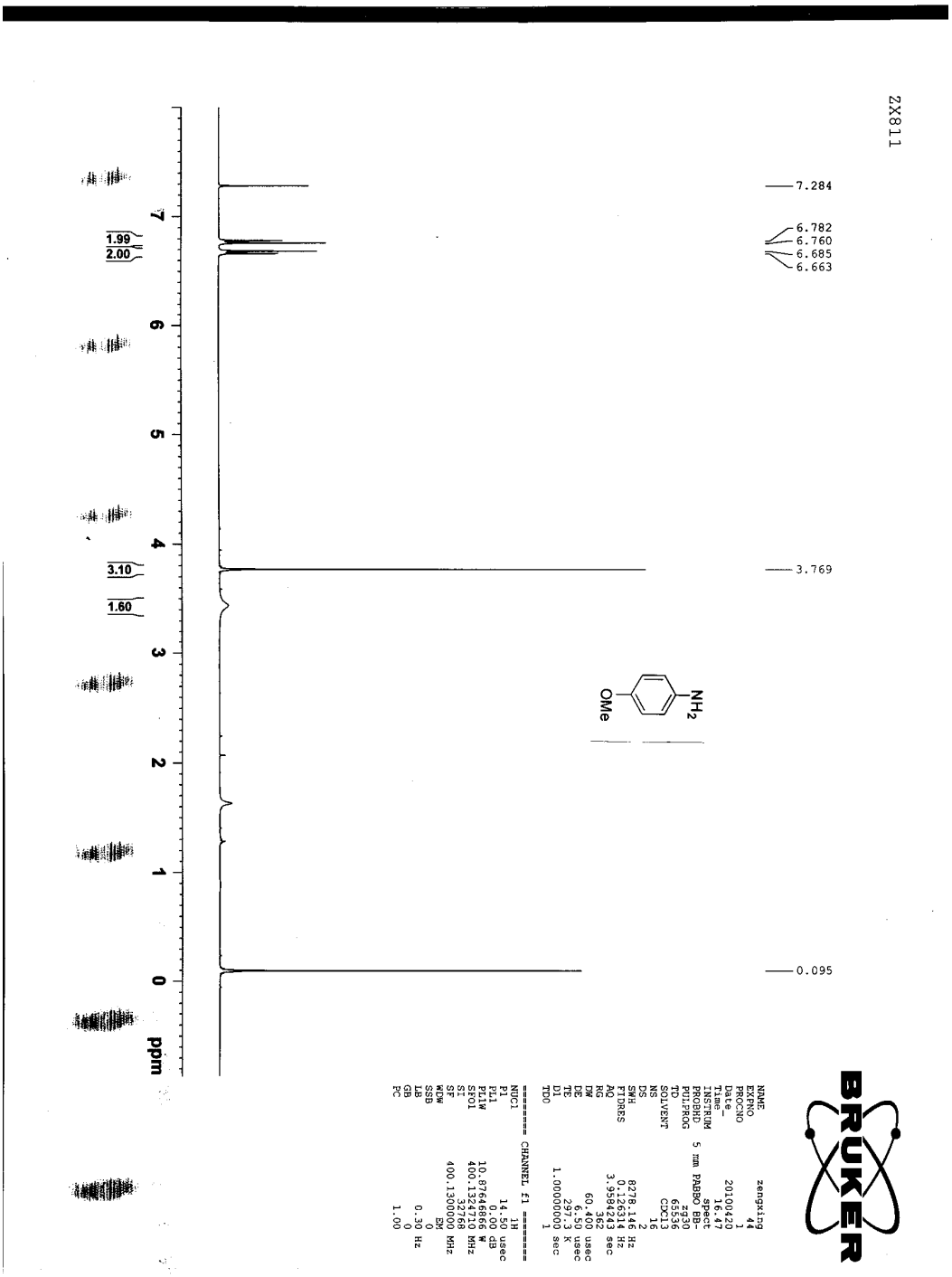

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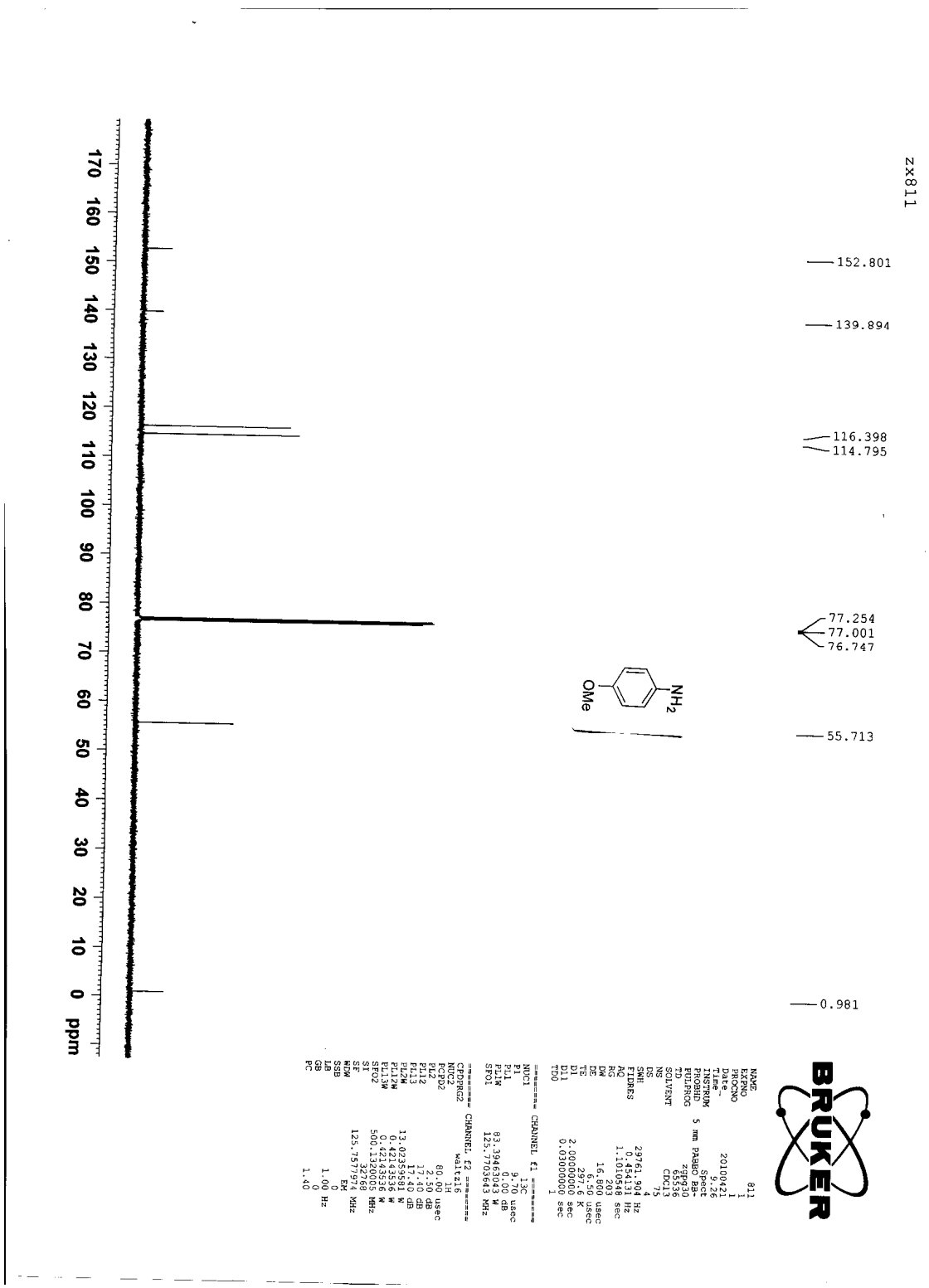

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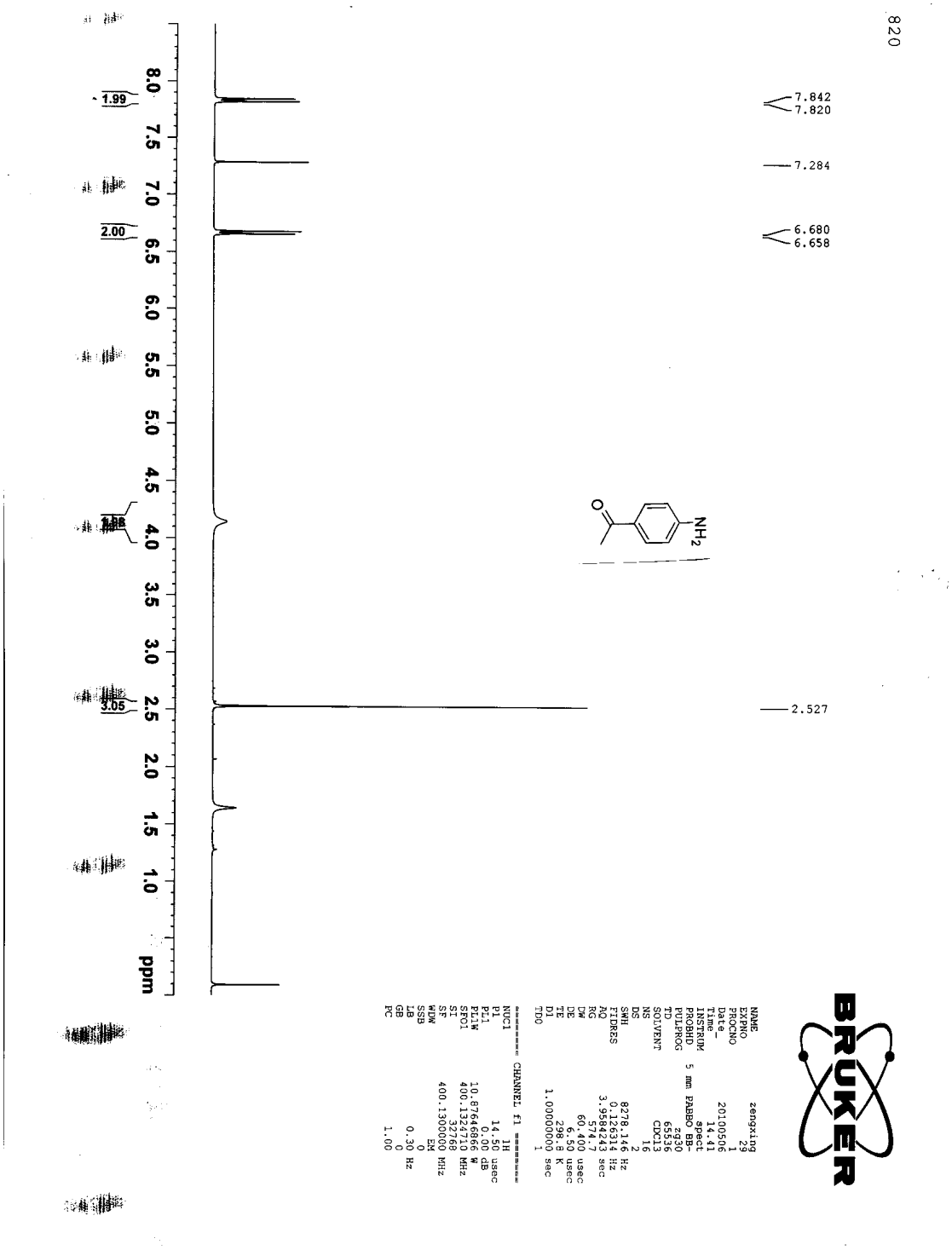

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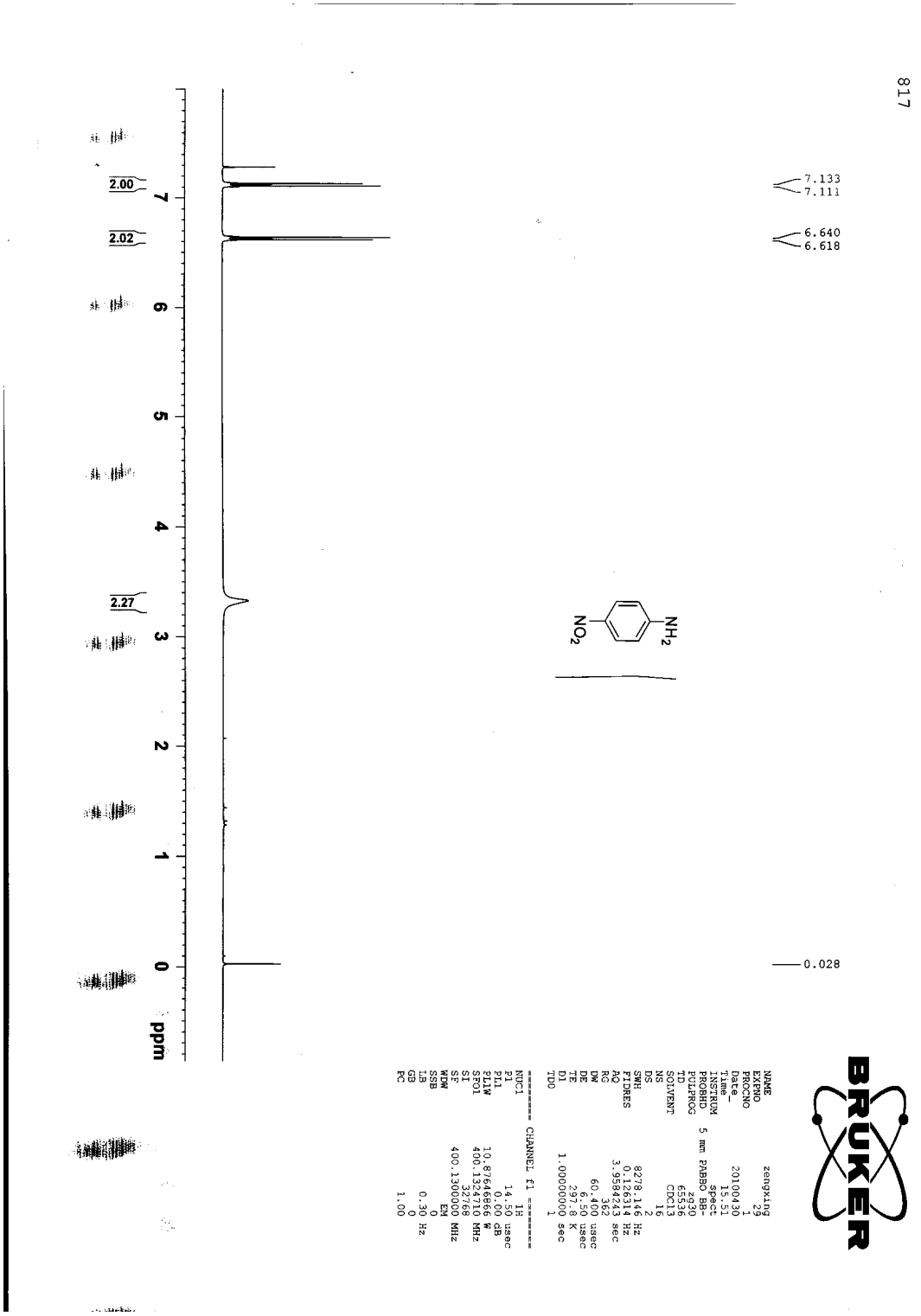

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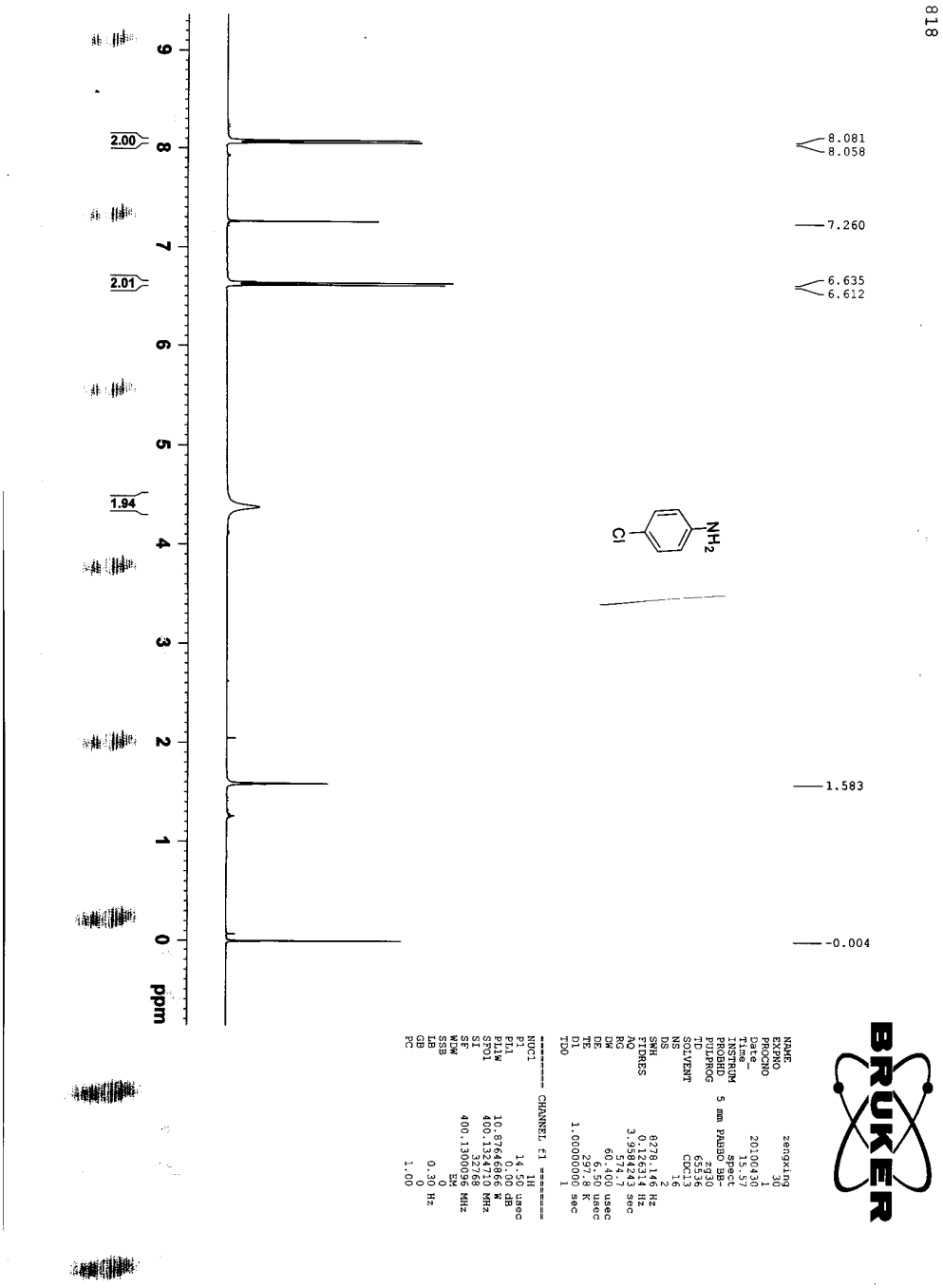

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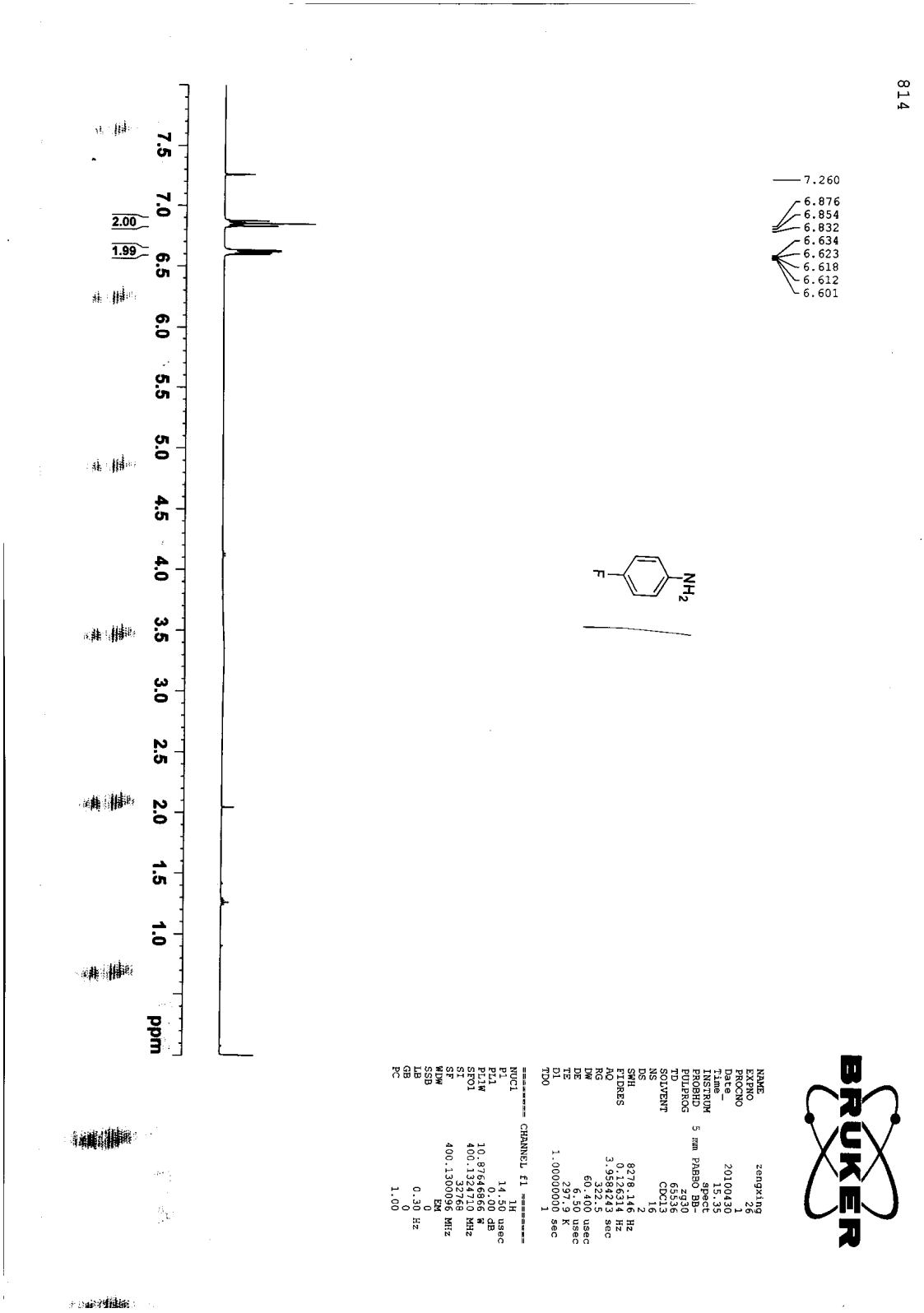

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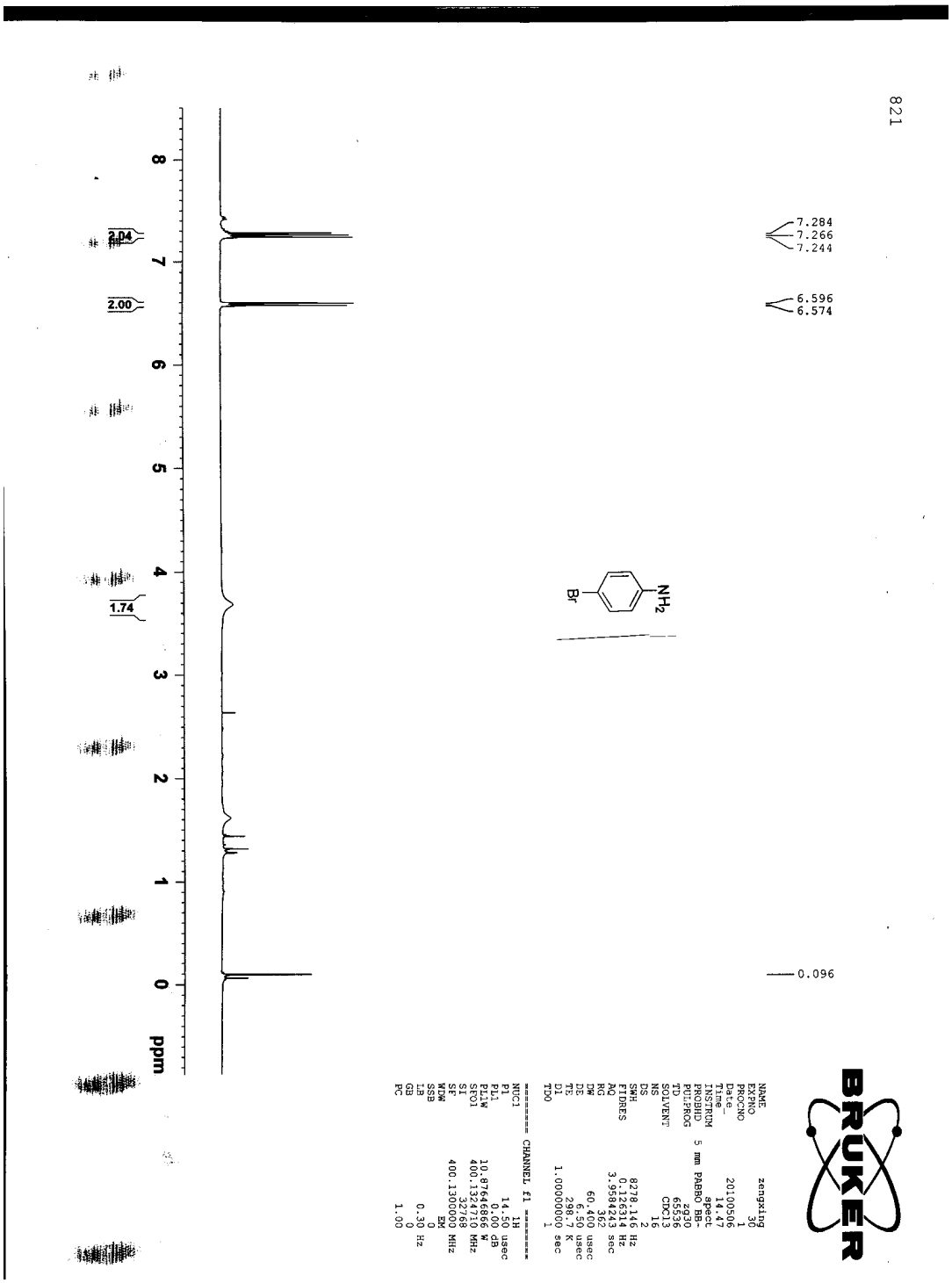

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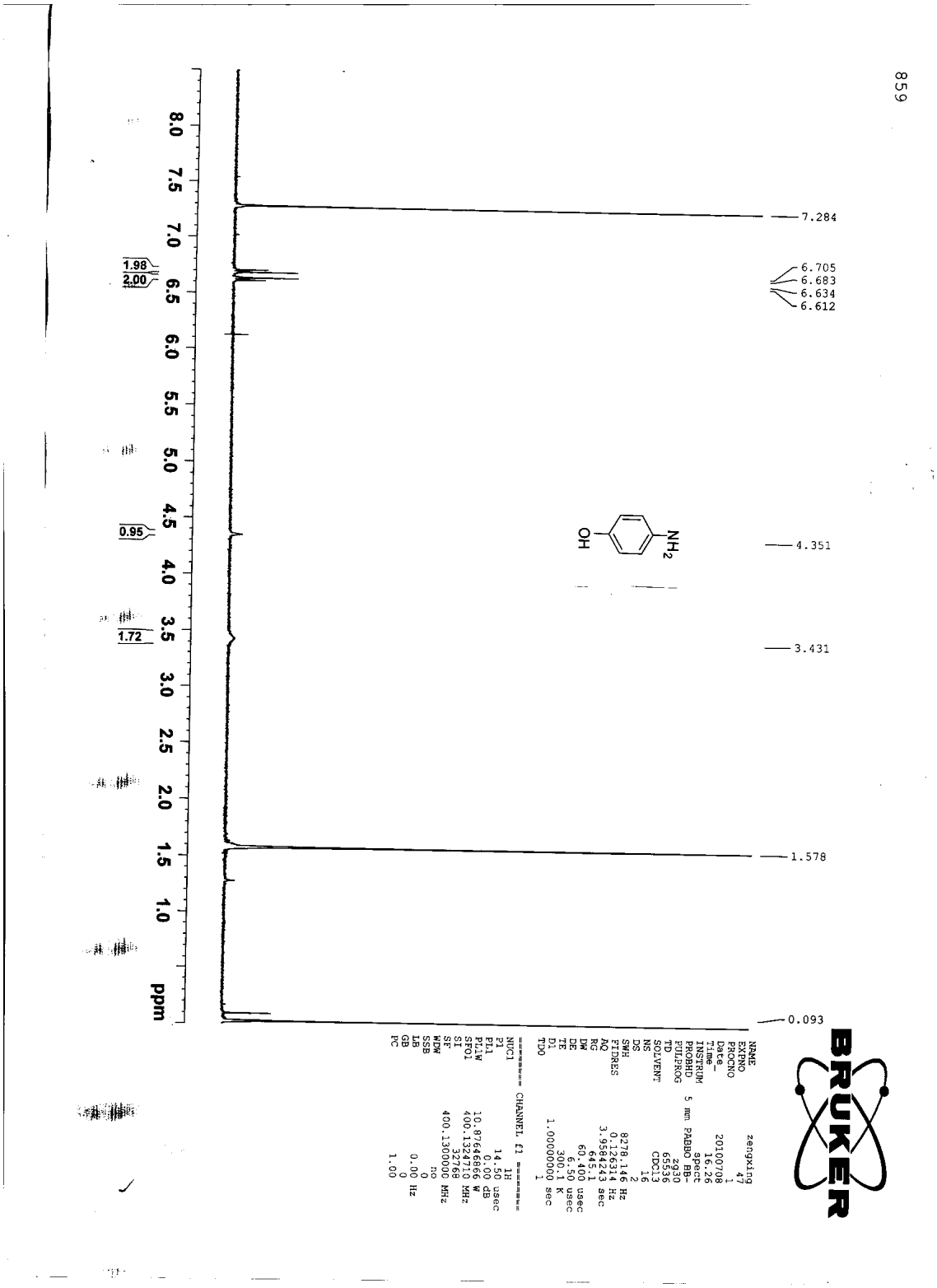

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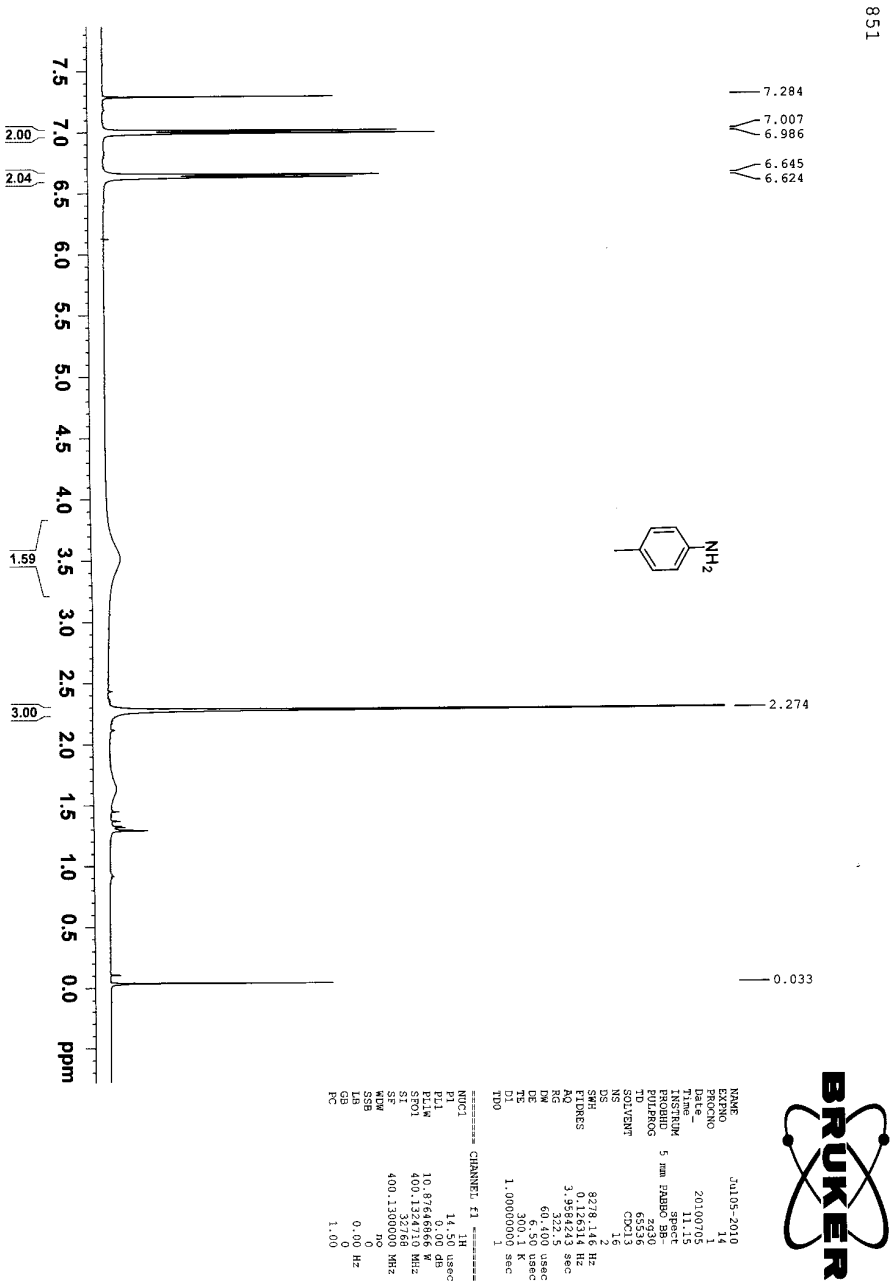

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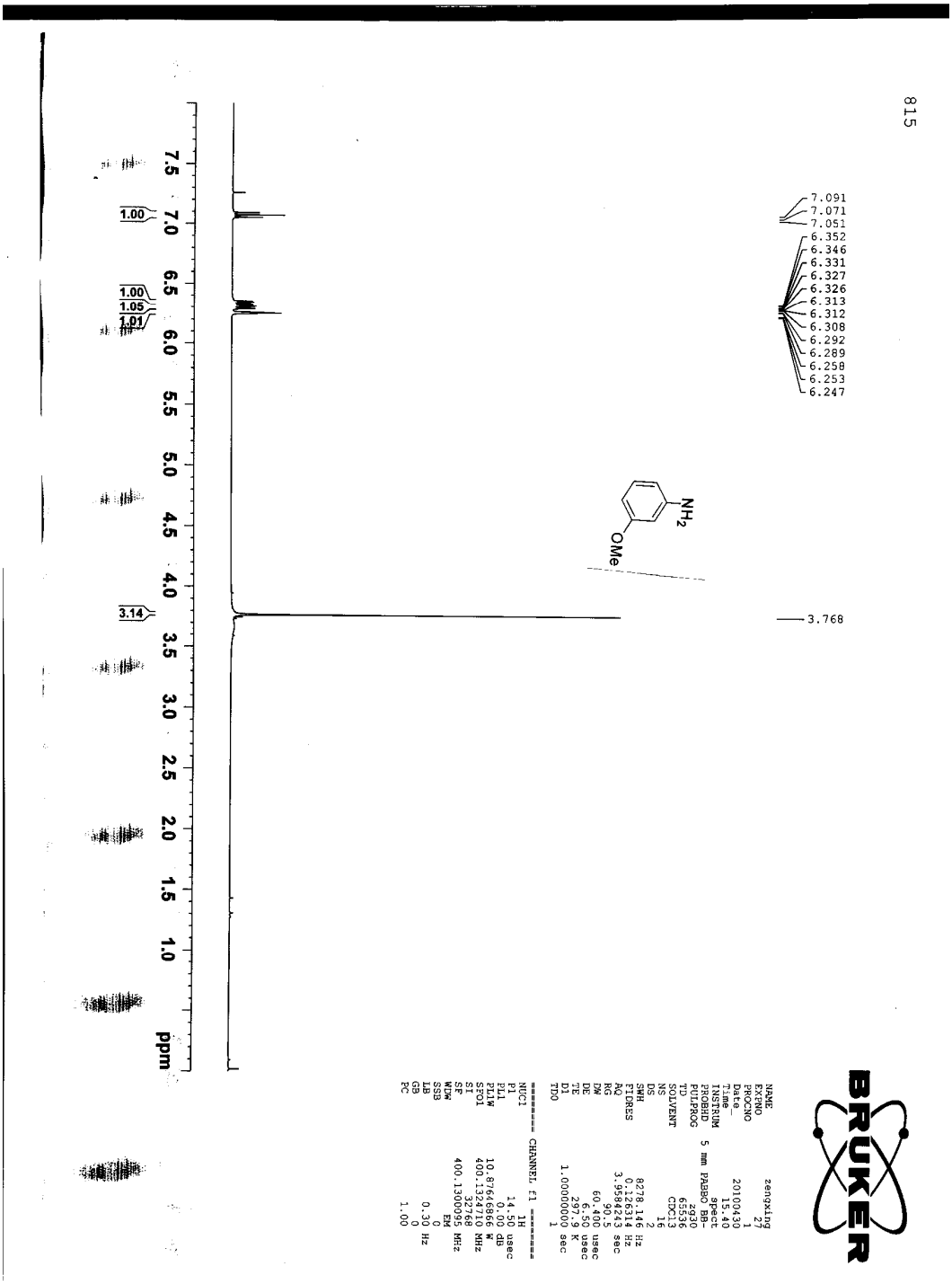

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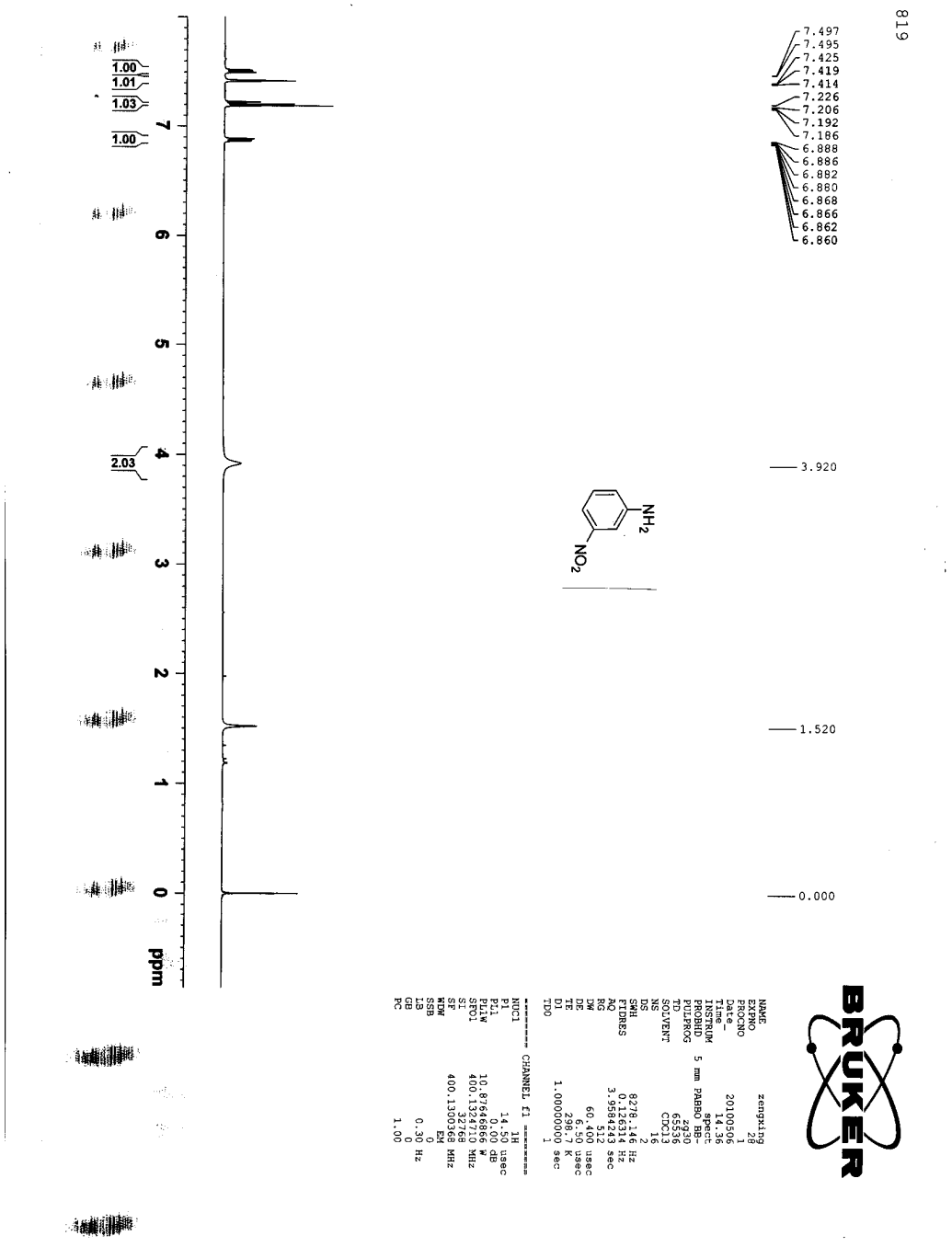

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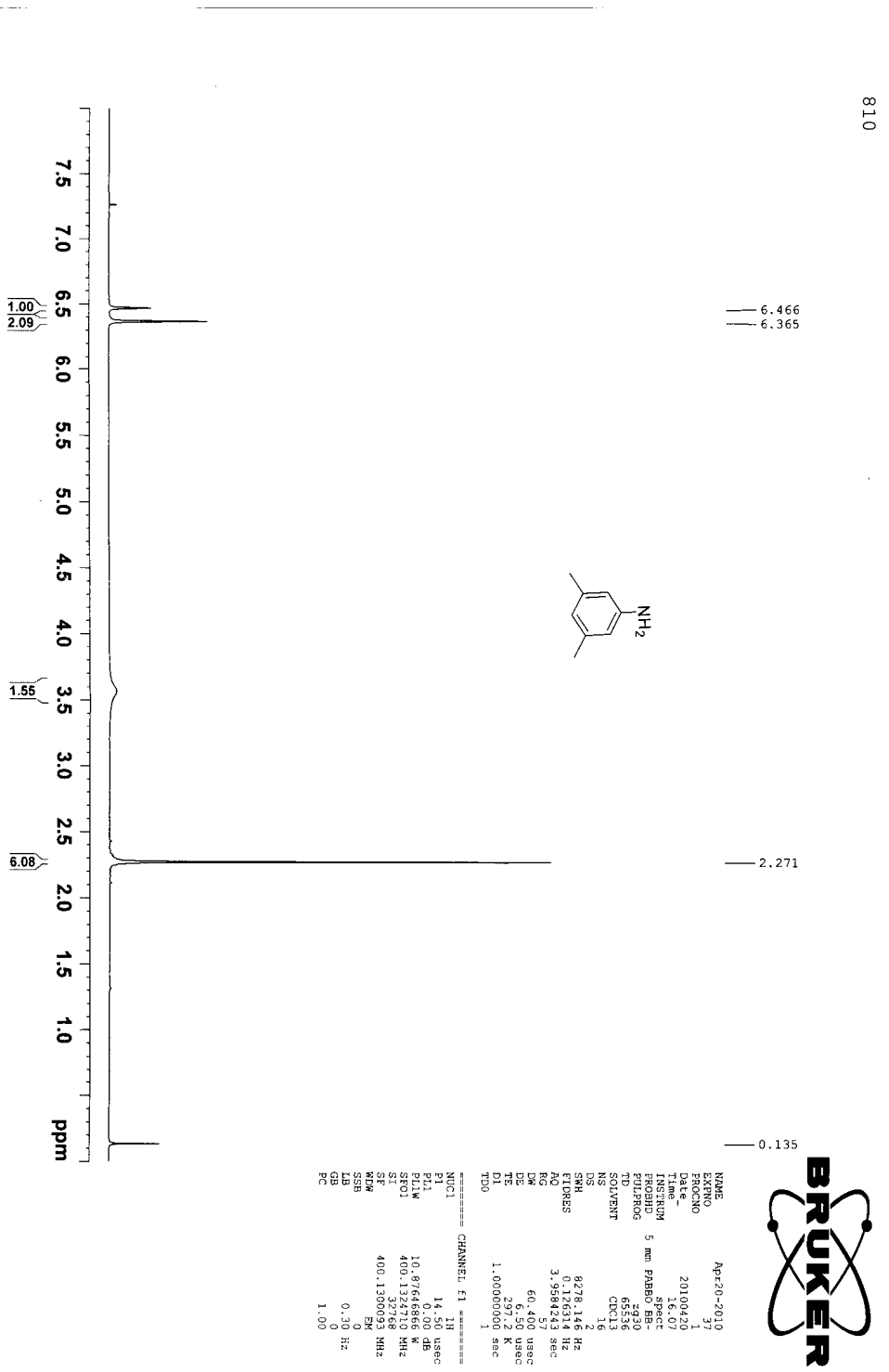

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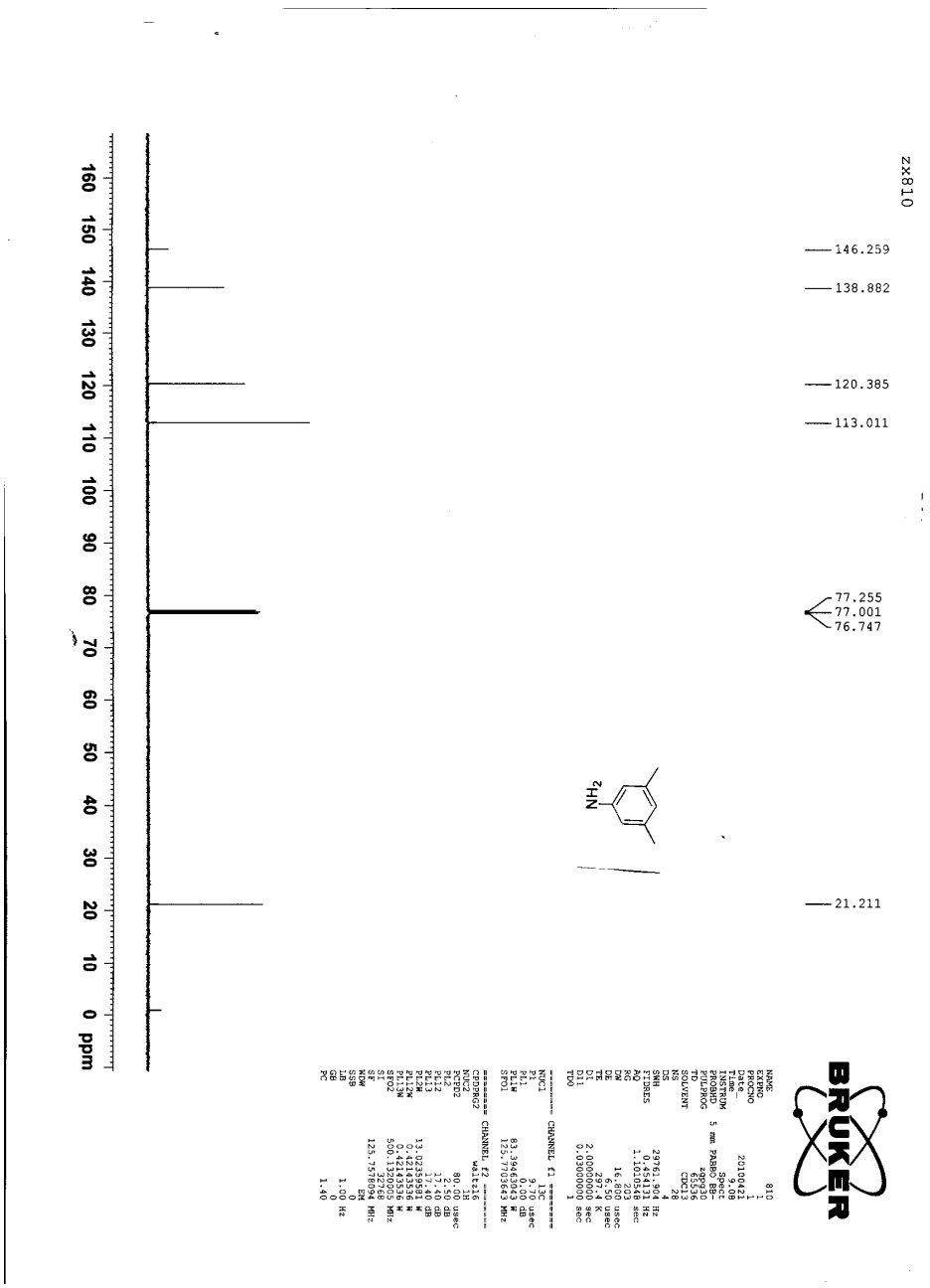


Table 2, Entry 12

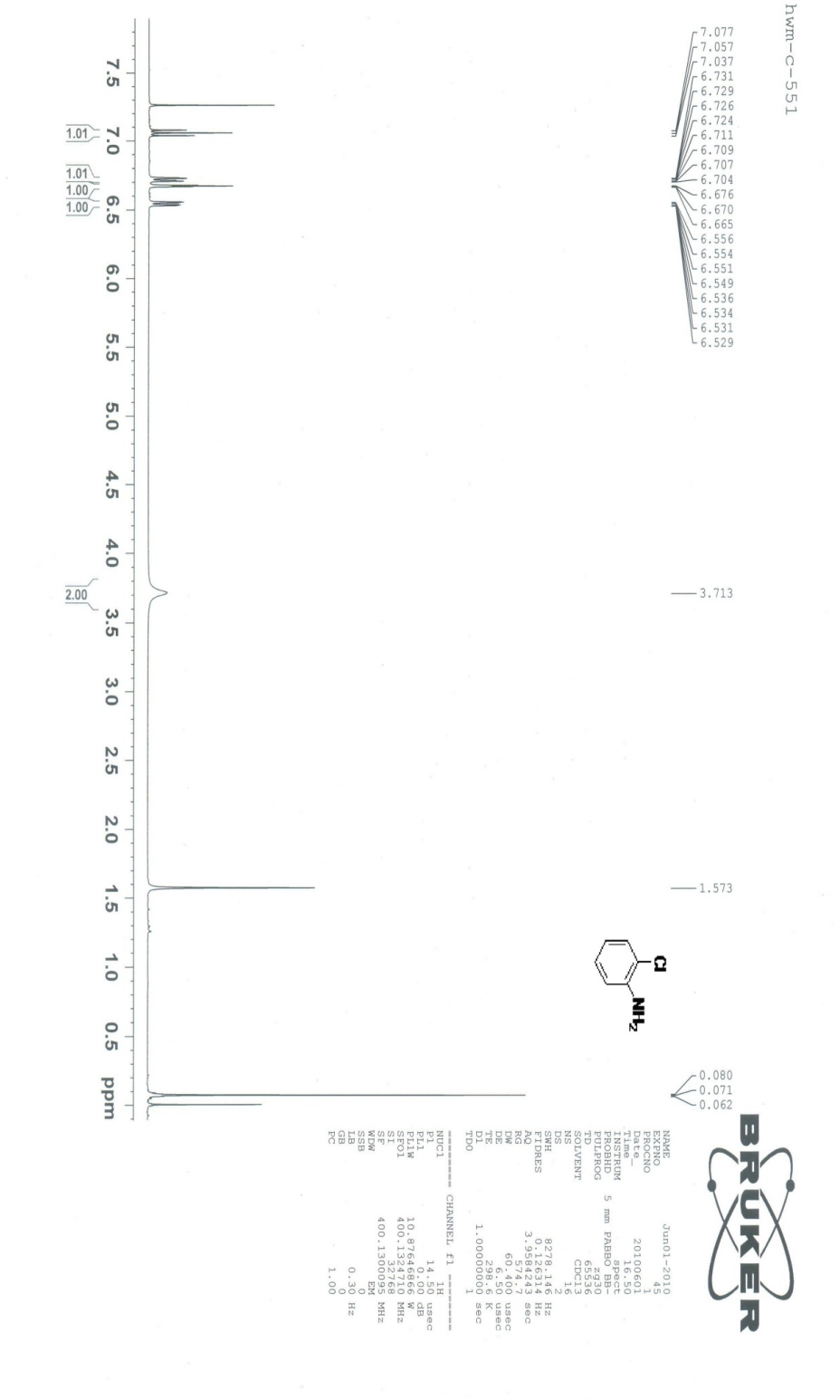
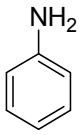
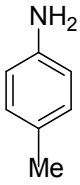


Table 2, Entry 13

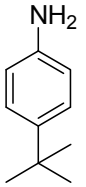
5. General Procedure B: Coupling of Aryl Bromides with Aqueous Ammonia: Table 3



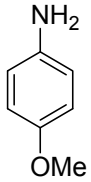
Aniline (entry 1) [1]**:** Following Procedure B, the crude oil was purified by flash chromatography on silica gel to provide 98% yield of the desired product as pale yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 3.65 (br s, 2H), 6.70 (d, J = 8.4 Hz, 2H), 6.78 (t, J = 12.5 Hz, 1H), 7.17 (m, J = 16.0, 5.2 Hz, 2H) ppm. ^{13}C NMR ($CDCl_3$) δ 149.0, 129.6, 116.8, 114.8. MS (EI, *m/z*): 94 (M^++1). HRMS (ESI): C_6H_8N calculated $[M+H]^+$ 94.0657, found 94.0658.



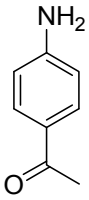
4-Methoxyaniline (entry 2)[1]**:** Following Procedure B, the crude oil was purified by flash chromatography on silica gel to provide 90% yield of the desired product as yellow solid. Mp 42-44 ^{o}C ^{1}H NMR (400 MHz, $CDCl_3$): δ 2.25 (s, 3H), 3.52 (brs, 2H), 6.61 (d, J = 6.0 Hz, 2H), 6.97 (d, J = 6.0 Hz, 2H) ppm. MS (EI, *m/z*): 108 (M^++1). HRMS (ESI): $C_7H_{10}N$ calculated $[M+H]^+$ 108.0810, found 108.0813.



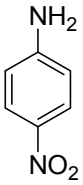
4-tert-Butyl benzenamine (entry 3)[5]**:** Following Procedure B, the crude oil was purified by flash chromatography on silica gel to provide 90% yield of the desired product as pale yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 1.28 (s, 9H), 3.54 (br s, 2H), 6.64 (d, J = 6.8 Hz), 7.18 (d, J = 6.8 Hz) ppm; ^{13}C NMR (125 MHz, $CDCl_3$): δ 1.003, 31.5, 33.9, 114.9, 126.0, 141.4, 143.8 ppm. MS (EI, *m/z*): 108 (M^++1). HRMS (ESI): $C_{10}H_{16}N$ calculated $[M+H]^+$ 108.0810, found 108.0813.



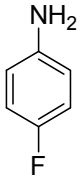
4-Methoxyaniline (entry 4)[1]**:** Following Procedure B, the crude oil was purified by flash chromatography on silica gel to provide 97% yield of the desired product as yellow solid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 3.44 (br s, 2H), 3.77 (s, 3H), 6.67 (d, J = 6.4 Hz, 2H), 6.71 (d, J = 6.6 Hz, 2H) ppm. ^{13}C NMR (125 MHz, $CDCl_3$): δ 55.7, 114.8, 116.4, 139.9, 152.8 ppm. MS (EI, *m/z*): 124 (M^++1). HRMS (ESI): $C_7H_{10}NO$ calculated $[M+H]^+$ 124.0762, found 124.0759.



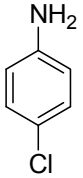
4-Aminoacetophenone (entry 5) [2]: Following Procedure B, the crude oil was purified by flash chromatography on silica gel to provide 93% yield of the desired product as pale yellow solid. Mp103-105 ^{o}C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 4.11 (br s, 2H), 6.65 (d, J = 6.8 Hz, 2H), 7.81 (d, J = 6.8 Hz, 2H) ppm. MS (EI, *m/z*): 136 (M^++1). HRMS (ESI): $C_8H_{10}NO$ calculated $[M+H]^+$ 136.0762, found 136.0765.



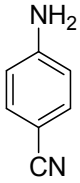
***p*-Nitroaniline (entry 6) [3]:** Following Procedure B, the crude oil was purified by flash chromatography on silica gel to provide 96% yield of the desired product as pale yellow solid. Mp146-149 ^{o}C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 4.39 (br s, 2H), 6.62 (d, J = 7.0 Hz, 2H), 8.07 (d, J = 7.2 Hz, 2H) ppm. MS (EI, *m/z*): 139 (M^++1). HRMS (ESI): $C_6H_7N_2O_2$ calculated $[M+H]^+$ 139.0508, found 139.0505.



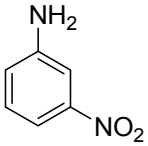
4-Fluoroaniline (entry 7): Following Procedure B, the crude oil was purified by flash chromatography on silica gel to provide 96% yield of the desired product as pale yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 3.53 (br s, 2H), 6.62 (m, J = 4.4, 2.0 Hz, 2H), 6.85 (m, J = 8.4, 8.8 Hz, 2H) ppm. ^{13}C NMR (125 MHz, $CDCl_3$): δ 157.2, 155.4, 142.4, 115.9 ppm. MS (EI, *m/z*): 112 (M^++1). HRMS (ESI): C_6H_7NF calculated $[M+H]^+$ 112.0563, found 112.0559.



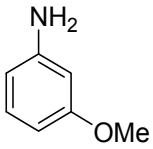
***p*-Chloroaniline (entry 8) [4]:** Following Procedure B, the crude oil was purified by flash chromatography on silica gel to provide 88% yield of the desired product as white solid. ^{1}H NMR (400 MHz, $CDCl_3$): δ 3.65 (br s, 2H), 6.60 (dd, J = 7.8, 4.2 Hz, 2H), 7.10 (dd, J = 6.2, 8.5 Hz, 2H) ppm; ^{13}C NMR (125 MHz, $CDCl_3$): δ116.2, 123.2, 129.1, 144.9 ppm. MS (EI, *m/z*): 128 (M^++1). HRMS (ESI): C_6H_7NCl calculated $[M+H]^+$ 128.0267, found 128.0263.



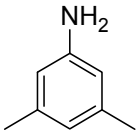
4-Aminobenzonitrile (entry 9) [1]: Following Procedure B, the crude oil was purified by flash chromatography on silica gel to provide 93% yield of the desired product as pale yellow solid. Mp 82-85 ^{o}C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 4.15 (brs, 2H), 6.64 (d, J = 6.8 Hz), 7.41 (d, J = 6.8 Hz) ppm; ^{13}C NMR (125 MHz, $CDCl_3$): δ 100.3, 114.4, 120.0, 150.3 ppm. MS (EI, *m/z*): 119 (M^++1). HRMS (ESI): $C_7H_7N_2$ calculated [M+H] $^+$ 119.0609, found 119.0606.



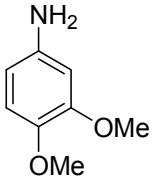
3-Nitroaniline (entry 10) [1]: Following Procedure B, the crude oil was purified by flash chromatography on silica gel to provide 95% yield of the desired product as pale yellow solid. Mp 112-115 ^{o}C. ^{1}H NMR (400 MHz, $CDCl_3$): δ 3.99 (brs, 2H), 6.94 (dd, J = 10.4, 5.8 Hz, 1H), 7.27 (m, J = 8.0 Hz, 1H), 7.49 (t, J = 2.2 Hz, 1H), 7.57 (d, J = 0.8 Hz, 1H) ppm. MS (EI, *m/z*): 139 (M^++1). HRMS (ESI): $C_6H_7N_2O_2$ calculated [M+H] $^+$ 139.0508, found 139.0510.



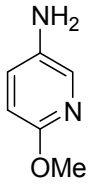
***m*-Methoxyaniline (entry 11)[2]:** Following Procedure B, the crude oil was purified by flash chromatography on silica gel to provide 93% yield of the desired product as pale yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 3.65 (brs, 2H), 3.77 (s, 3H), 6.25 (t, J = 2 Hz), 6.31 (m, J = 8.2, 3.2, 4.2 Hz,), 7.06 (t, J = 8.0 Hz) ppm; ^{13}C NMR (500 MHz, $CDCl_3$): δ 55.08, 101.11, 103.99, 107.92, 130.09, 147.74, 160.78 ppm. MS (EI, *m/z*): 124 (M^++1). HRMS (ESI): $C_7H_{10}NO$ calculated [M+H] $^+$ 124.0762, found 124.0765.



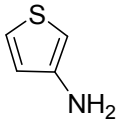
3,5-Dimethoxyaniline (entry 12)[1]: Following Procedure B, the crude oil was purified by flash chromatography on silica gel to provide 91% yield of the desired product as pale yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 2.18 (s, 6H), 3.48 (br s, 2H), 6.29 (s, 2H), 6.38 (s, 1H) ppm; ^{13}C NMR (500 MHz, $CDCl_3$): δ 21.3, 113.4, 120.4, 138.9, 146.3 ppm. MS (EI, *m/z*): 122 (M^++1). HRMS (ESI): $C_8H_{12}N$ calculated [M+H] $^+$ 122.0970, found 122.0966.



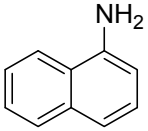
4-Aminoveratrole (entry 13): Following Procedure B, the crude oil was purified by flash chromatography on silica gel to provide 96% yield of the desired product as pale yellow solid. Mp. 85-87 ^{o}C ^{1}H NMR (400 MHz, $CDCl_3$): δ 3.44 (br s, 2H), 3.80 (s, 3H), 3.83 (s, 3H), 6.23 (d, J = 8.4 Hz, 1H), 6.31 (d, J = 2.4 Hz, 1H), 6.70 (d, J = 1.2 Hz) ppm; ^{13}C NMR (125 MHz, $CDCl_3$): δ 55.7, 56.6, 100.776, 106.4, 113.2, 140.6, 142.2, 149.9 ppm. MS (EI, *m/z*): 154 (M^++1). HRMS (ESI): $C_8H_{12}NO_2$ calculated [M+H] $^+$ 154.0868, found 154.0871.



5-Amino-2-methoxypyridine (entry 14) [4]: Following Procedure B, the crude oil was purified by flash chromatography on silica gel to provide 95% yield of the desired product as pale yellow solid. ^{1}H NMR (500 MHz, $CDCl_3$): δ 3.39 (br s, 2H), 3.84 (s, 3H), 6.58 (d, J = 8.8 Hz, 1H), 7.01 (d, J = 8.9 Hz, 1H), 7.64 (d, J = 2.4 Hz, 1H) ppm; ^{13}C NMR (500 MHz, $CDCl_3$): δ 53.3, 110.7, 127.6, 132.8, 136.6, 158.0 ppm. MS (EI, *m/z*): 125 (M^++1). HRMS (ESI): $C_6H_9N_2O$ calculated [M+H] $^+$ 125.0715, found 125.0716.

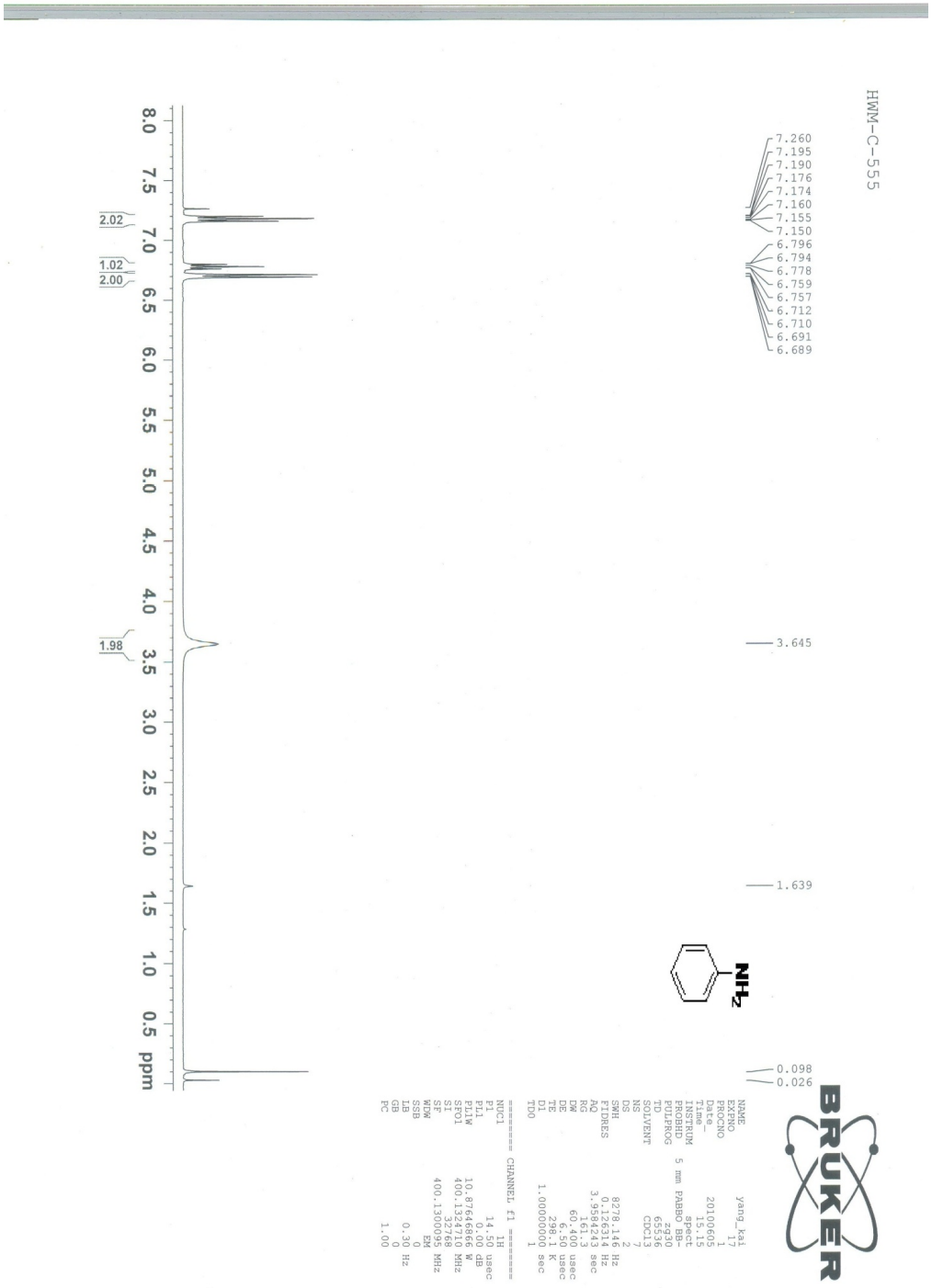


3-Thiophenamine (entry 15)[1]: Following Procedure B, the crude oil was purified by flash chromatography on silica gel to provide 86% yield of the desired product as pale yellow oil. ^{1}H NMR (400 MHz, $CDCl_3$): δ 3.60 (br s, 2H), 6.17 (d, J = 3.0 Hz, 1H), 6.65 (d, J = 5.2 Hz, 1H), 7.13 (d, J = 5.2 Hz) ppm; ^{13}C NMR (125 MHz, $CDCl_3$): δ 100.2, 121.1, 125.3, 145.1 ppm. MS (EI, *m/z*): 100 (M^++1). HRMS (ESI): C_4H_6NS calculated [M+H] $^+$ 100.0221, found 100.0221.



1-Naphthalenamine (entry 16)[1]: Following Procedure B, the crude oil was purified by flash chromatography on silica gel to provide 92% yield of the desired product as white soild. ^{1}H NMR (400 MHz, $CDCl_3$): δ 4.14 (br s, 2H), 6.79 (t, J = 8.0 Hz, 1H), 7.33 (m, J = 6.4, 10.8 Hz, 2H), 7.48 (m, J = 4.8, 4.8 Hz, 2H), 7.81 (d, J = 2Hz, 2H) ppm; ^{13}C NMR (125 MHz, $CDCl_3$): δ , 109.7, 118.9, 120.7, 123.7,

124.8, 125.8, 126.3, 128.6, 134.4, 142.0 ppm. MS (EI, *m/z*): 144 (M^++1). HRMS (ESI): $C_{10}H_{10}N$ calculated $[M+H]^+$ 144.0813, found 144.0812.



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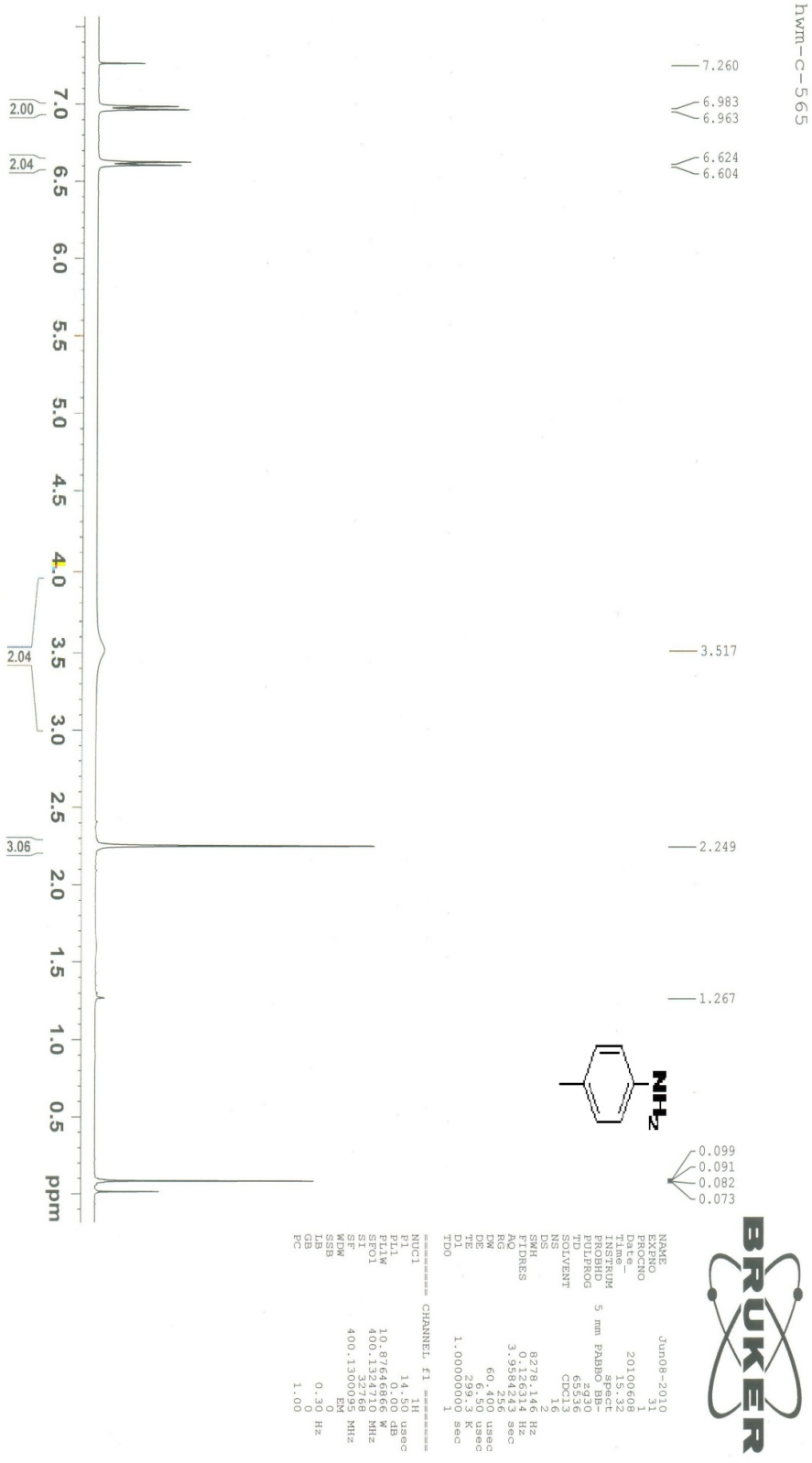

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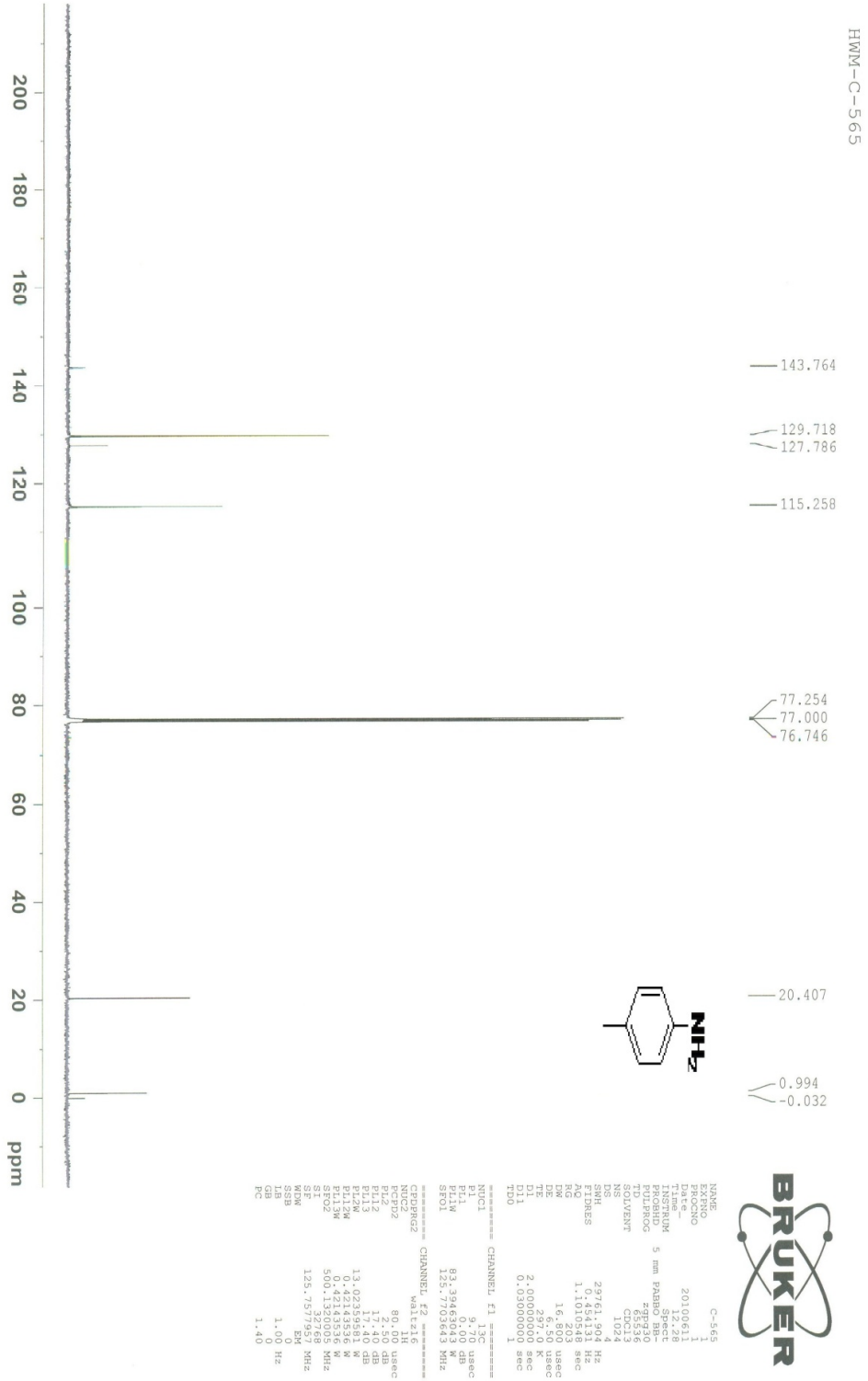

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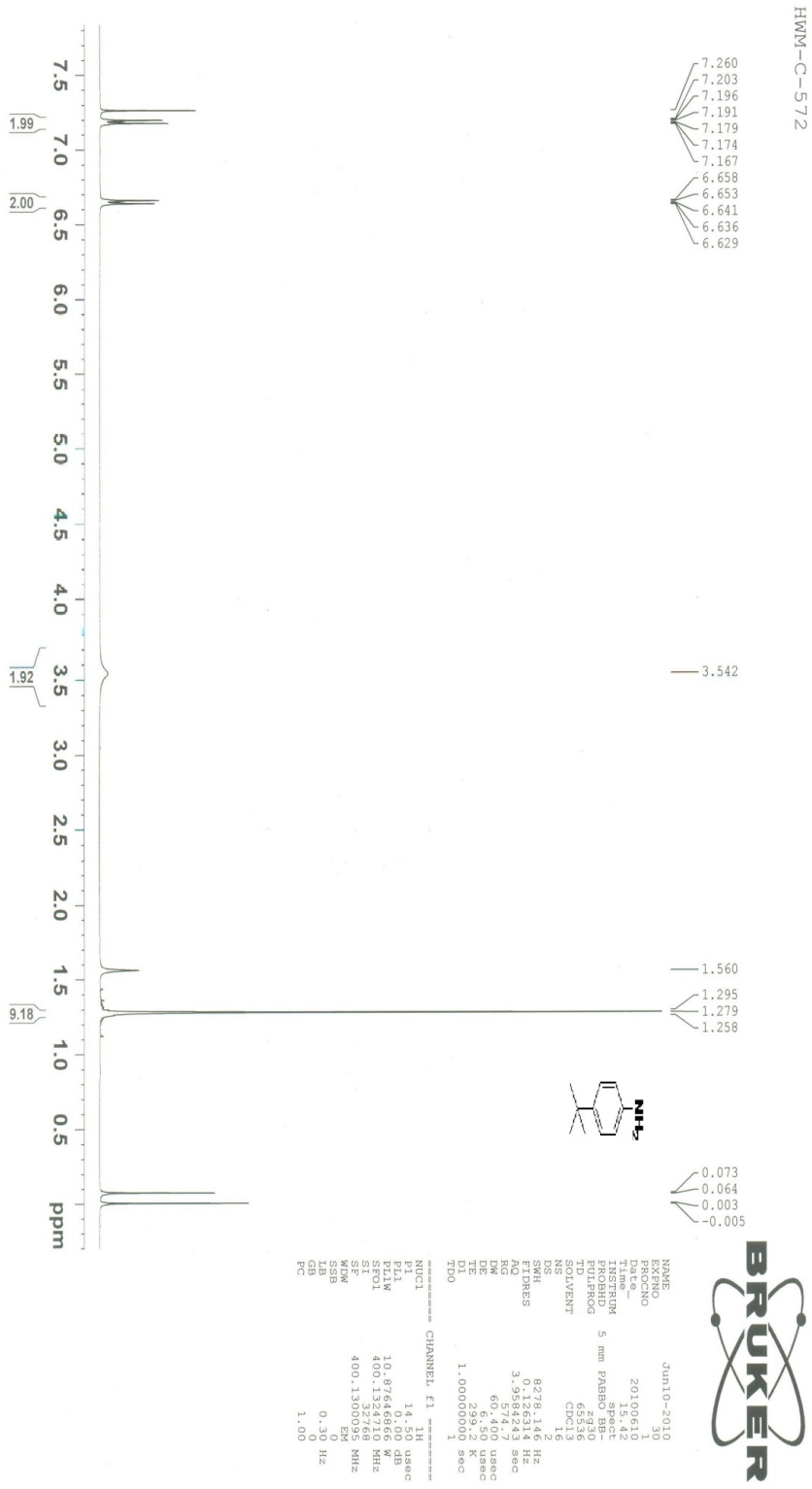

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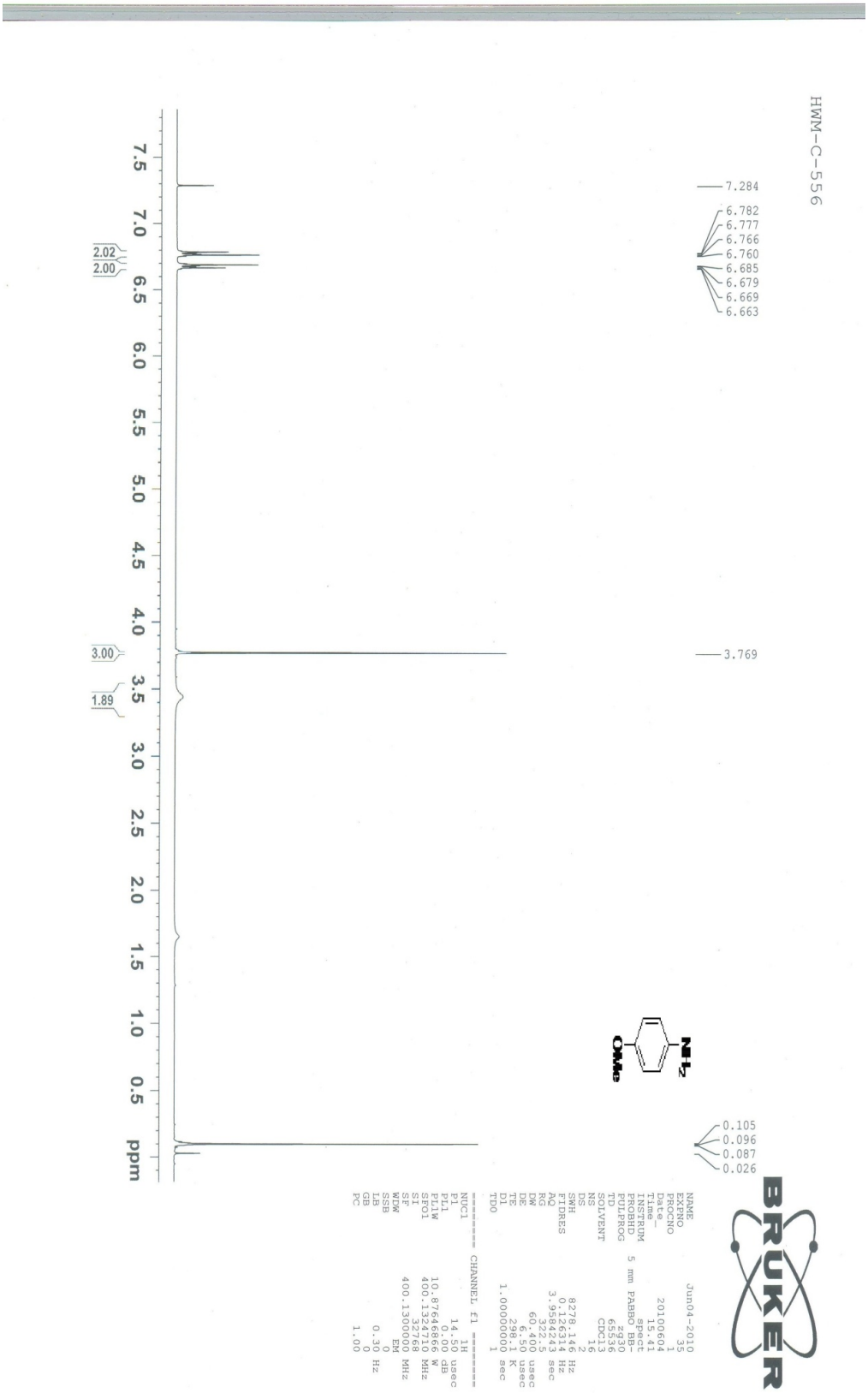

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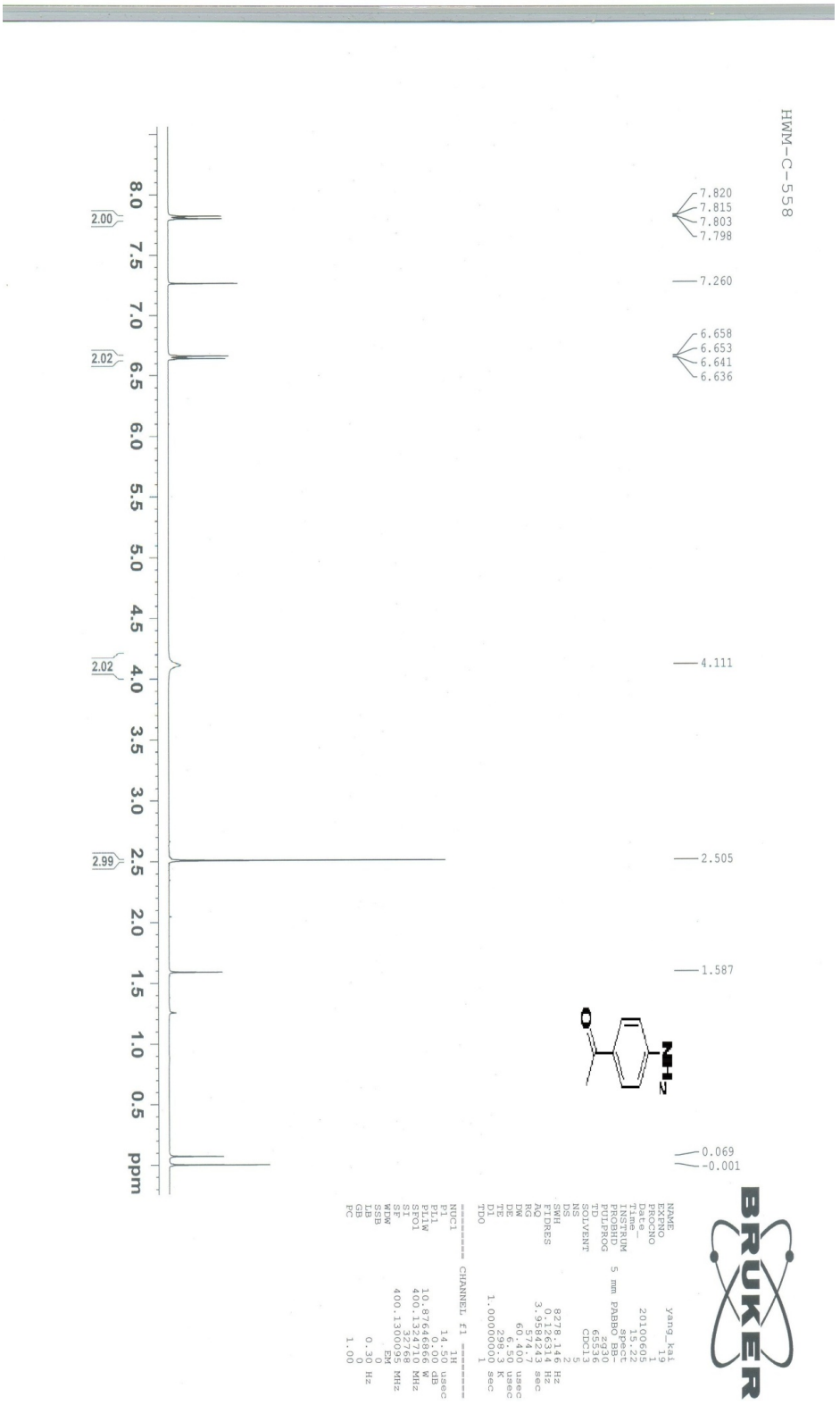

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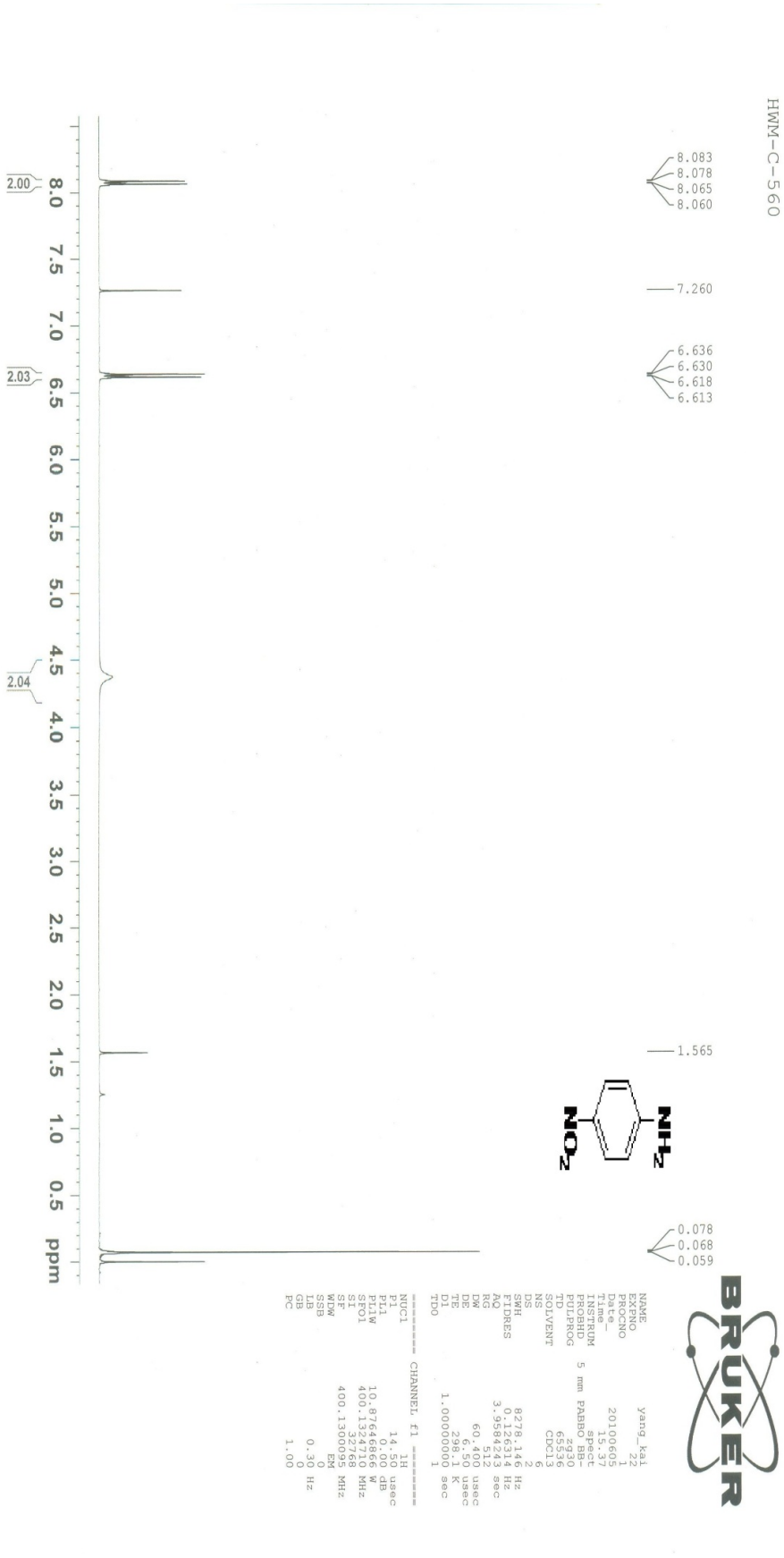

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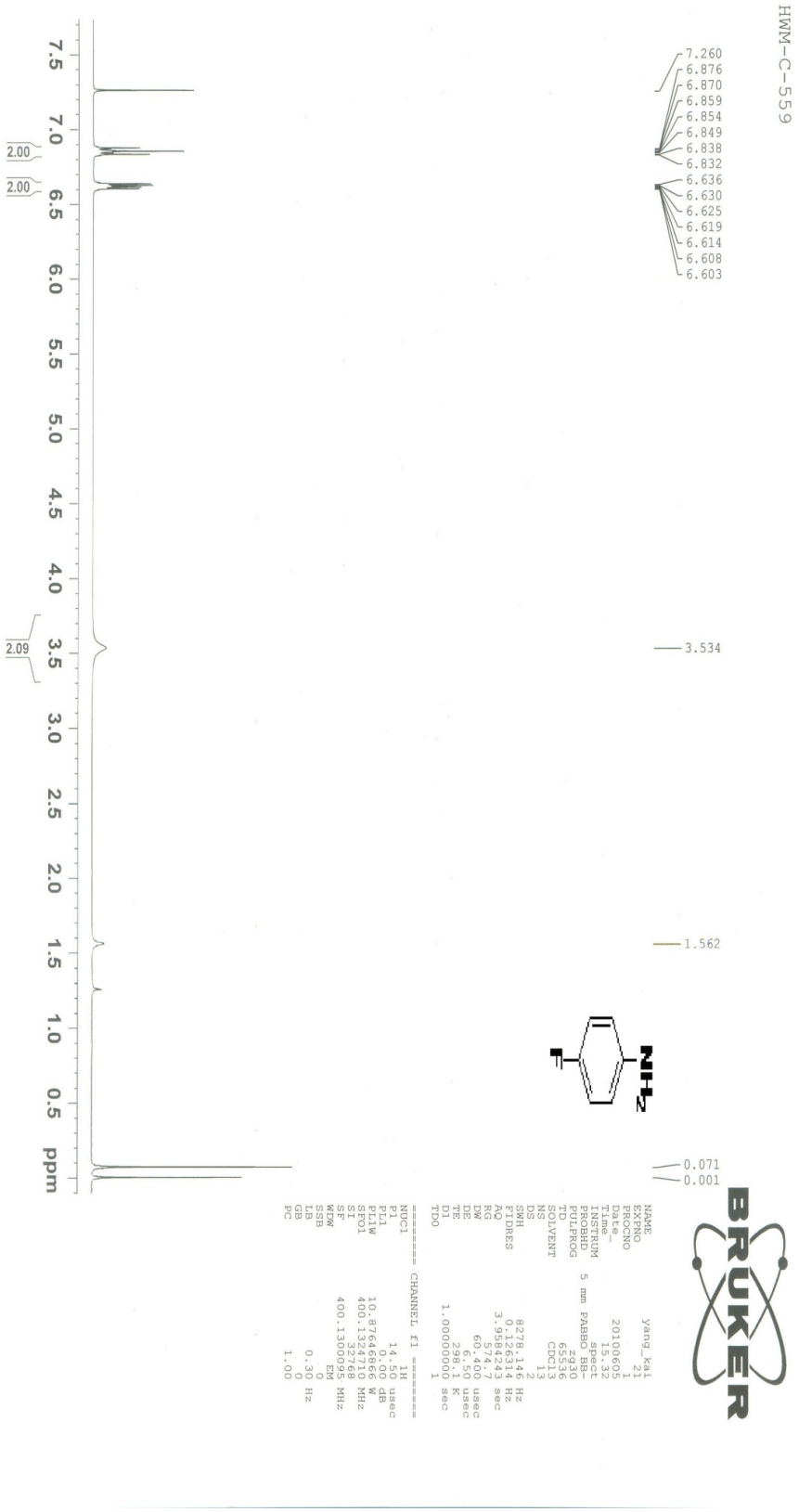

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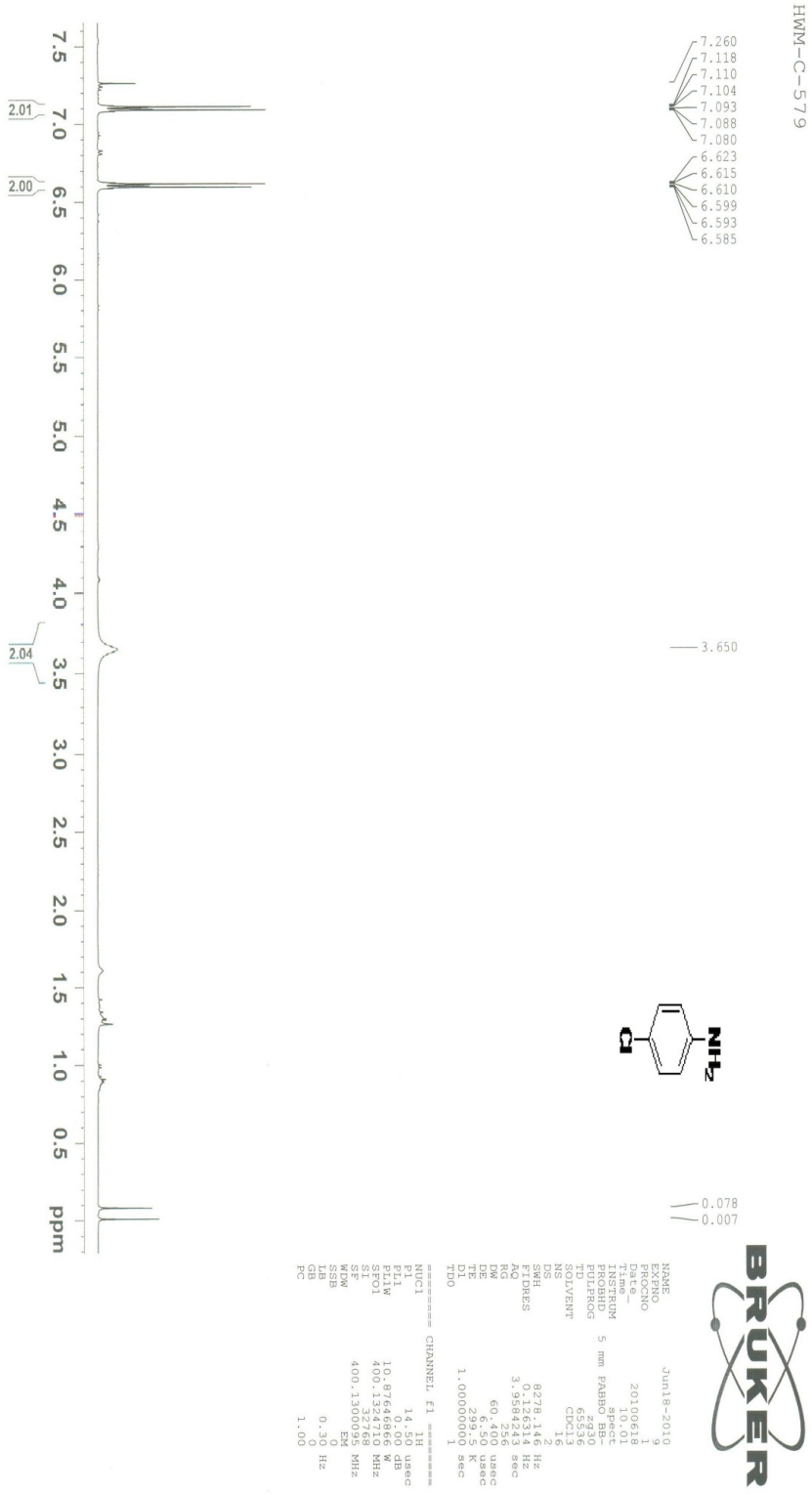

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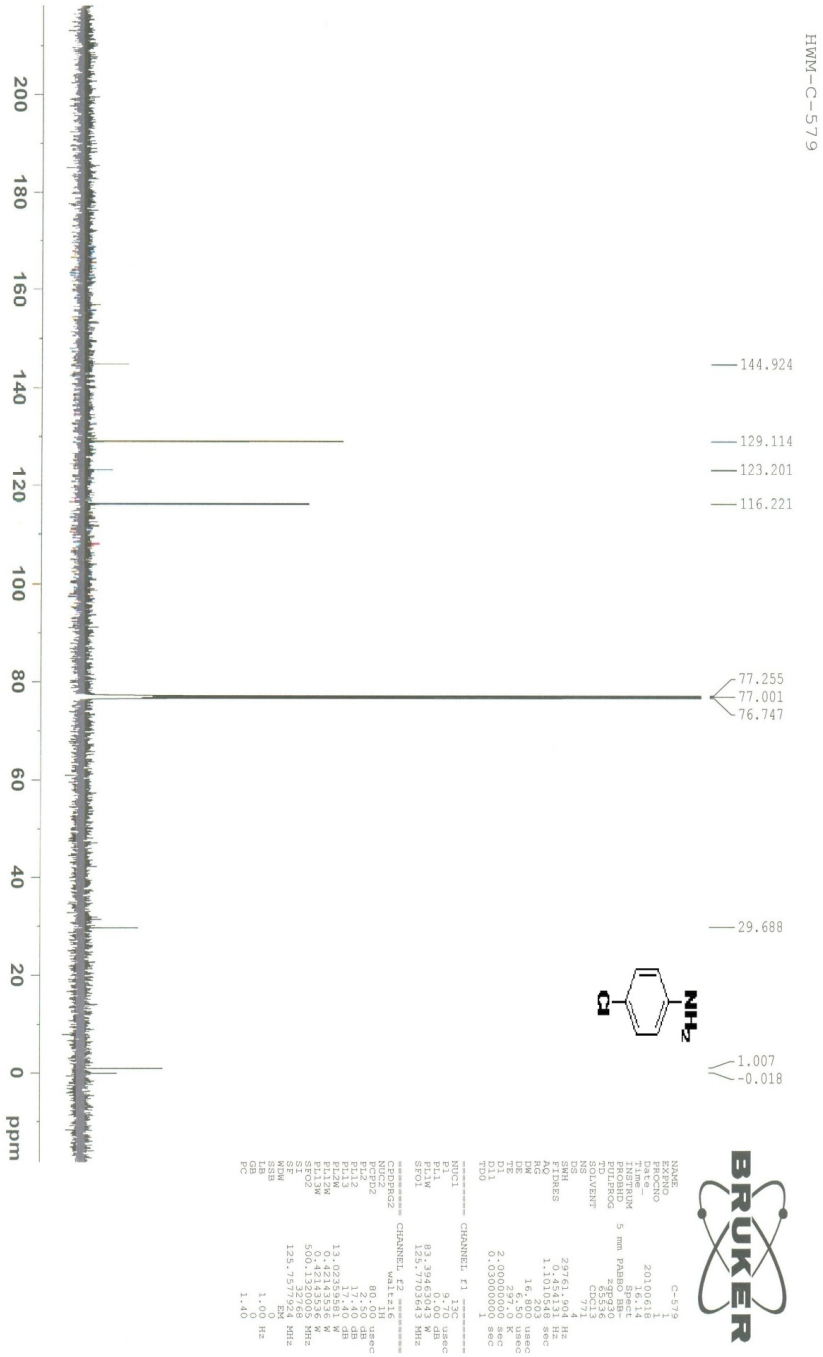
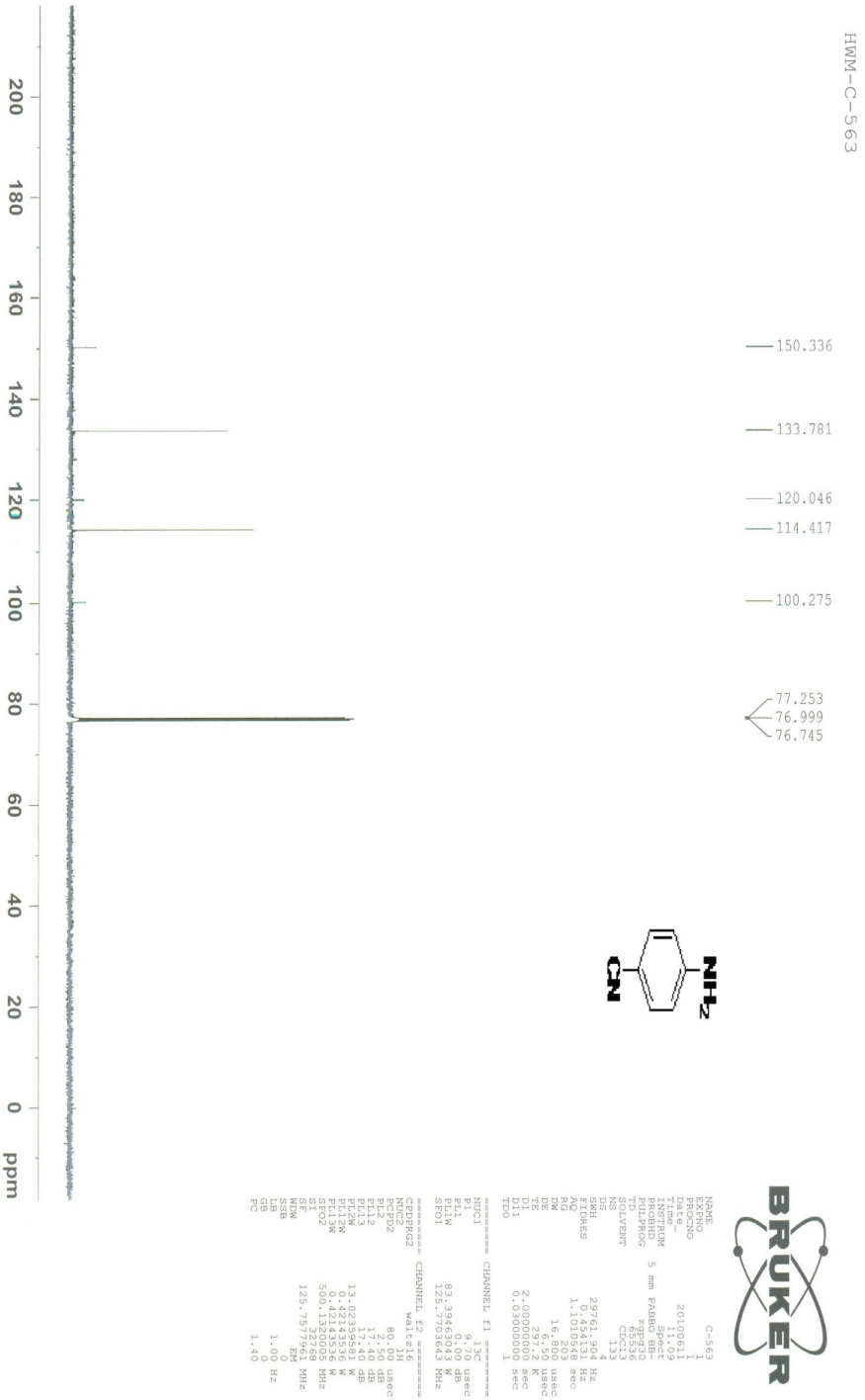


Table 3, Entry 8

Table 3, Entry 9



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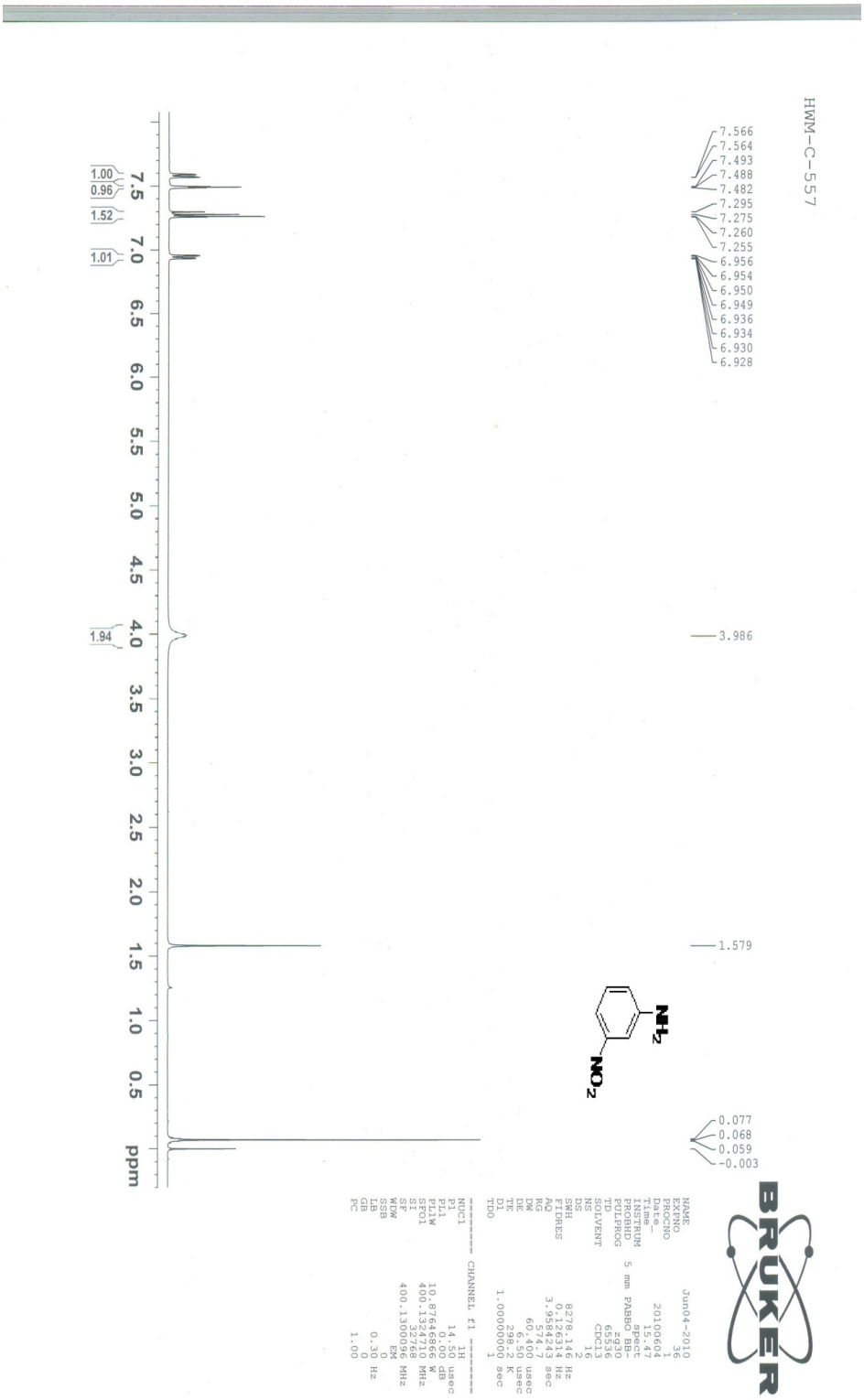

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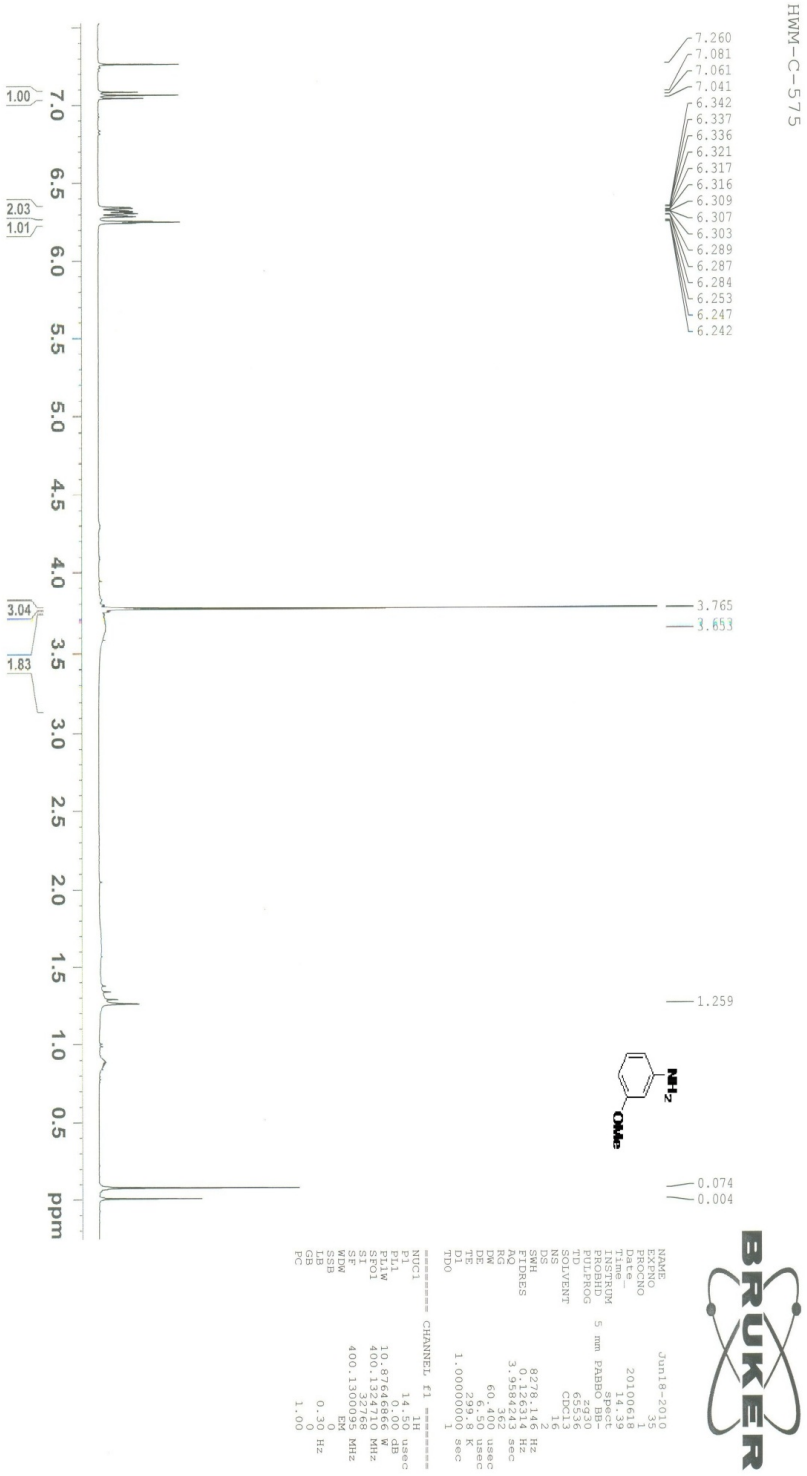

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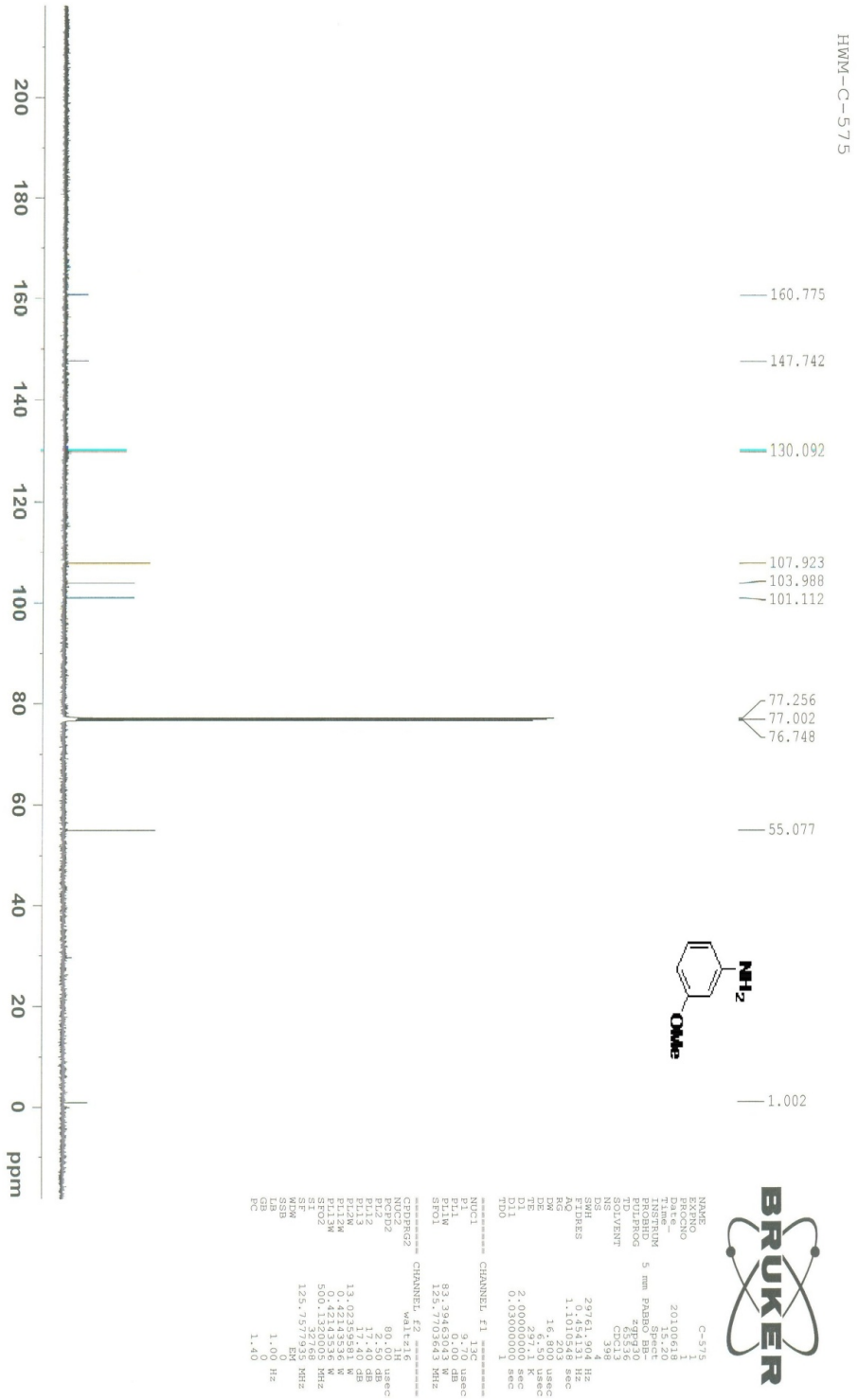

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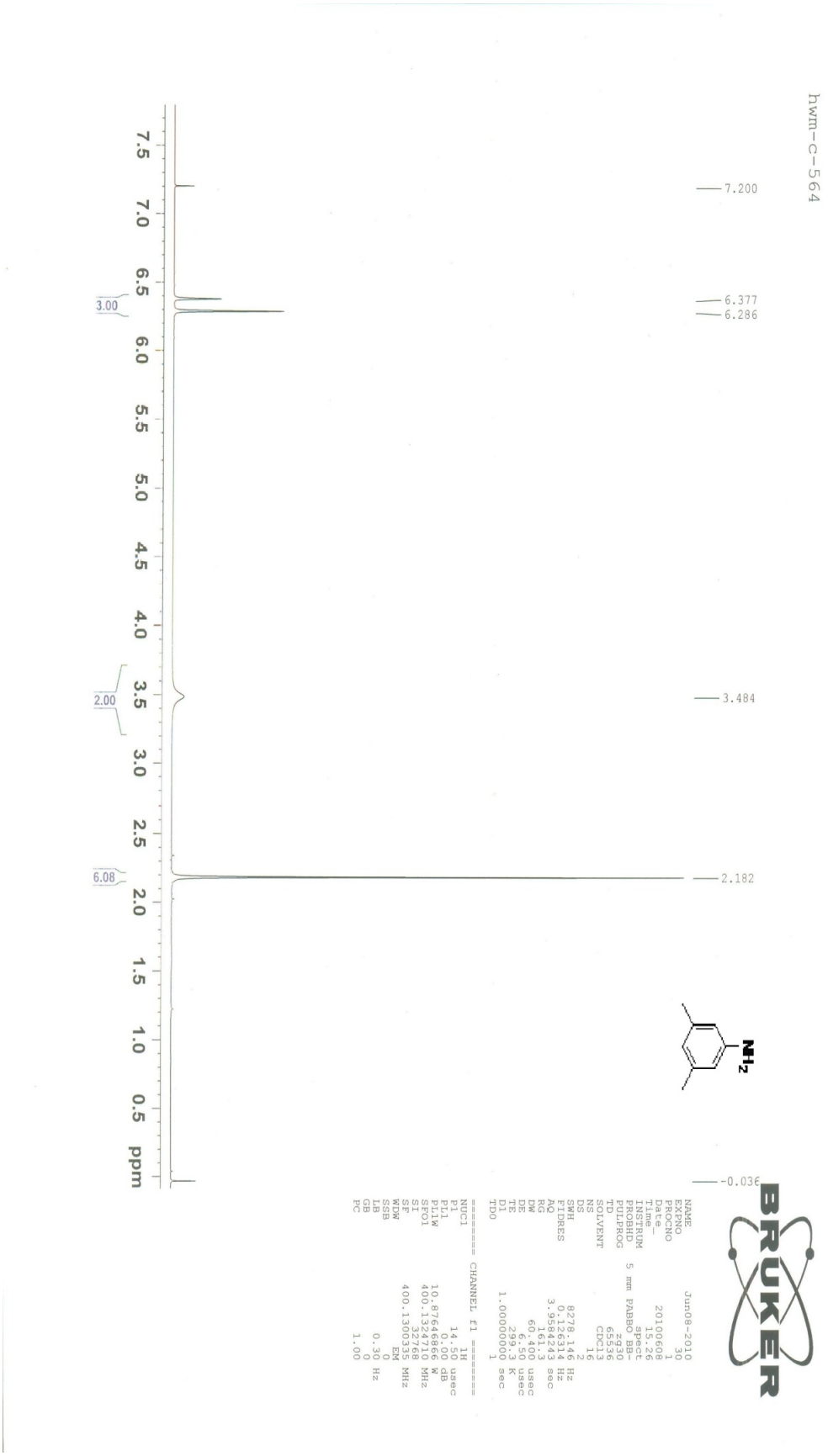

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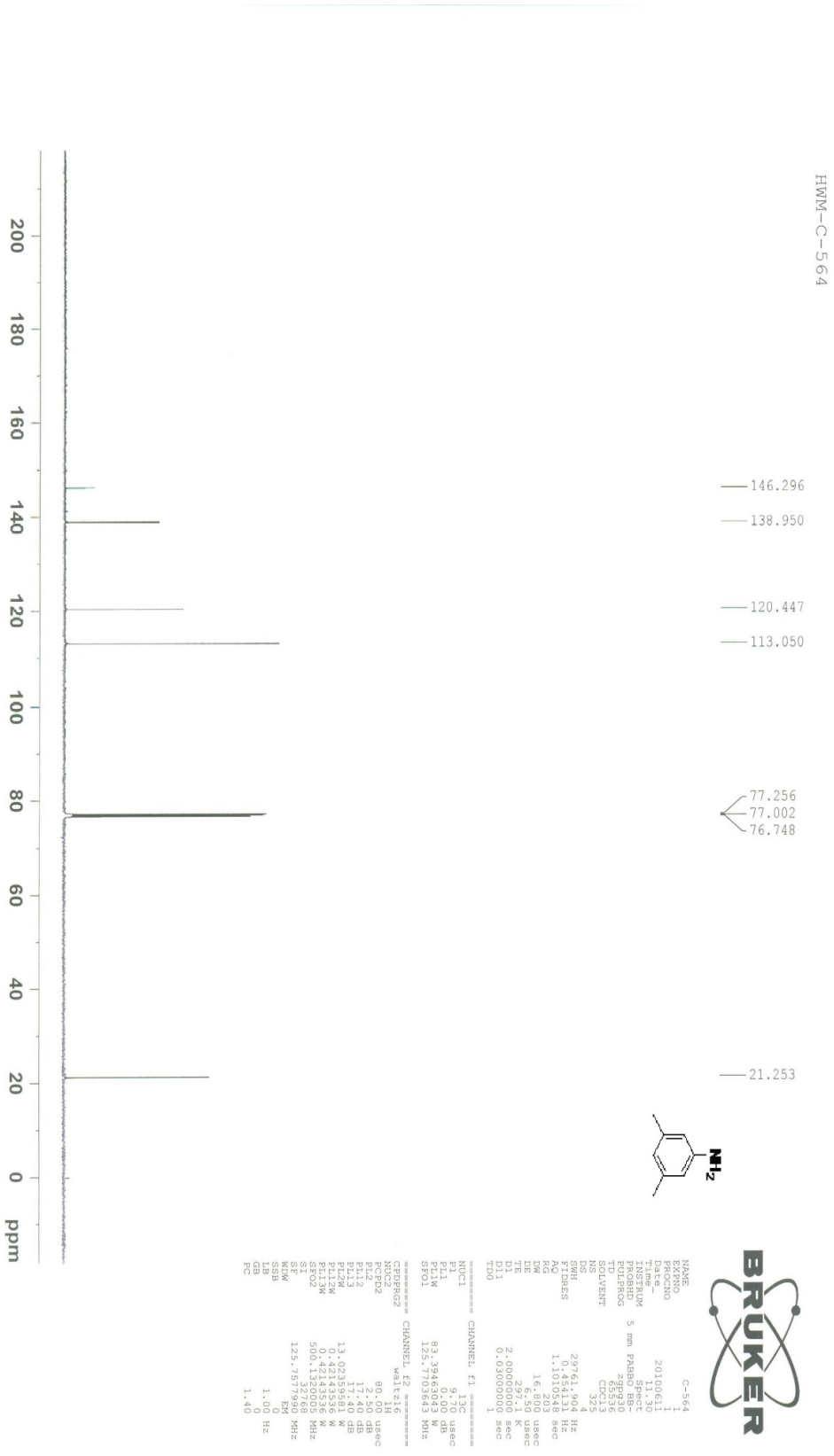

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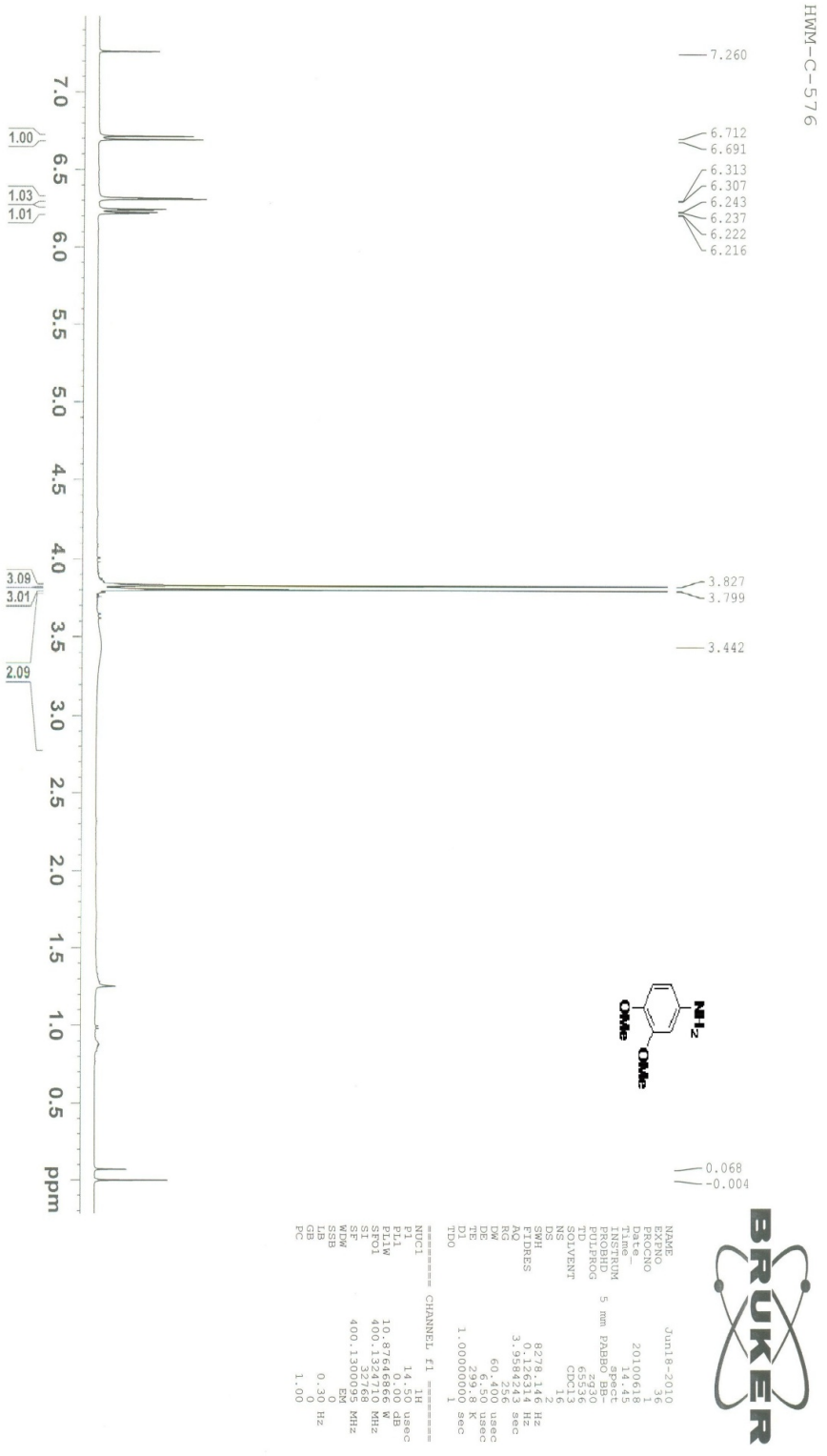

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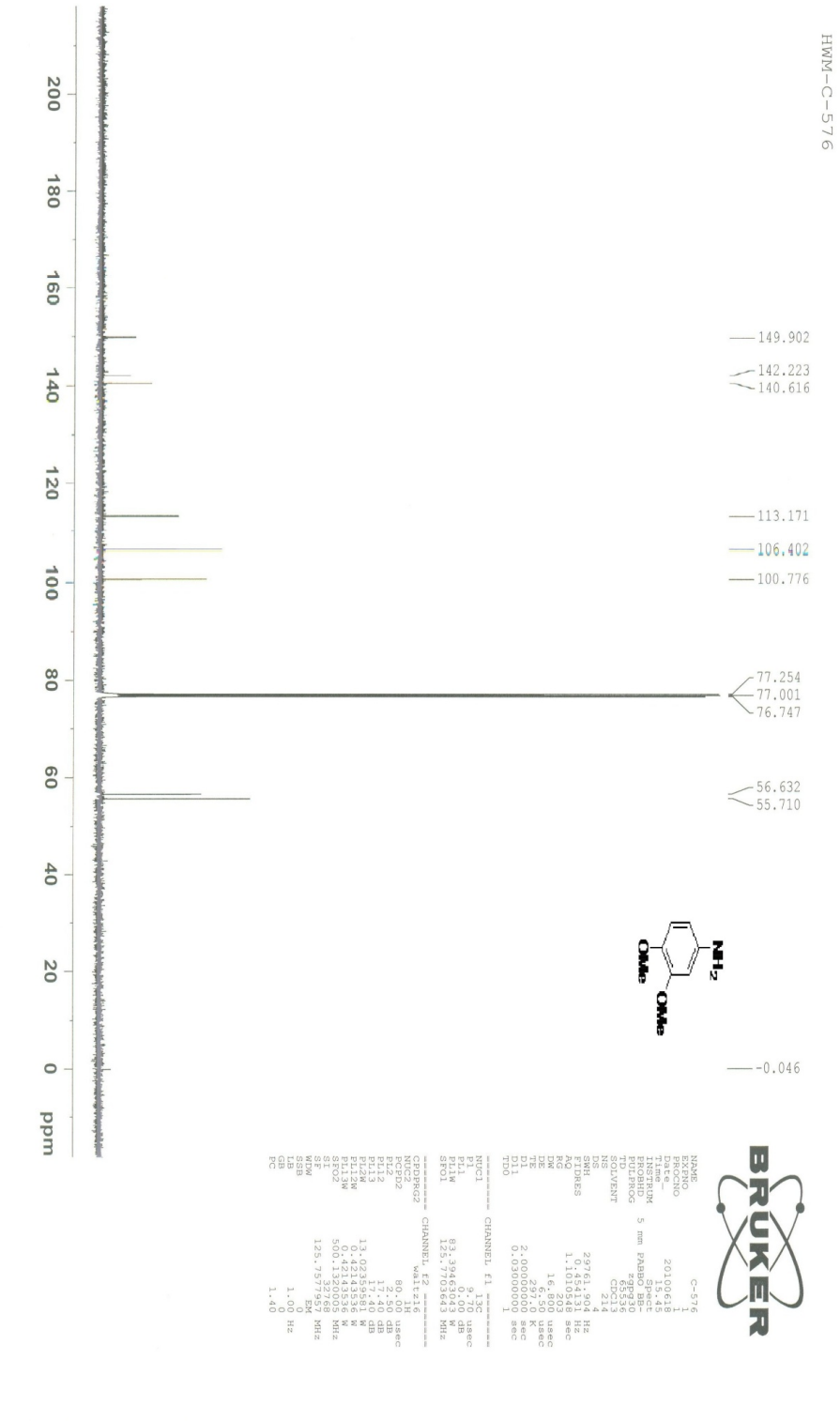

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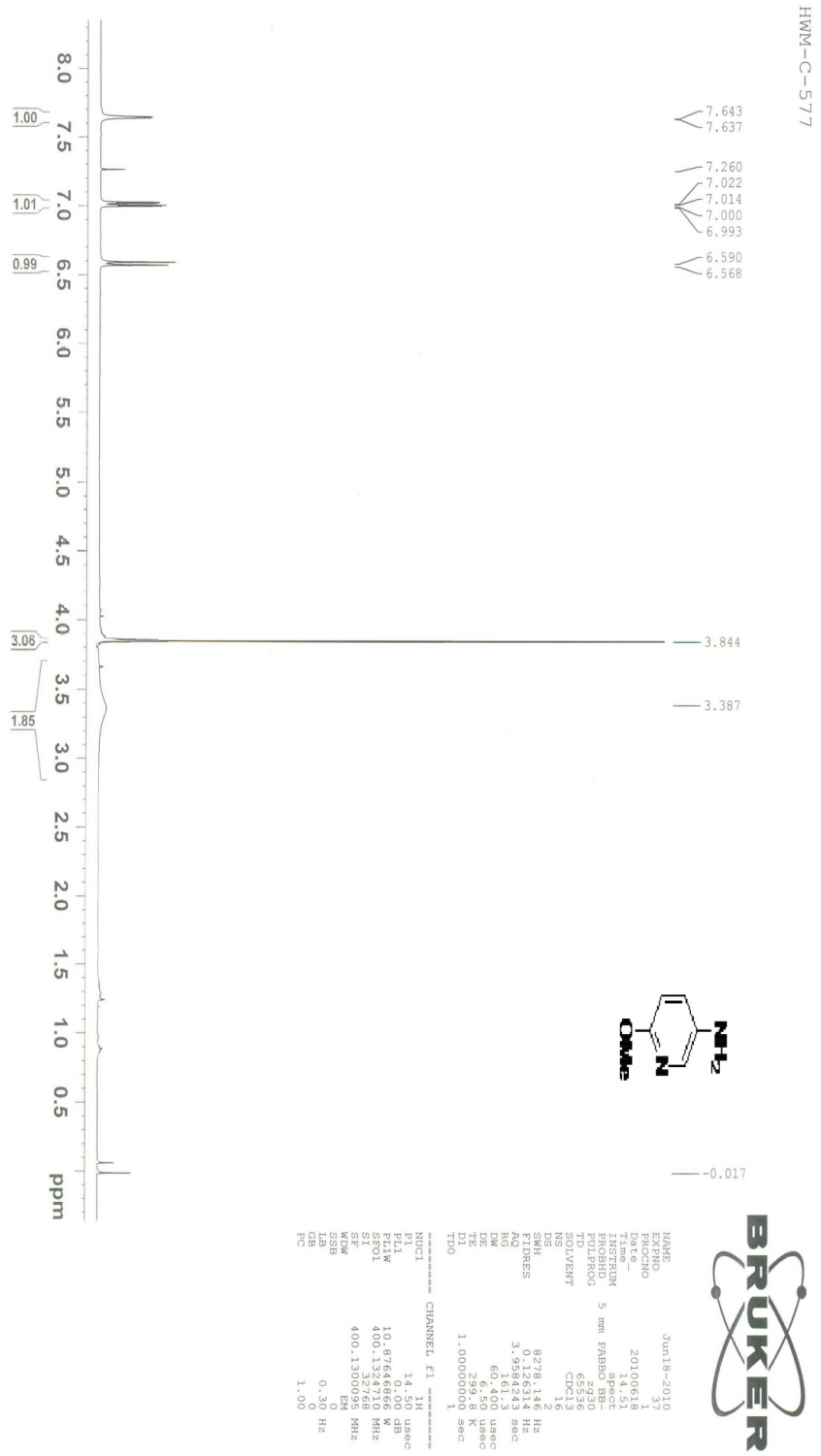
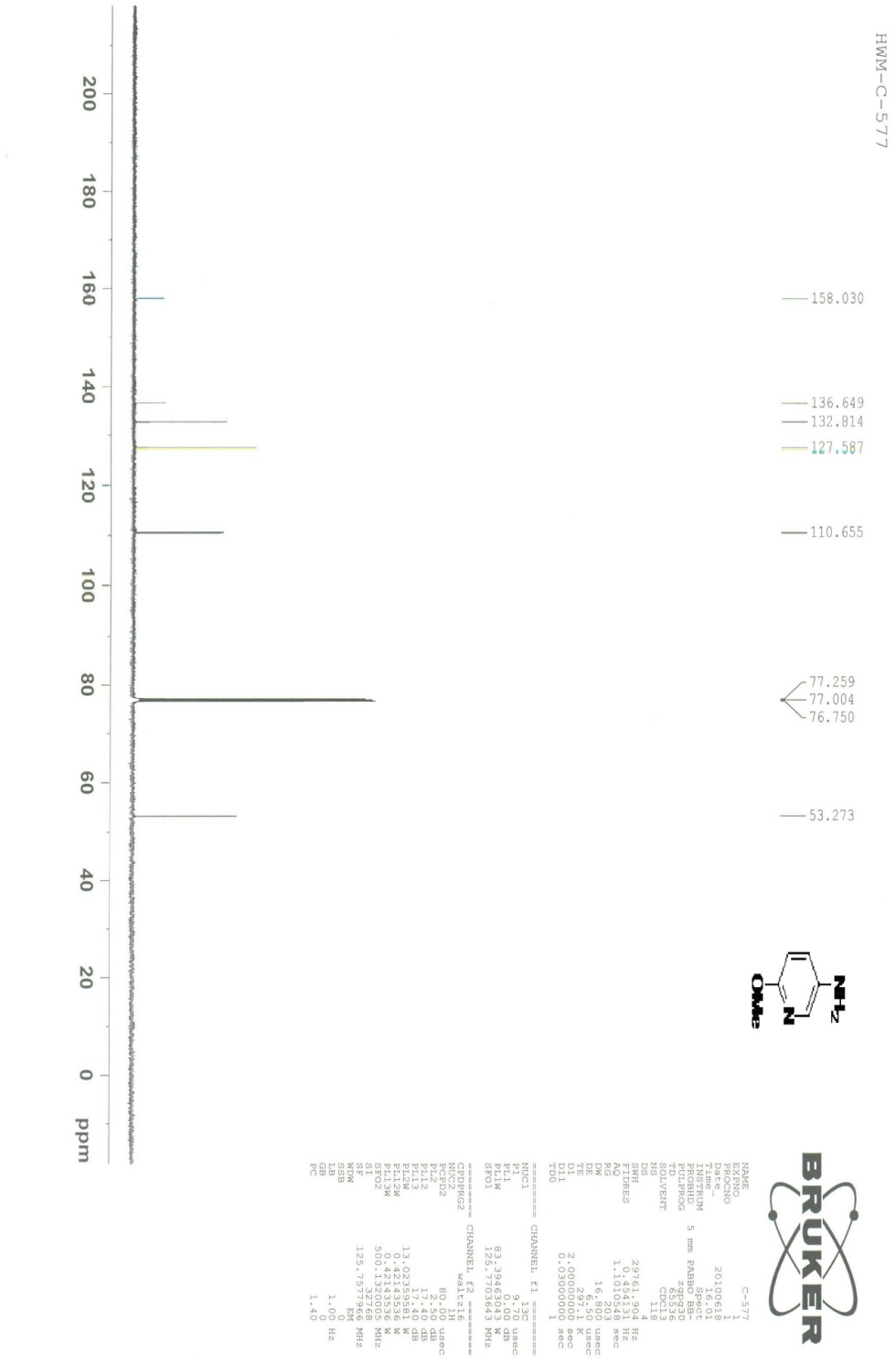


Table 3, Entry 14



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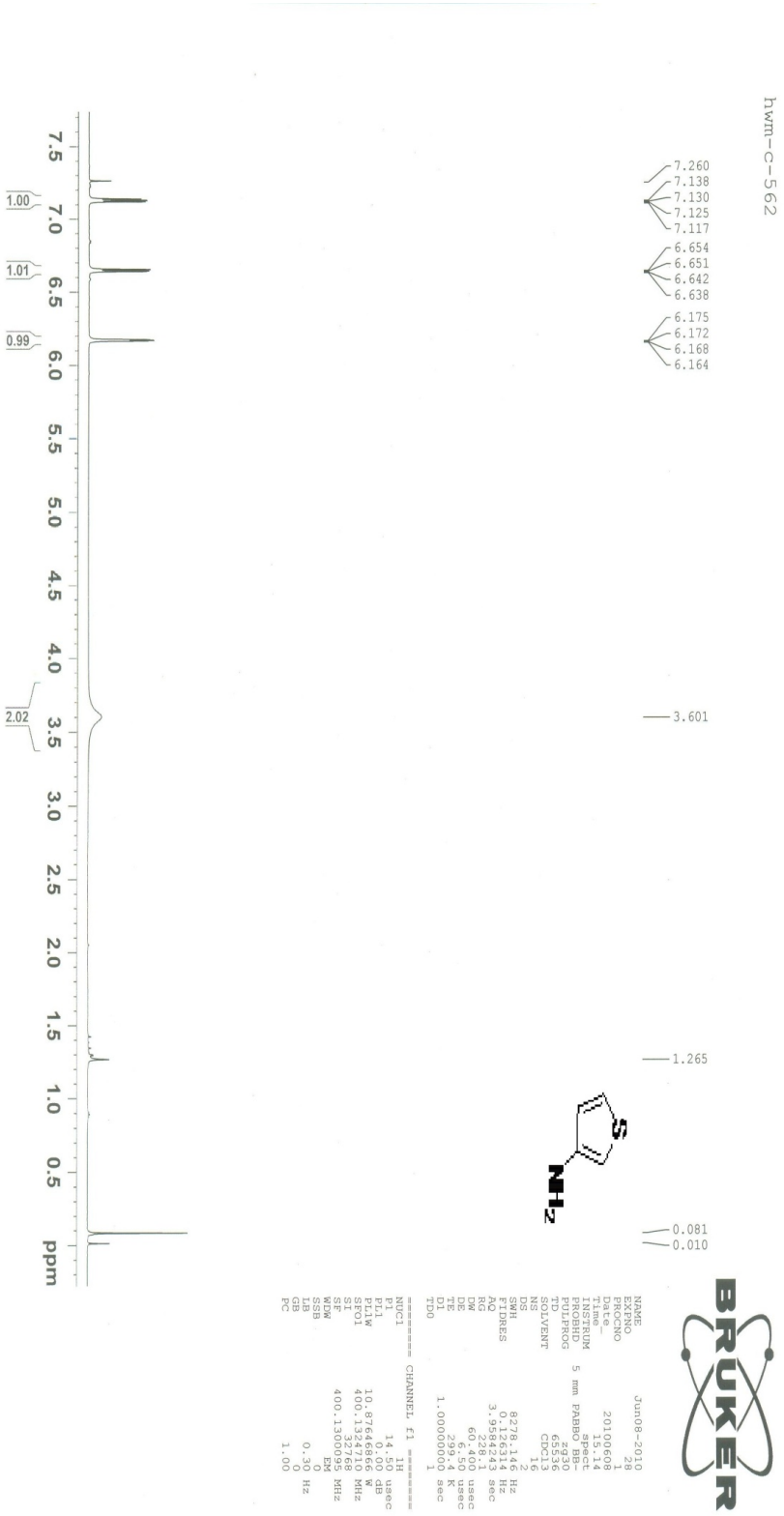

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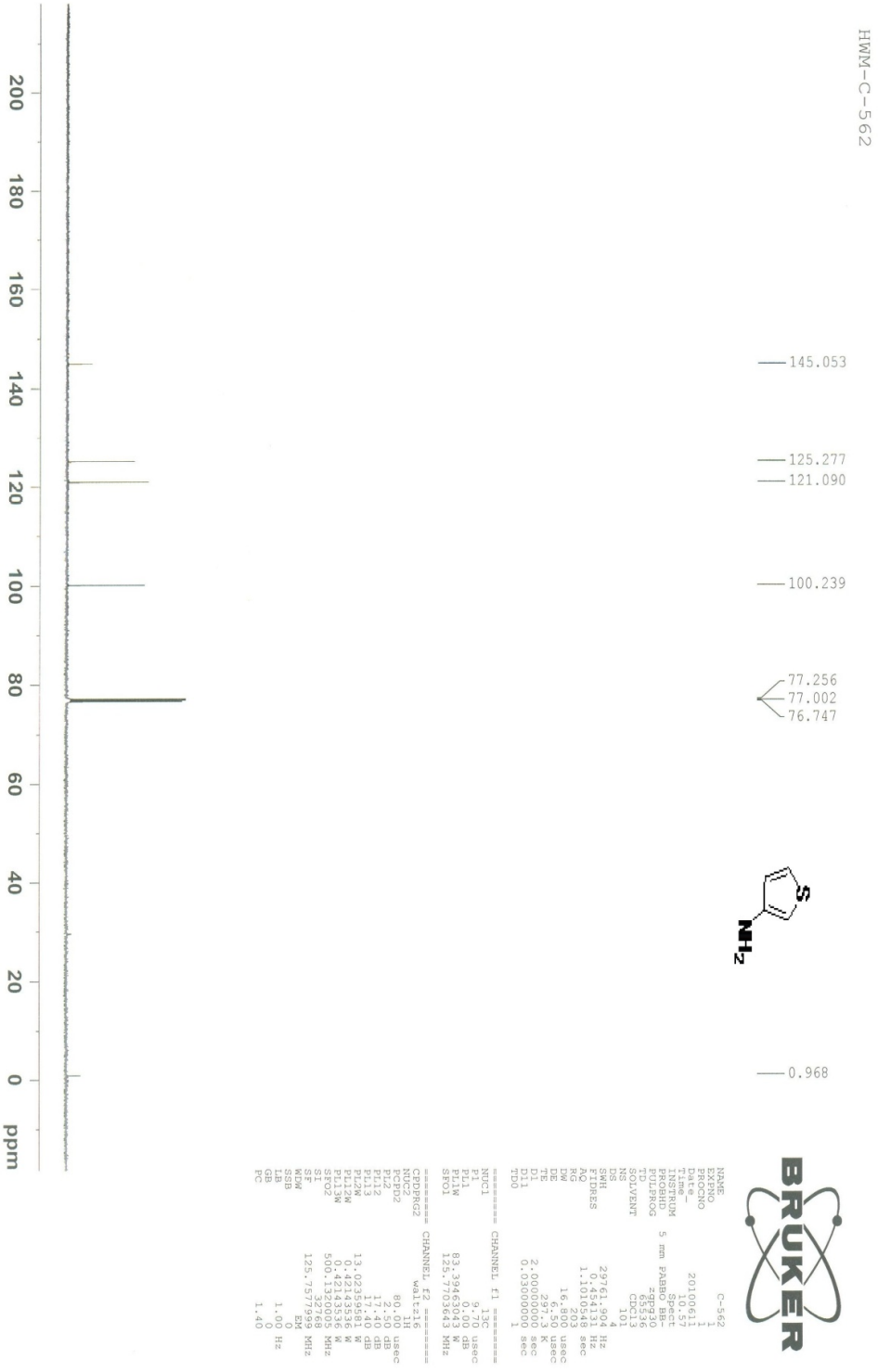

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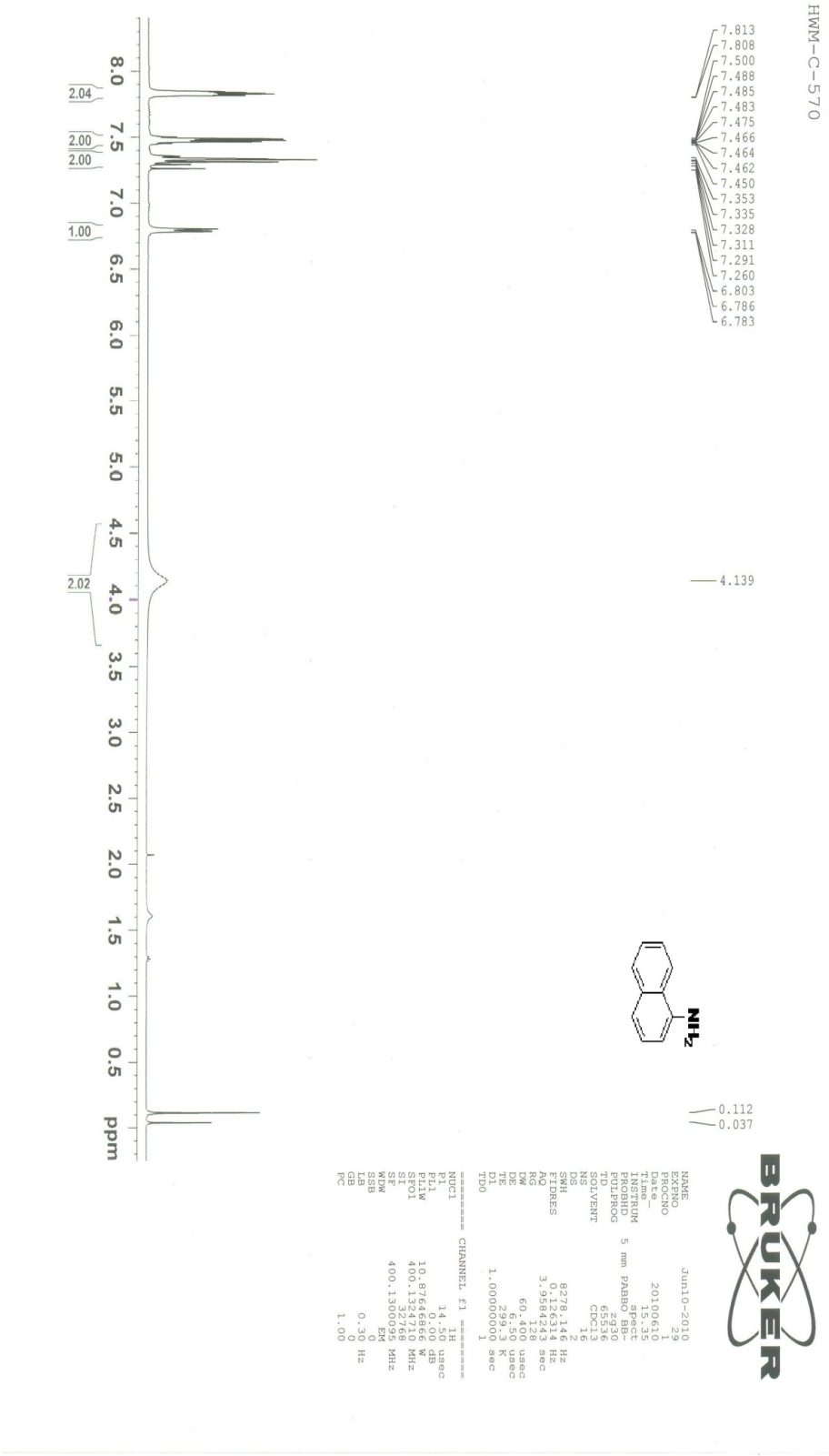

Table 3, Entry 16

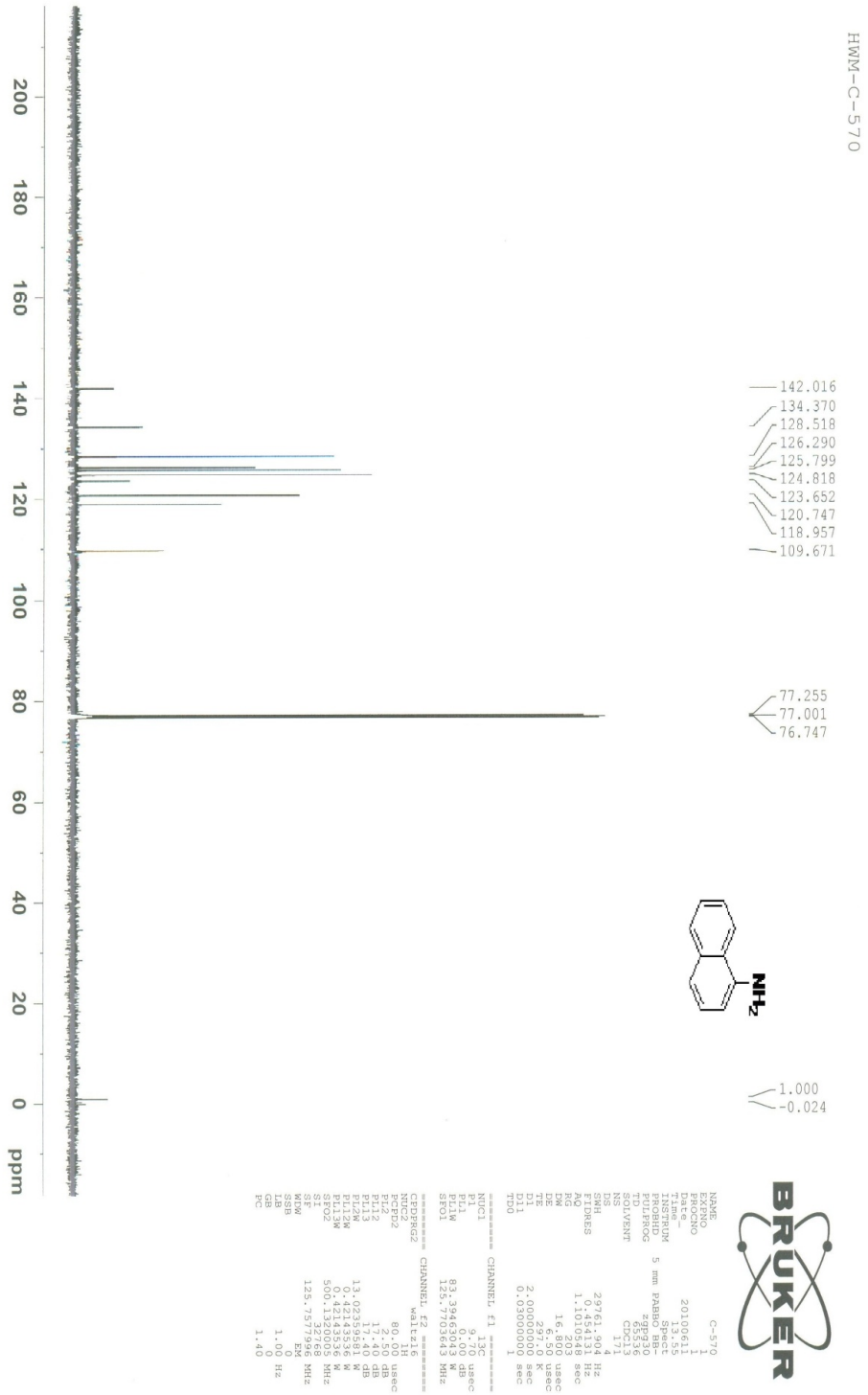

Table 3, Entry 16

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