Highly efficient one-pot four-component Kabachnik-Fields synthesis of novel α-amino phosphonates under solvent-free and catalyst-free conditions

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SUPPORTING INFORMATION

Experimental Part

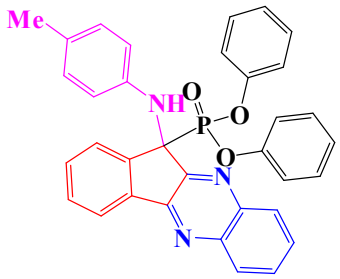
Reagents and Materials:

The chemicals used in this work were obtained from Fluka and Merck and were used without purification. Melting points were measured on an Electrothermal 9200 apparatus. IR spectra were recorded as KBr pellets on a Perkin-Elmer 781 spectrophotometer and an Impact 400 Nicolet FT-IR spectrophotometer. ^{1}H NMR and ^{13}C NMR spectra were recorded in DMSO–d_6 solvents on a Bruker DRX-400 spectrometer with tetramethylsilane as internal reference. The elemental analyses (C, H, N) were obtained from a Carlo ERBA Model EA 1108 analyzer. The purity determination of the substrates and reaction monitoring were accomplished by TLC on silica-gel polygram SILG/UV 254 plates (from Merck Company).

General procedure for synthesis of α-aminophosphonates

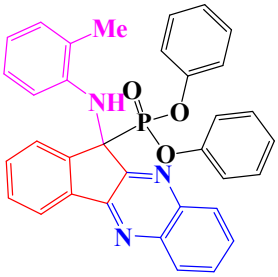
A mixture of ninhydrin **1**(1 mmol) and 1,2-phenylenediamines **2** (1 mmol) was stirred by a magnet in a test tube under solvent free conditions at room temperature for 10 min, followed by the addition of aniline derivatives (1 mmol) temperature was slowly increased until 70 °C. The reaction mixture was stirred for appropriate time, after nearly complete conversion into an intermediate presumed to be the corresponding internediate 5 (as indicated by TLC), alkyl /aryl phosphite (1 mmol) was then added to the reaction mixture which was heated at 70 °C. After completion of the reaction (as assessed by TLC), the reaction mixture was cooled to room temperature, and EtOH (5 mL) was added to the crude products and stirred for a while. The reaction mixture was filtered and the precipitate washed with EtOH to afford the pure products. The spectroscopic and analytical data for synthesized compounds are presented below.

Diphenyl 11-(*p*-tolylamino)-11*H*-indeno[1,2-*b*]quinoxalin-11-ylphosphonate (7a):



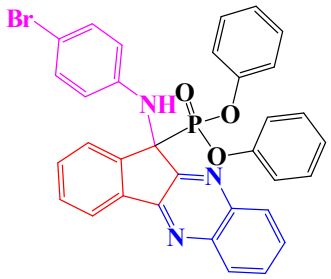
Yellow powder (Yield: 90%). mp>300°C. IR (KBr) (ν_{max}/ cm^{-1}): 3384, 1589, 1487, 1268, 1189, 930, 768. ^{1}H NMR (DMSO-d_6, 400 MHz): δ_{ppm}: 1.85 (3H, s, CH_3) 6.94 (1H, d, NH, $^{3}j_{HP}$=11.6 Hz), 6.08-8.28 (22 H, m, ArH).^{13}C NMR (DMSO-d_6, 100 MHz): δ_{ppm}: 20.2, 67.9 (1C, d, C-P, $^{1}j_{CP}$=148 Hz), 116.3, 120.6, 120.9, 123.3, 126.1, 127.8, 129.5, 129.8, 130.1, 130.3, 130.5, 131.3, 132.5, 137.6, 141.2, 142.4, 142. 8, 143.0, 143.4, 150.2, 150.5, 153.8. Anal. Calcd for $C_{35}H_{28}N_3O_3P$: C, 73.80; H, 4.95; N, 7.38%;. Found C, 73.92; H, 4.89; N, 7.47%; MS: *m/z* 569.

Diphenyl 11-(*o*-tolylamino)-11*H*-indeno[1,2-*b*]quinoxalin-11-ylphosphonate (7b):



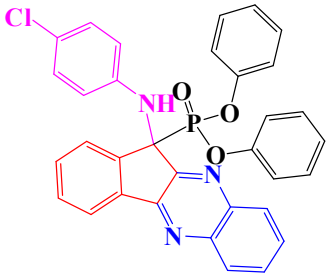
Yellow powder (Yield: 89%). mp>300°C. IR (KBr) (ν_{max}/ cm^{-1}): 3389, 1588, 1485, 1277, 1196, 927, 764. ^{1}H NMR (DMSO-d_6, 400 MHz): δ_{ppm}: 2.25 (3H, s, CH_3) 6.99 (1H, d, NH, $^{3}j_{HP}$=8 Hz), 6.39-8.32 (22 H, m, ArH). ^{13}C NMR (DMSO-d_6, 100 MHz): δ_{ppm}: 17.8, 67.1 (1C, d, C-P, $^{1}j_{CP}$=142 Hz), 113.8, 119.9, 120.3, 120.4, 120.7, 120.8, 123.4, 125.9, 126.1, 126.2, 126.7, 127.4, 129.5, 129.9, 130.3, 130.4, 130.6, 130.9, 131.5, 131.9, 132.7, 142.5, 150.3, 150.6. Anal. Calcd for $C_{34}H_{26}N_3O_3P$: C, 73.50; H, 4.72; N, 7.56%;. Found C, 73.37; H, 4.77; N, 7.62%; MS: *m/z* 555.

Diphenyl 11-(4-bromophenylamino)-11*H*-indeno[1,2-*b*]quinoxalin-11-ylphosphonate (7c):



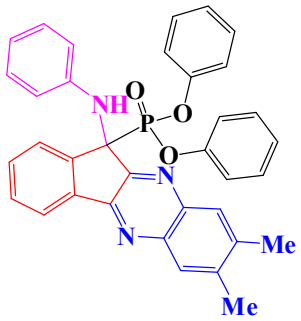
Cream powder (Yield: 93%). mp>300°C. IR (KBr) (ν_{max}/ cm^{-1}): 3335, 1589, 1487, 1265, 1205, 955, 761. ^{1}H NMR (DMSO-d_6, 400 MHz): δ_{ppm}: 6.20 (1H, d, NH, $^3J_{HP=}$ 12 Hz), 6.13-8.30 (22H, m, ArH). Anal. Calcd for $C_{33}H_{23}BrN_3O_3P$: C, 63.88; H, 3.74; N, 6.77%;. Found C, 63.75; H, 3.67; N, 6.85%; MS: *m/z* 619.

Diphenyl 11-(4-chlorophenylamino)-11*H*-indeno[1,2-b]quinoxalin-11-ylphosphonate (7d):



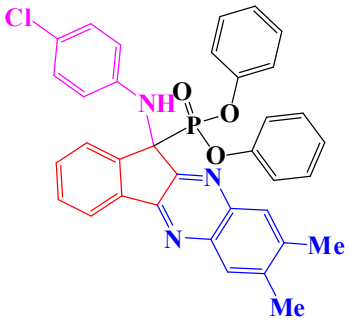
Yellow powder (Yield: 84%). mp>300°C. IR (KBr) (ν_{max}/ cm^{-1}): 3293, 1591, 1490, 1251, 1205, 955, 759. ^{1}H NMR (DMSO-d_6, 400 MHz): δ_{ppm}: 7.50 (1H, d, NH, $^3J_{HP=}$ 12 Hz), 6.16-8.30 (22H, m, ArH). ^{13}C NMR (DMSO-d_6, 100 MHz): δ_{ppm}: 67.8 (1C, d, C-P, ^{1} j $_{CP}$=147 Hz), 117.0, 120.5, 120.9, 123.4, 126.1, 127.4, 129.5, 129.8, 130.4, 130.6, 131.4, 132.6, 137.7, 141.2, 142.5, 142.9, 144.3, 144.5, 150.2, 150.5, 153.6, 159.9. Anal. Calcd for $C_{33}H_{23}ClN_3O_3P$: C, 68.81; H, 4.02; N, 7.30%;. Found C, 68.94; H, 4.09; N, 7.22%; MS: *m/z* 575.

Diphenyl 7,8-dimethyl-11-(phenylamino)-11*H*-indeno[1,2-*b*]quinoxalin-11-ylphosphonate (7e):



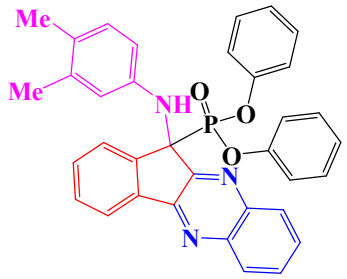
Yellow powder (Yield: 86%). mp>300°C. IR (KBr) (ν_{max}/ cm^{-1}): 3428, 1591, 1489, 1271, 1205, 945, 767. ^{1}H NMR (DMSO-d_6, 400 MHz): δ_{ppm}: 7.07 (1H, d, NH, $^3J_{HP=}$ 7 Hz), 6.14-8.24 (20H, m, ArH). ^{13}C NMR (DMSO-d_6, 100 MHz): δ_{ppm}: 20.1, 20.3, 67.8 (1C, d, C-P, ^{1} j $_{CP}$=148 Hz), 116.6, 120.6, 121.0, 122.9, 125.8, 126.0, 127.4, 127.7, 128.9, 129.4, 130.1, 130.3, 131.0, 132.0, 138.0, 140.1, 141.2, 141.6, 142.9, 143.1, 150.4, 152.9, 157.3. Anal. Calcd for $C_{35}H_{28}N_3O_3P$: C, 73.80; H, 4.95; N, 7.38%;. Found C, 73.71; H, 4.87; N, 7.31%; MS: *m/z* 569.

Diphenyl 11-(4-chlorophenylamino)-7,8-dimethyl-11*H*-indeno[1,2-*b*]quinoxalin-11-ylphosphonate (7f):



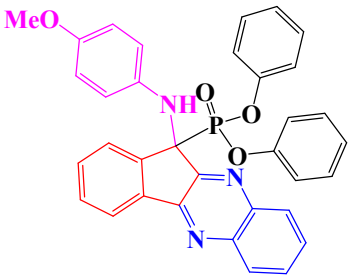
Yellow powder (Yield: 82%). mp>300°C. IR (KBr) (ν_{max}/ cm^{-1}): 3423, 1592, 1490, 1270, 1207, 949, 763. ^{1}H NMR (DMSO-d_6, 400 MHz): δ_{ppm}: 2.44 (3H, s, CH_3), 2.48 (3H, s, CH_3), 7.42 (1H, d, NH, $^3J_{HP=}$ 11 Hz), 6.14-8.24 (20H, m, ArH). Anal. Calcd for $C_{35}H_{27}ClN_3O_3P$: C, 69.59; H, 4.51; N, 6.96%;. Found C, 69.47; H, 4.56; N, 7.01%; MS: *m/z* 603.

Diphenyl (11-((3,4-dimethylphenyl)amino)-11H-indeno[1,2-b]quinoxalin-11-yl)phosphonate (7g):



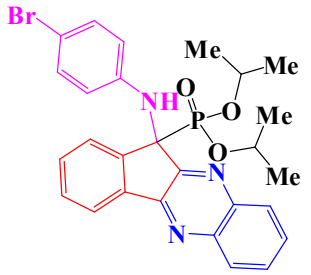
Yellow powder (Yield: 89%). mp>300°C. IR (KBr) (ν_{max}/ cm^{-1}): 3427, 1587, 1493, 1273, 1210, 953, 758. ^{1}H NMR (DMSO-d_6, 400 MHz): δ_{ppm}: 1.83 (3H, s, CH_3), 1.85 (3H, s, CH_3), 6.44 (1H, d, NH, $^3J_{HP=}$ 12 Hz), 5.64-7.96 (21H, m, ArH). Anal. Calcd for $C_{35}H_{28}N_3O_3P$: C, 73.80; H, 4.96; N, 7.38%;. Found C, 73.71; H, 4.88; N, 7.44%; MS: *m/z* 569.

Diphenyl (11-((4-methoxyphenyl)amino)-11H-indeno[1,2-b]quinoxalin-11-yl)phosphonate (7h):



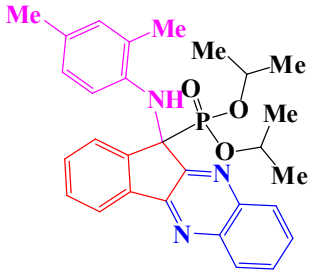
Yellow powder (Yield: 85%). mp>300°C. IR (KBr) (ν_{max}/ cm^{-1}): 3429, 1588, 1485, 1270, 1210, 953, 766. ^{1}H NMR (DMSO-d_6, 400 MHz): δ_{ppm}: 3.43 (3H, s, OCH_3), 6.40 (1H, d, NH, $^3J_{HP=}$ 12 Hz), 6.20-7.94 (21H, m, ArH). Anal. Calcd for $C_{37}H_{26}N_3O_4P$: C, 71.45; H, 4.59; N, 7.35%;. Found C, 71.37; H, 4.53; N, 7.43%; MS: *m/z* 571.

Diisopropyl 11-(4-bromophenylamino)-11*H*-indeno[1,2-*b*]quinoxalin-11-ylphosphonate (7i):



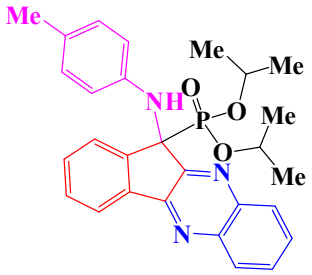
Yellow powder (Yield: 83%). mp>300°C. IR (KBr) (ν_{max}/ cm^{-1}): 3294, 1592, 1490, 1240, 1008, 757. ^1H NMR (DMSO-d_6, 400 MHz): δ_{ppm}: ^1H NMR (DMSO-d_6, 400 MHz): δ_{ppm}: 1.04 (3H, d, CH_3), 1.05 (3H, d, CH_3), 1.14 (3H, d, CH_3), 1.16 (3H, d, CH_3), 1.88 (3H, s, CH_3), 2.29 (3H, s, CH_3), 4.38 (1H, m, OCH), 4.53 (1H, m, OCH), 6.75 (1H, d, NH, $^3J_{HP=}$ 12 Hz), 6.01-8.23 (12H, m, ArH). Anal. Calcd for $C_{27}H_{27}BrN_3O_3P$: C, 58.71; H, 4.93; N, 7.61%;. Found C, 58.84; H, 4.99; N, 7.54%; MS: *m/z* 551.

Diisopropyl 11-(2,4-dimethylphenylamino)-11*H*-indeno[1,2-*b*]quinoxalin-11-ylphosphonate (7j):



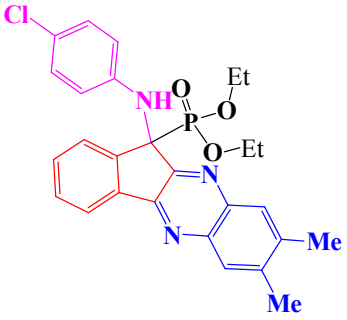
Yellow powder (Yield: 85%). mp>300°C. IR (KBr) (ν_{max}/ cm^{-1}): 3421, 1511, 1251, 1002, 759. ^1H NMR (DMSO-d_6, 400 MHz): δ_{ppm}: 1.03 (3H, d, CH_3), 1.10 (3H, d, CH_3), 1.13 (3H, d, CH_3), 1.19 (3H, d, CH_3), 1.88 (3H, s, CH_3), 2.29 (3H, s, CH_3), 4.38 (1H, m, OCH), 4.55 (1H, m, OCH), 5.18 (1H, d, NH, $^3J_{HP=}$ 12 Hz), 4.98-8.24 (11H, m, ArH). Anal. Calcd for $C_{29}H_{32}N_3O_3P$: C, 69.45; H, 6.43; N, 8.38%;. Found C, 69.32; H, 6.50; N, 8.46%; MS: *m/z* 501.

Diisopropyl 11-(p-tolylamino)-11*H*-indeno[1,2-*b*]quinoxalin-11-ylphosphonate (7k):



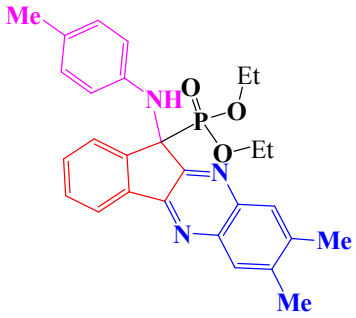
Yellow powder (Yield: 92%). mp>300°C. IR (KBr) (ν_{max}/ cm^{-1}): 3308, 1614, 1516, 1238, 1101, 1005, 758. . ^{1}H NMR (DMSO-d_6, 400 MHz): δ_{ppm}: 1.17 (9H, m, $3CH_3$), 1.20 (3H, s, CH_3), 3.33 (3H, s, CH_3), 3.33 (1H, m, OCH), 4.56 (1H, m, OCH), 5.96 (1H, d, NH, $^{3}J_{HP=}$ 10.8 Hz), 5.10-8.24 (12H, m, ArH). ^{13}C NMR (DMSO-d_6, 100 MHz): δ_{ppm}: 16.5, 55.3, 64.3, 64.7, 67.1 (1C, d, C-P, ^{1} j $_{CP}$=143 Hz), 114.3, 117.6, 122.9, 127.1, 129.4, 129.8, 130.2, 130.5, 130.9, 132.1, 137.4, 139.2, 141.2, 142.2, 144.7, 152.7, 153.8, 159.7.Anal. Calcd for $C_{28}H_{30}N_3O_3P$: C, 68.98; H, 6.20; N, 8.62%;. Found C, 68.86; H, 6.25; N, 8.71%; MS: *m/z* 487.

Diethyl 11-(4-chlorophenylamino)-7,8-dimethyl-11*H*-indeno[1,2-*b*]quinoxalin-11-ylphosphonate (7l):



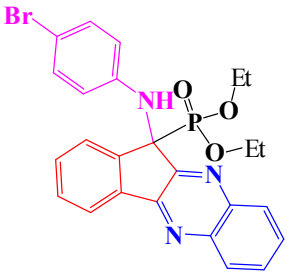
Orange powder (Yield: 80%). mp>300°C. IR (KBr) (ν_{max}/ cm^{-1}): 3427, 1602, 1494, 1233, 1025, 752. ^{1}H NMR (DMSO-d_6, 400 MHz): δ_{ppm}: 0.99 (3H, t, CH_3), 1.08 (3H, t, CH_3), 2.43 (3H, s, CH_3), 2.47 (3H, s, CH_3), 3.83 (2H, q, OCH_2), 3.98 (2H, q, OCH_2), 6.80 (1H, d, NH, $^{3}J_{HP=}$ 12 Hz), 6.03-7.95 (10H, m, ArH). Anal. Calcd for $C_{27}H_{27}ClN_3O_3P$: C, 63.84; H, 5.36; N, 8.27%;. Found C, 63.70; H, 5.41; N, 8.18%; MS: *m/z* 508.

Diethyl 7,8-dimethyl-11-(*p*-tolylamino)-11*H*-indeno[1,2-*b*]quinoxalin-11-ylphosphonate (7m):



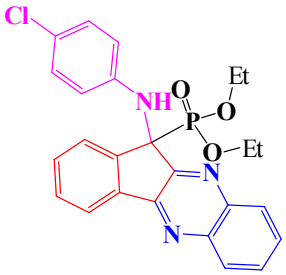
Yellow powder (Yield: 86%). mp>300°C. IR (KBr) (ν_{max}/ cm^{-1}): 3431, 1618, 1520, 1236, 1025. . ^{1}H NMR (DMSO-d_6, 400 MHz): δ_{ppm}: 1.00 (3H, t, CH_3), 1.09 (3H, t, CH_3), 2.44 (3H, s, CH_3), 2.48 (3H, s, CH_3), 3.83 (2H, q, OCH_2), 3.98 (2H, q, OCH_2), 6.21 (1H, d, NH, $^3J_{HP=}$ 11.2 Hz), 5.94-8.16 (10H, m, ArH). Anal. Calcd for $C_{28}H_{30}N_3O_3P$: C, 68.98; H, 6.20; N, 8.62%;. Found C, 69.11; H, 6.13; N, 8.71%; MS: *m/z* 487.

Diethyl 11-(4-bromophenylamino)-11*H*-indeno[1,2-*b*]quinoxalin-11-ylphosphonate (7n):



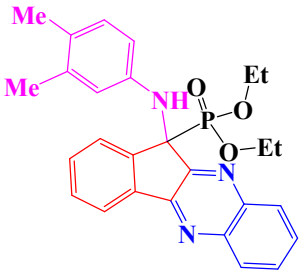
Orange powder (Yield: 83%). mp>300°C. IR (KBr) (ν_{max}/ cm^{-1}): 3279, 1593, 1490, 1238, 1034, 756. ^{1}H NMR (DMSO-d_6, 400 MHz): δ_{ppm}: 0.98 (3H, t, CH_3), 1.09 (3H, t, CH_3), 3.77 (2H, q, OCH_2), 4.00 (2H, q, OCH_2), 6.94 (1H, d, NH, $^3J_{HP=}$ 10.4 Hz), 6.00-8.24 (12H, m, ArH). Anal. Calcd for $C_{25}H_{23}BrN_3O_3P$: C, 57.27; H, 4.42; N, 8.01%;. Found C, 57.20; H, 4.46; N, 8.09%; MS: *m/z* 524.

Diethyl 11-(4-chlorophenylamino)-11*H*-indeno[1,2-*b*]quinoxalin-11-ylphosphonate (7o):



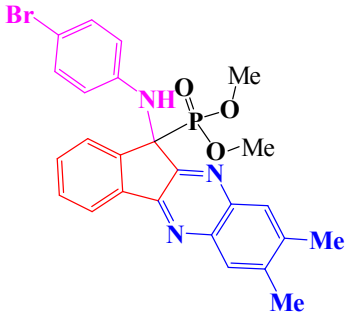
Cream powder (Yield: 87%). mp>300°C. IR (KBr) (ν_{max}/ cm^{-1}): 3410, 1591, 1493, 1256, 1009, 757. ^1H NMR (DMSO-d_6, 400 MHz): δ_{ppm}: 1.09 (3H, t, CH_3), 1.11 (3H, t, CH_3), 4.01 (2H, q, OCH_2), 4.02 (2H, q, OCH_2), 6.93 (1H, d, NH, $^3J_{HP=}$ 12 Hz), 6.04-8.25 (12H, m, ArH). Anal. Calcd for $C_{25}H_{23}ClN_3O_3P$: C, 62.57; H, 4.83; N, 8.76%;. Found C, 62.41; H, 4.77; N, 8.85%; MS: *m/z* 479.

Diethyl (11-((3,4-dimethylphenyl)amino)-11H-indeno[1,2-b]quinoxalin-11-yl)phosphonate (7p):



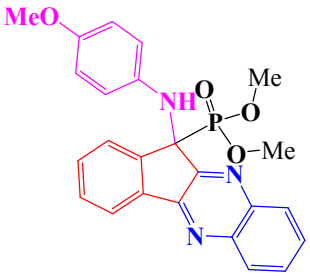
Yellow powder (Yield: 89%). mp>300°C. IR (KBr) (ν_{max}/ cm^{-1}): 3415, 1585, 1487, 1250, 1020, 757. ^1H NMR (DMSO-d_6, 400 MHz): δ_{ppm}: 1.04 (3H, t, CH_3), 1.10 (3H, t, CH_3), 1.80 (3H, s, CH_3), 1.82 (3H, s, CH_3), 3.60 (2H, q, OCH_2), 4.03 (2H, q, OCH_2), 6.38 (1H, d, NH, $^3J_{HP=}$ 12 Hz), 5.49-8.25 (11H, m, ArH). Anal. Calcd for $C_{27}H_{28}N_3O_3P$: C, 68.49; H, 5.96; N, 8.87%;. Found C, 68.41; H, 5.88; N, 8.79%; MS: *m/z* 573.

Dimethyl 11-(4-bromophenylamino)-7,8-dimethyl-11*H*-indeno[1,2-*b*]quinoxalin-11-ylphosphonate (7q):



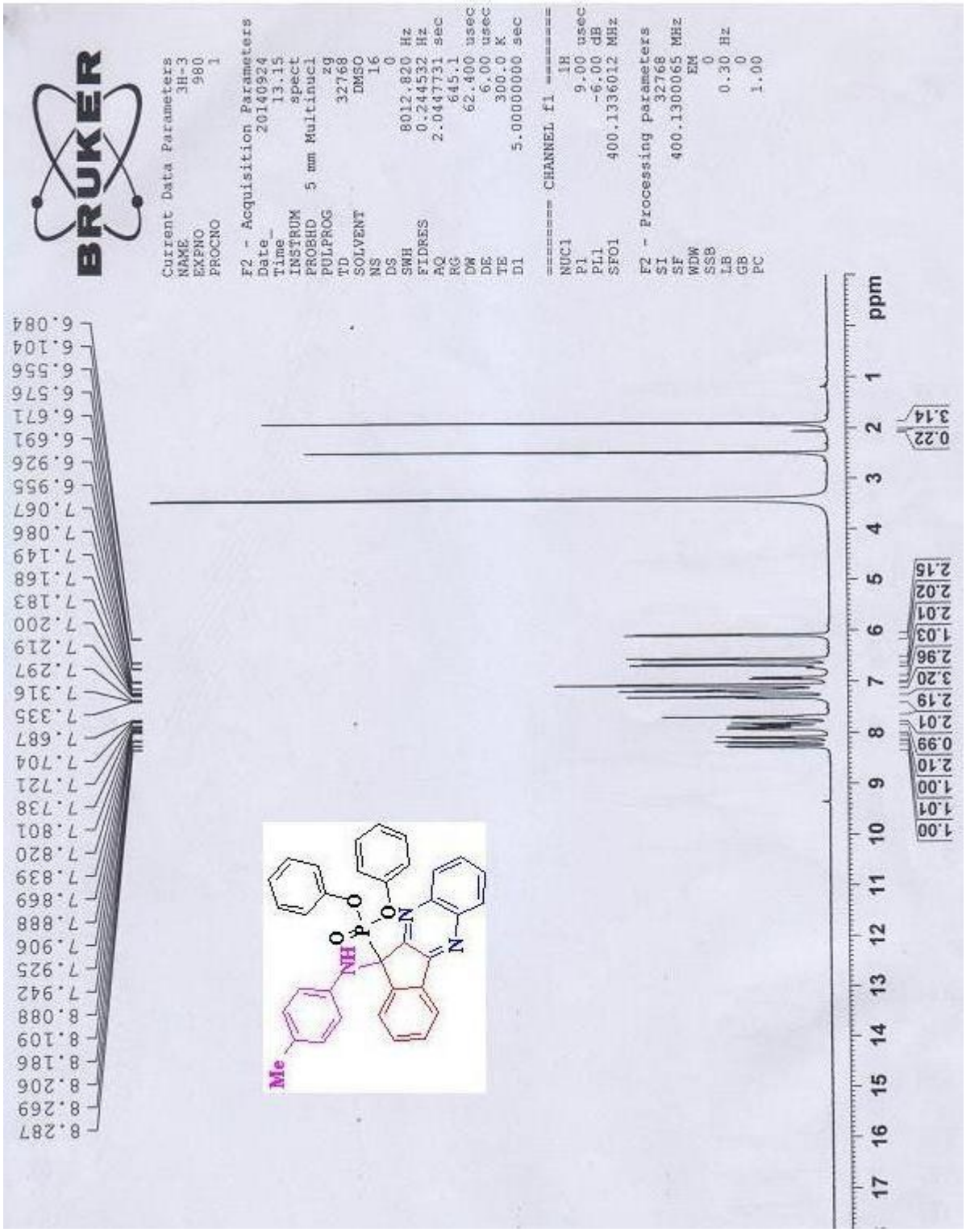
Pale yellow powder (Yield: 92%). mp>300°C. IR (KBr) (ν_{max}/ cm^{-1}): 3283, 1549, 1492, 1242, 1038, 767. ^{1}H NMR (DMSO-d_6, 400 MHz): δ_{ppm}: 2.47 (3H, s, CH_3), 2.48 (3H, s, CH_3), 3.51 (3H, d, OCH_3), 3.64 (3H, d, OCH_3), 6.94 (1H, d, NH, $^3J_{HP=}$ 12 Hz), 5.97-8.20 (10H, m, ArH). Anal. Calcd for $C_{25}H_{23}BrN_3O_3P$: C, 57.27; H, 4.42; N, 8.01%;. Found C, 57.38; H, 4.47; N, 8.10%; MS: *m/z* 524.

Dimethyl (11-((4-methoxyphenyl)amino)-11H-indeno[1,2-b]quinoxalin-11-yl)phosphonate (7r):

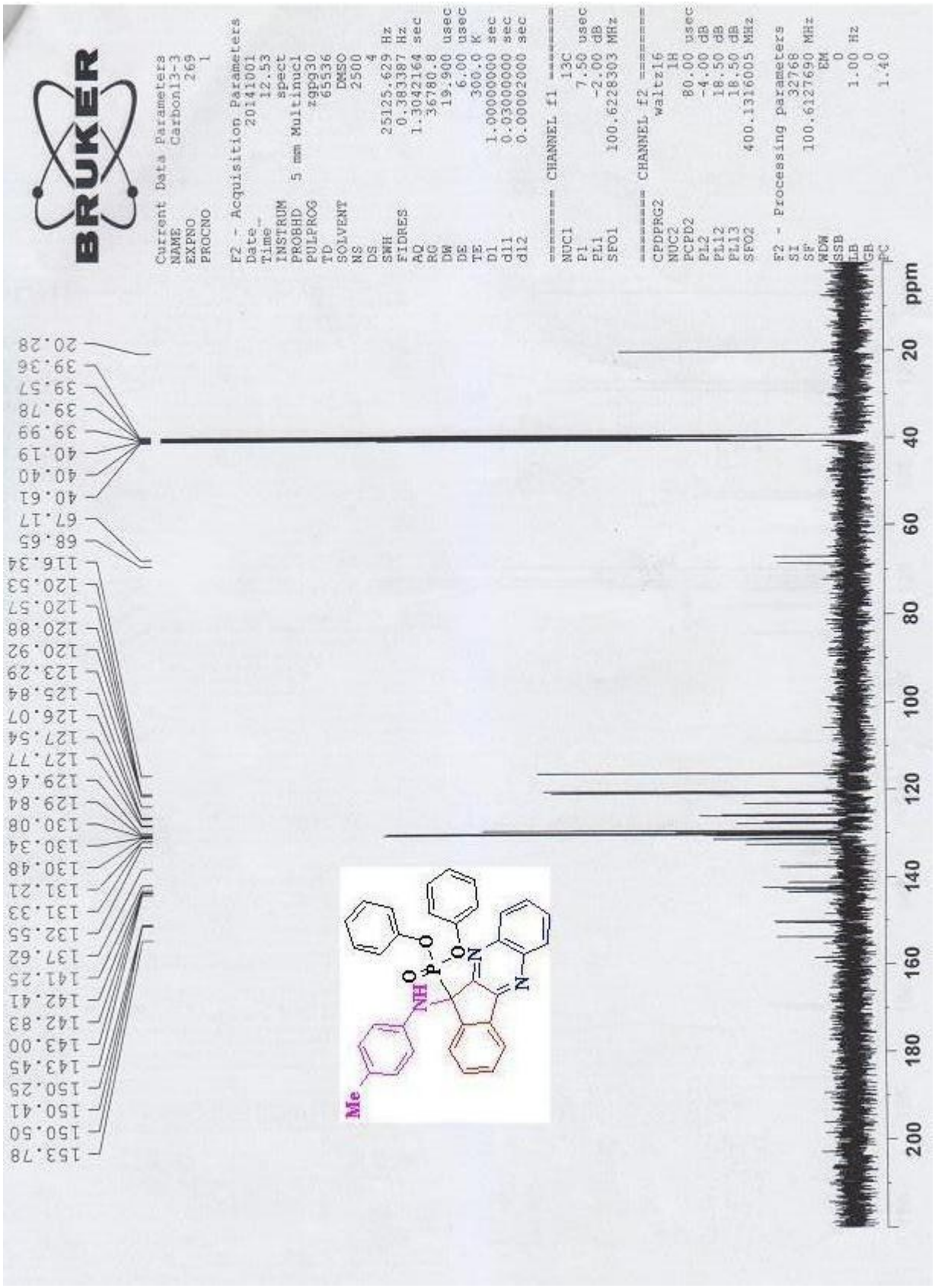


Yellow powder (Yield: 92%). mp>300°C. IR (KBr) (ν_{max}/ cm^{-1}): 3278, 1540, 1485, 1252, 1020, 763. ^{1}H NMR (DMSO-d_6, 400 MHz): δ_{ppm}: 3.41 (3H, s, OCH_3), 3.53 (3H, d, OCH_3), 3.68 (3H, d, OCH_3), 6.23 (1H, d, NH, $^3J_{HP=}$ 12 Hz), 6.04-8.21 (12H, m, ArH). Anal. Calcd for $C_{24}H_{22}N_3O_4P$: C, 64.43; H, 4.96; N, 9.39%;. Found C, 64.35; H, 4.84; N, 9.30%; MS: *m/z* 447.

^{1}H and ^{13}C NMR spectrums



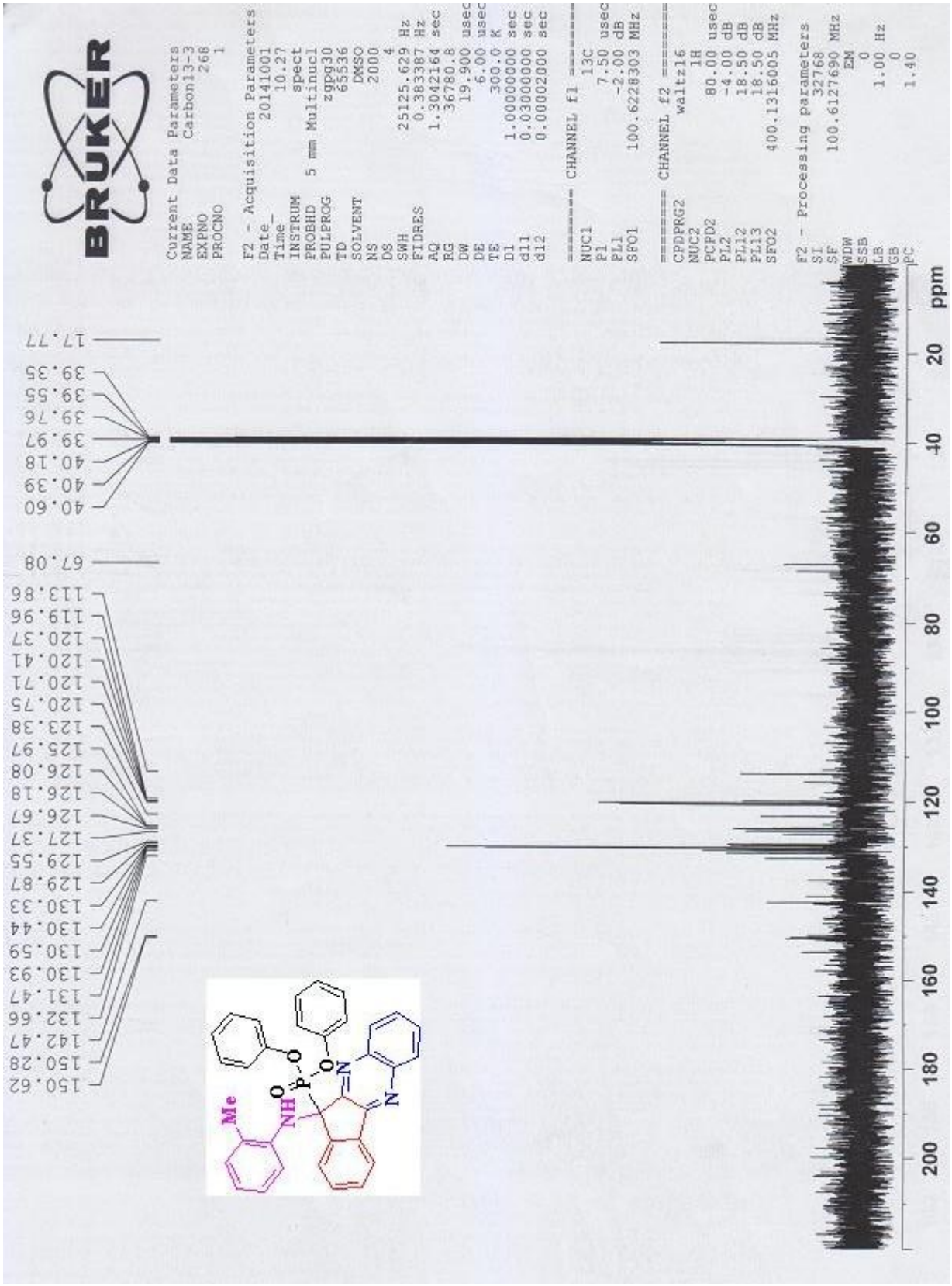
^{1}H NMR of 7a


BRUKER
Current Data Parameters
NAME Carbon13-3
EXPNO 269
PROCNO 1
F2 - Acquisition Parameters
Date_ 20141001
Time_ 12.53
INSTRUM spect
PROBHD 5 mm Multinucl
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 2500
DS 4
SWH 25125.629 Hz
FIDRES 0.383387 Hz
AQ 1.30042164 sec
RG 36780.8
DW 19.900 usec
DE 6.00 usec
TE 300.0 K
D1 1.00000000 sec
d11 0.03000000 sec
d12 0.00002000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 7.50 usec
PL1 -2.00 dB
SFO1 100.6228303 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 18.50 dB
PL13 18.50 dB
SFO2 400.1316005 MHz
F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
20.28
39.36
39.57
39.78
39.99
40.19
40.40
40.61
67.17
68.65
116.34
120.53
120.57
120.88
120.92
123.29
125.84
126.07
127.54
127.77
129.46
129.84
130.08
130.34
130.48
131.21
131.33
132.55
137.62
141.25
142.41
142.83
143.00
143.45
150.25
150.41
150.50
153.78
200
180
160
140
120
100
80
60
40
20
ppm
Me
NH
O
P
O
N
N

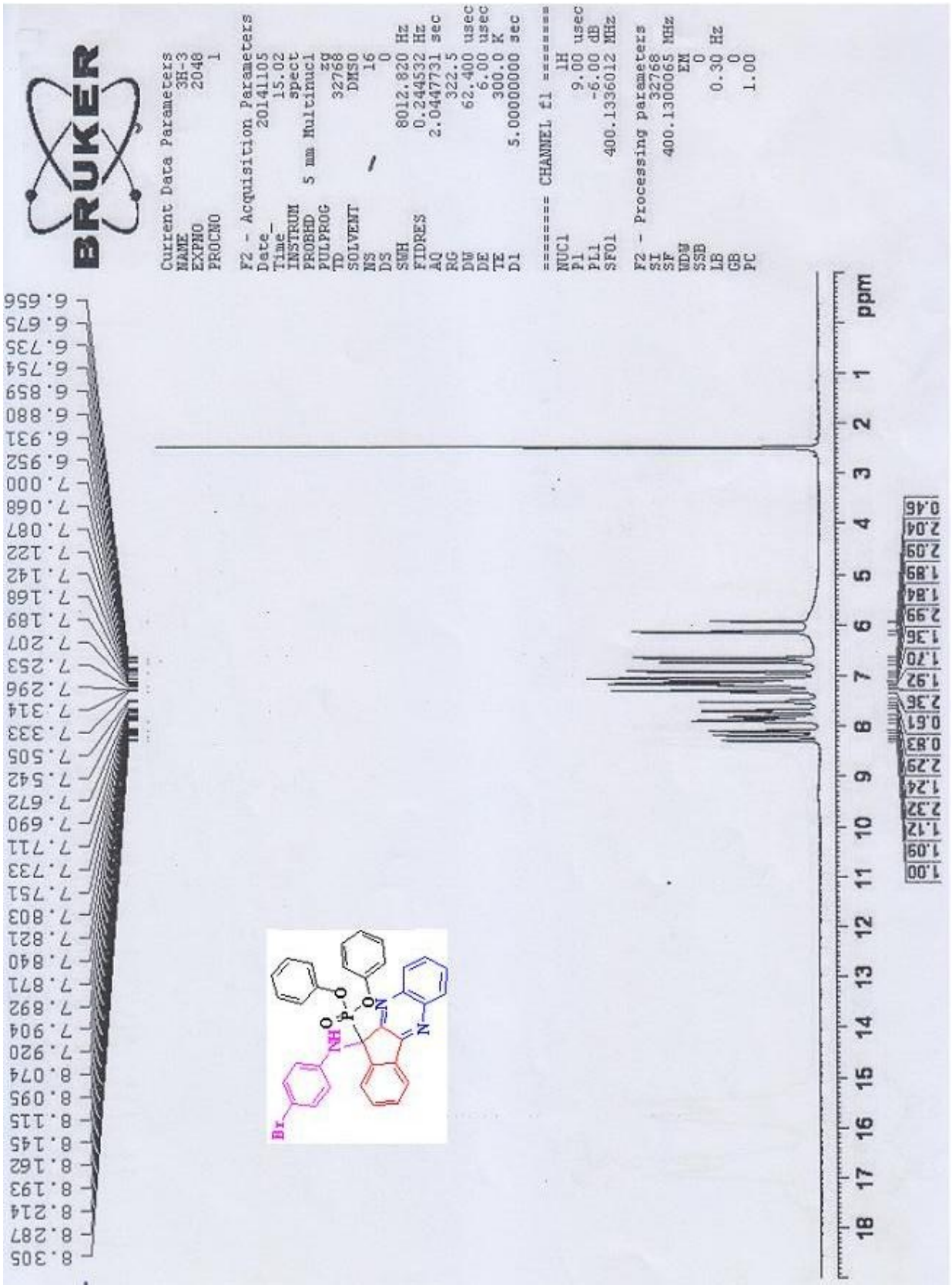
^{13}C NMR of 7a


BRUKER
Current Data Parameters
NAME 3H-3
EXPNO 995
PROCNO 1
F2 - Acquisition Parameters
Date_ 20140928
Time 8.08
INSTRUM spect
PROBHD 5 mm Multinucl
PULPROG zg
TD 32768
SOLVENT DMSO
NS 16
DS 0
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 2.0447731 sec
RG 724.1
DW 62.400 usec
DE 6.00 usec
TE 300.0 K
D1 5.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 9.00 usec
PL1 -6.00 dB
SFO1 400.1336012 MHz
F2 - Processing parameters
SI 32768
SF 400.1300065 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
ppm
Me
NH
O
P
N
N
2.44

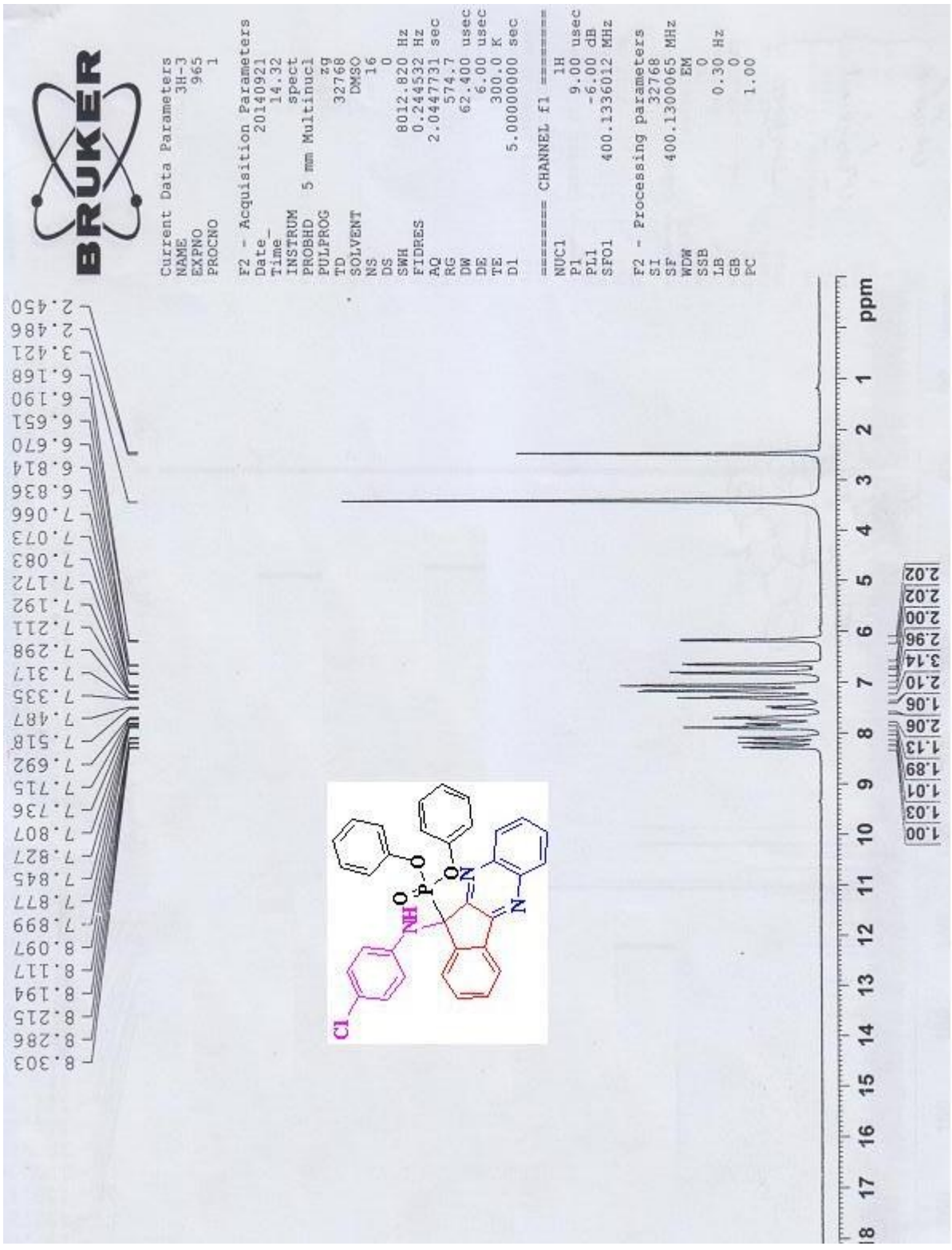
[1]H NMR of 7b


BRUKER
Current Data Parameters
NAME Carbon13-3
EXPNO 266
PROCNO 1
F2 - Acquisition Parameters
Date_ 20141001
Time_ 10.27
INSTRUM spect
PROBHD 5 mm Multinucl
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 2000
DS 4
SWH 25125.629 Hz
FIDRES 0.383387 Hz
AQ 1.3042164 sec
RG 36780.8
DW 19.900 usec
DE 6.00 usec
TE 300.0 K
D1 1.00000000 sec
d11 0.03000000 sec
d12 0.00002000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 7.50 usec
PL1 -2.00 dB
SFO1 100.6228303 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 18.50 dB
PL13 18.50 dB
SFO2 400.1316005 MHz
F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
17.77
39.35
39.55
39.76
39.97
40.18
40.39
40.60
67.08
113.86
119.96
120.37
120.41
120.71
120.75
123.38
125.97
126.08
126.18
126.67
127.37
129.55
129.87
130.33
130.44
130.59
130.93
131.47
132.66
142.47
150.28
150.62
Me
NH
O
P
O
O
N
N
200
180
160
140
120
100
80
60
40
20
ppm

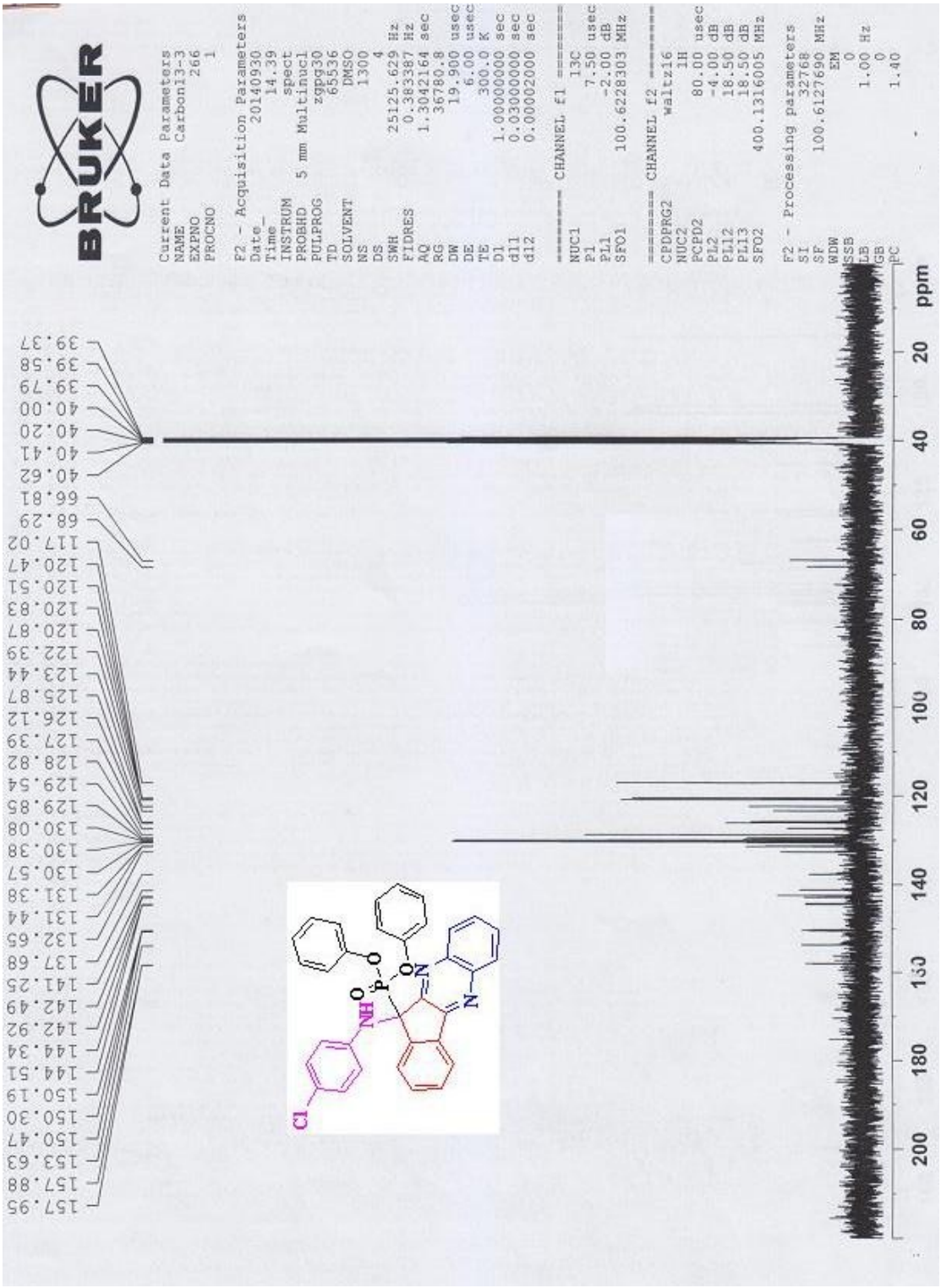
^{13}C NMR of 7b


BRUKER
Current Data Parameters
NAME 3H-3
EXPNO 2048
PROCNO 1
F2 - Acquisition Parameters
Date_ 20141105
Time_ 15.02
INSTRUM spect
PROBHD 5 mm Multinucl
PULPROG zg
TD 32768
SOLVENT DMSO
NS 16
DS 0
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 2.0447731 sec
RG 322.5
DW 62.400 usec
DE 6.00 usec
TE 300.0 K
D1 5.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 9.00 usec
PL1 -6.00 dB
SFO1 400.1336012 MHz
F2 - Processing parameters
SI 32768
SF 400.1300065 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
ppm
Br
NH
O
P
O
N
N

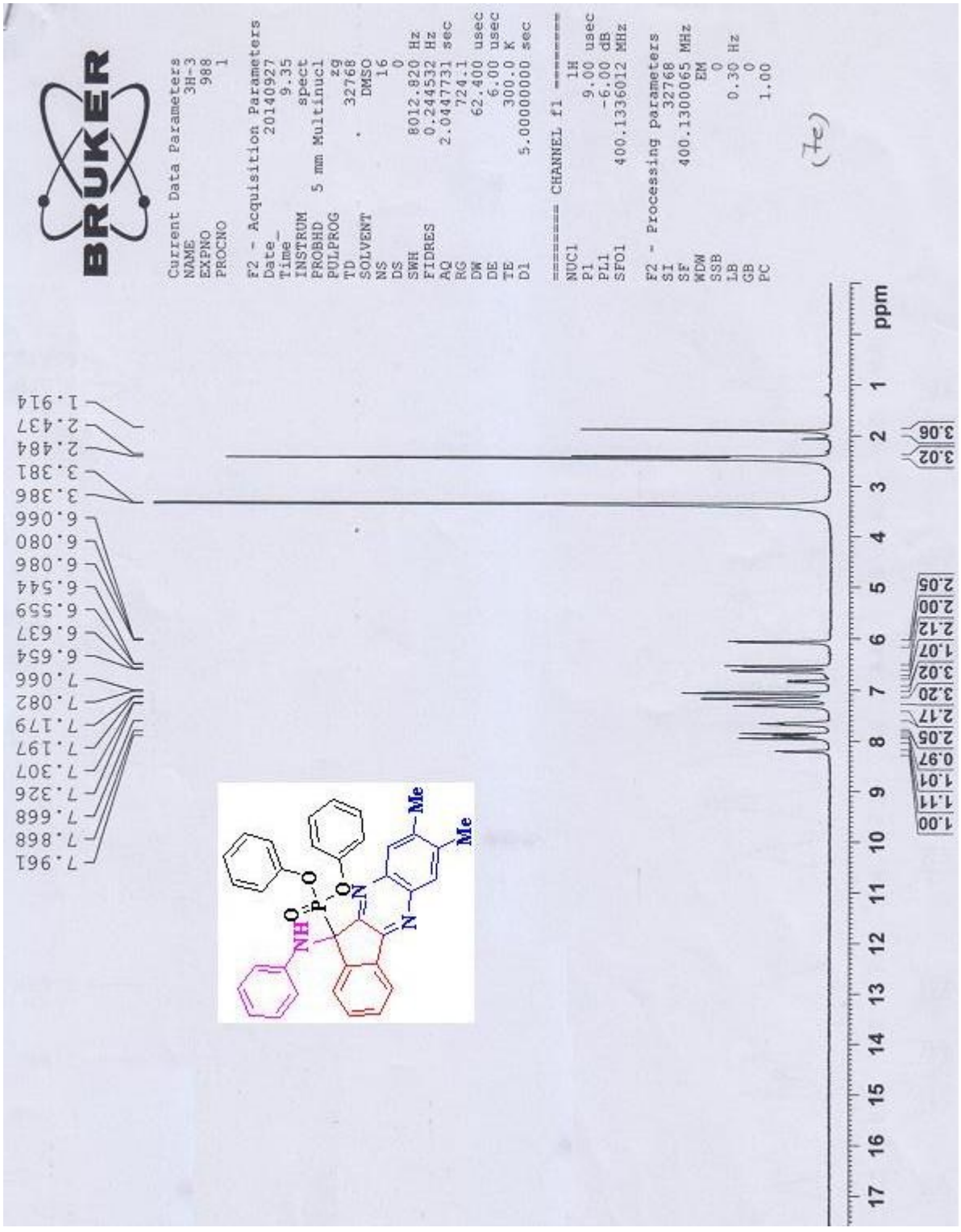
[1]H NMR of 7c


BRUKER
Current Data Parameters
NAME 3H-3
EXPNO 965
PROCNO 1
F2 - Acquisition Parameters
Date_ 20140921
Time_ 14.32
INSTRUM spect
PROBHD 5 mm Multinucl
PULPROG zg
TD 32768
SOLVENT DMSO
NS 16
DS 0
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 2.0447731 sec
RG 574.7
DW 62.400 usec
DE 6.00 usec
TE 300.0 K
D1 5.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 9.00 usec
PL1 -6.00 dB
SFO1 400.1336012 MHz
F2 - Processing parameters
SI 32768
SF 400.1300065 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
ppm
Cl
NH
O
P
O
N
N

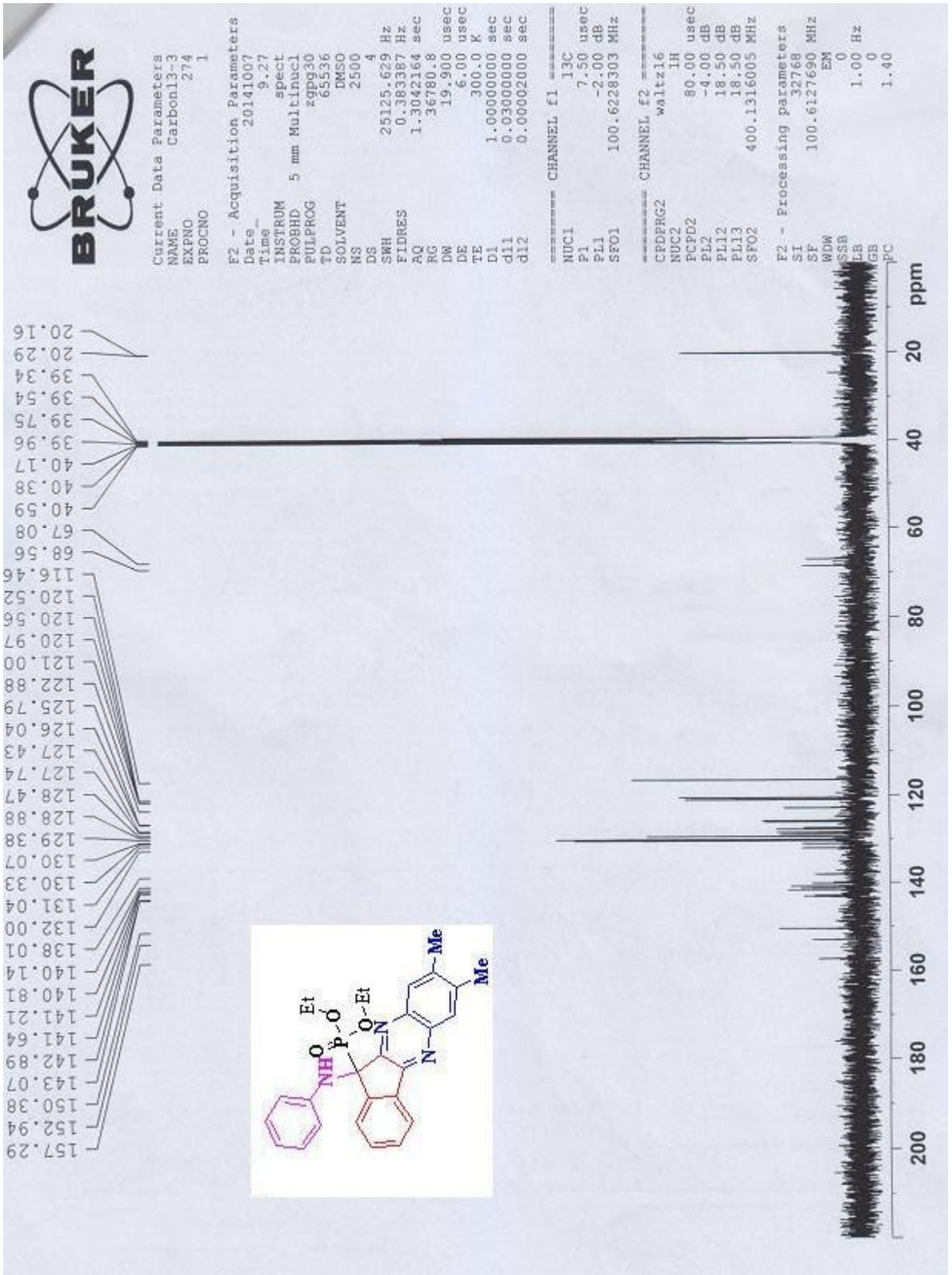
[1]H NMR of 7d


BRUKER
Current Data Parameters
NAME Carbon13-3
EXPNO 266
PROCNO 1
F2 - Acquisition Parameters
Date_ 20140930
Time_ 14.39
INSTRUM spect
PROBHD 5 mm Multinucl
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 1300
DS 4
SWH 25125.629 Hz
FIDRES 0.383387 Hz
AQ 1.3042164 sec
RG 36780.8
DW 19.900 usec
DE 6.00 usec
TE 300.0 K
D1 1.00000000 sec
d11 0.03000000 sec
d12 0.00002000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 7.50 usec
PL1 -2.00 dB
SFO1 100.6228303 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 18.50 dB
PL13 18.50 dB
SFO2 400.1316005 MHz
F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
ppm
200 180 160 140 120 100 80 60 40 20
157.95 157.88 153.63 150.47 150.30 150.19 144.51 144.34 142.92 142.49 141.25 137.68 132.65 131.44 131.38 130.57 130.38 130.08 129.85 129.54 128.82 127.39 126.12 125.87 123.44 122.39 120.87 120.83 120.51 120.47 117.02 68.29 66.81 40.62 40.41 40.20 40.00 39.79 39.58 39.37
Cl
NH
O
P
O
N
N

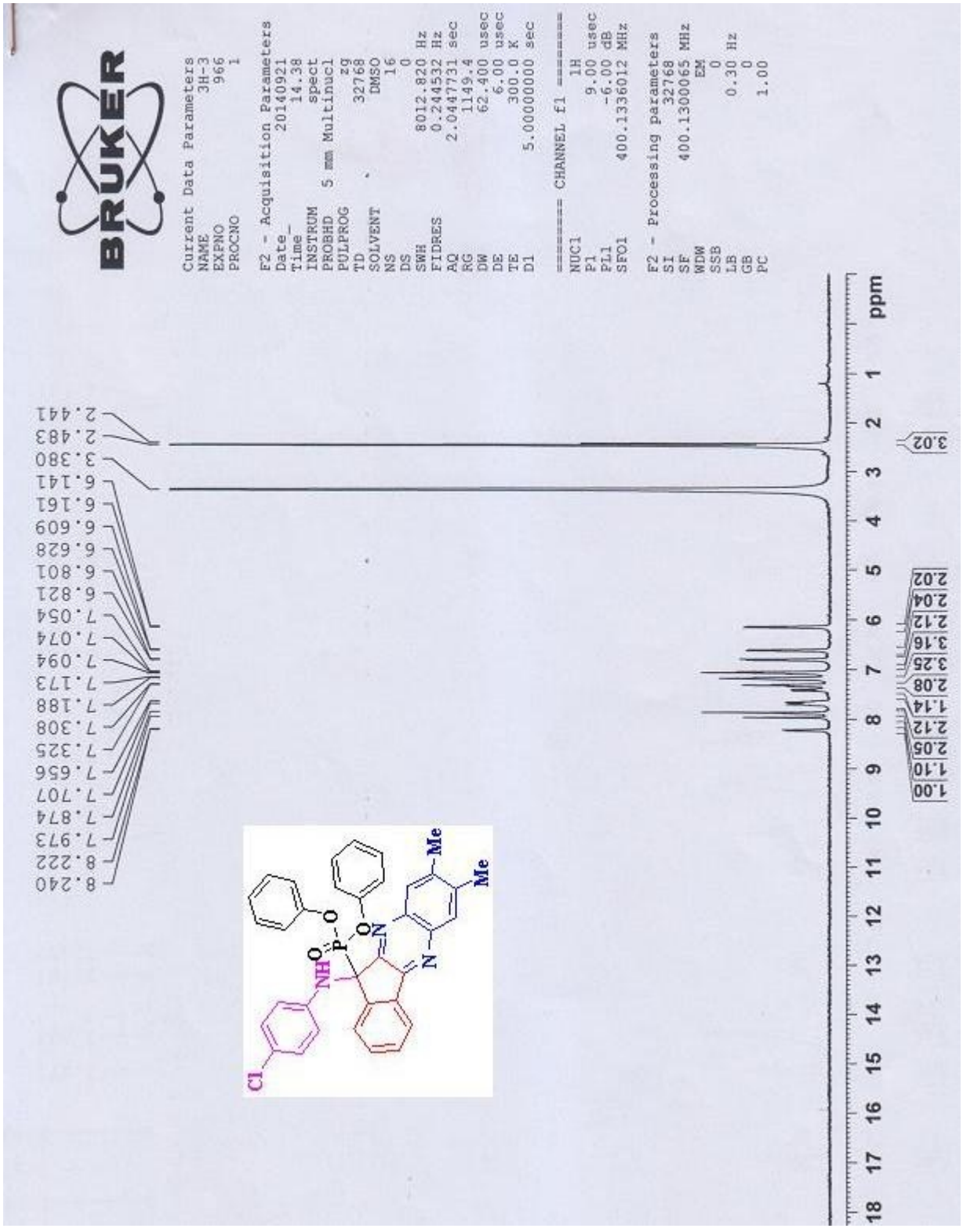
^{13}C NMR of 7d


BRUKER
Current Data Parameters
NAME 3H-3
EXPNO 988
PROCNO 1
F2 - Acquisition Parameters
Date_ 20140927
Time 9.35
INSTRUM spect
PROBHD 5 mm Multinucl
PULPROG zg
TD 32768
SOLVENT DMSO
NS 16
DS 0
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 2.0447731 sec
RG 724.1
DW 62.400 usec
DE 6.00 usec
TE 300.0 K
D1 5.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 9.00 usec
PL1 -6.00 dB
SFO1 400.1336012 MHz
F2 - Processing parameters
SI 32768
SF 400.1300065 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
(7e)
ppm
Me
Me
NH
O
P
O
O
N
N
7.961
7.868
7.668
7.326
7.307
7.197
7.179
7.082
7.066
6.654
6.637
6.559
6.544
6.086
6.080
6.066
3.386
3.381
2.484
2.437
1.914
1.00
1.11
1.01
0.97
2.05
2.17
3.20
3.02
1.07
2.12
2.00
2.05
3.02
3.06

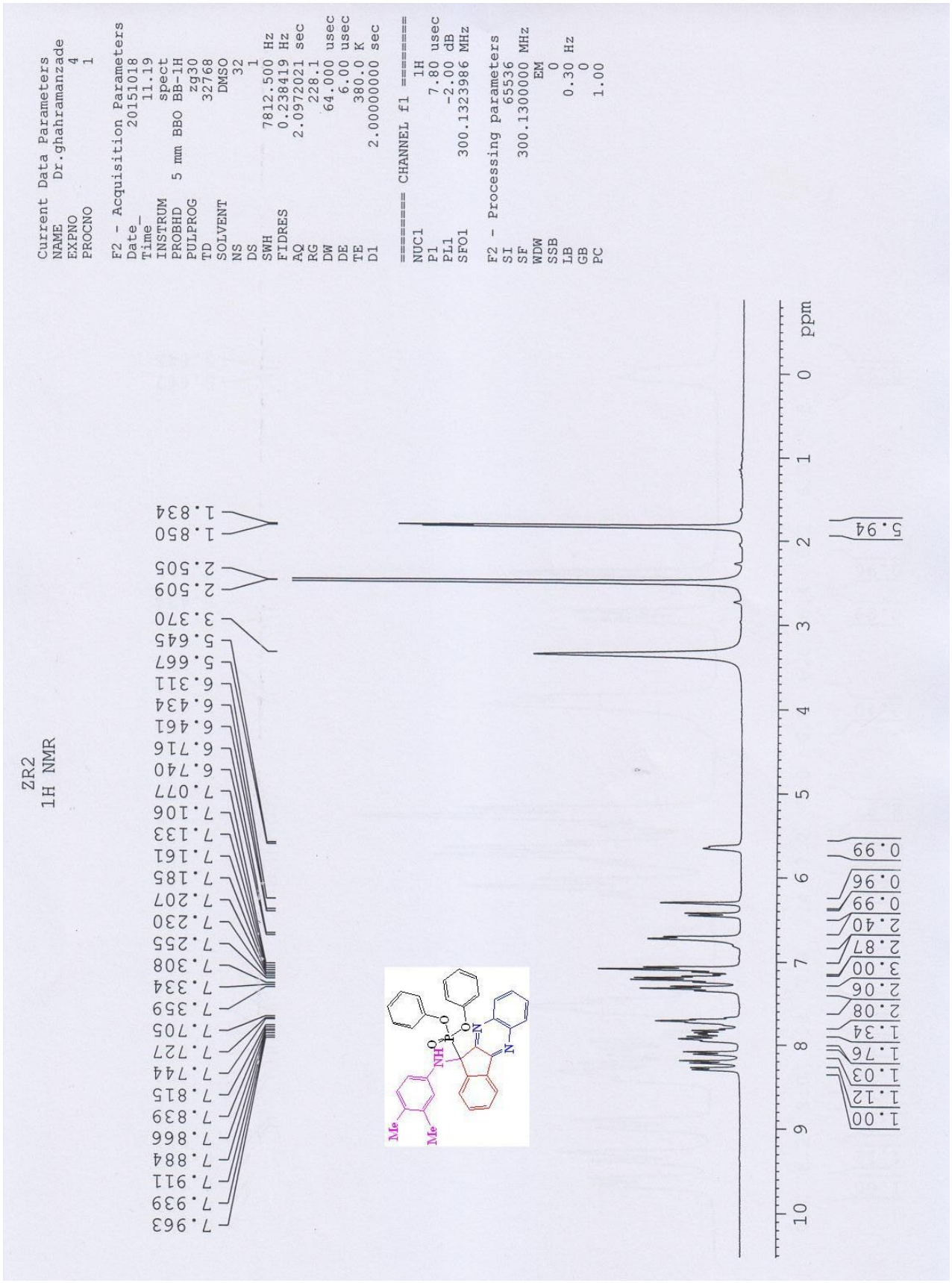
[1]H NMR of 7e


BRUKER
Current Data Parameters
NAME Carbon13-3
EXPNO 274
PROCNO 1
F2 - Acquisition Parameters
Date_ 20141007
Time 9.27
INSTRUM spect
PROBHD 5 mm Multinucl
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 2500
DS 4
SWH 25125.629 Hz
FIDRES 0.383387 Hz
AQ 1.3042164 sec
RG 36780.8
DW 19.900 usec
DE 6.00 usec
TE 300.0 K
D1 1.00000000 sec
d11 0.03000000 sec
d12 0.00002000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 7.50 usec
PL1 -2.00 dB
SFO1 100.6228303 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 18.50 dB
PL13 18.50 dB
SFO2 400.1316005 MHz
F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
ppm
20.16
20.29
39.34
39.54
39.75
39.96
40.17
40.38
40.59
67.08
68.56
116.46
120.52
120.56
120.97
121.00
122.88
125.79
126.04
127.43
127.74
128.47
128.88
129.38
130.07
130.33
131.04
132.00
138.01
140.14
140.81
141.21
141.64
142.89
143.07
150.38
152.94
157.29
Et
O
P
O
Et
NH
N
N
Me
Me

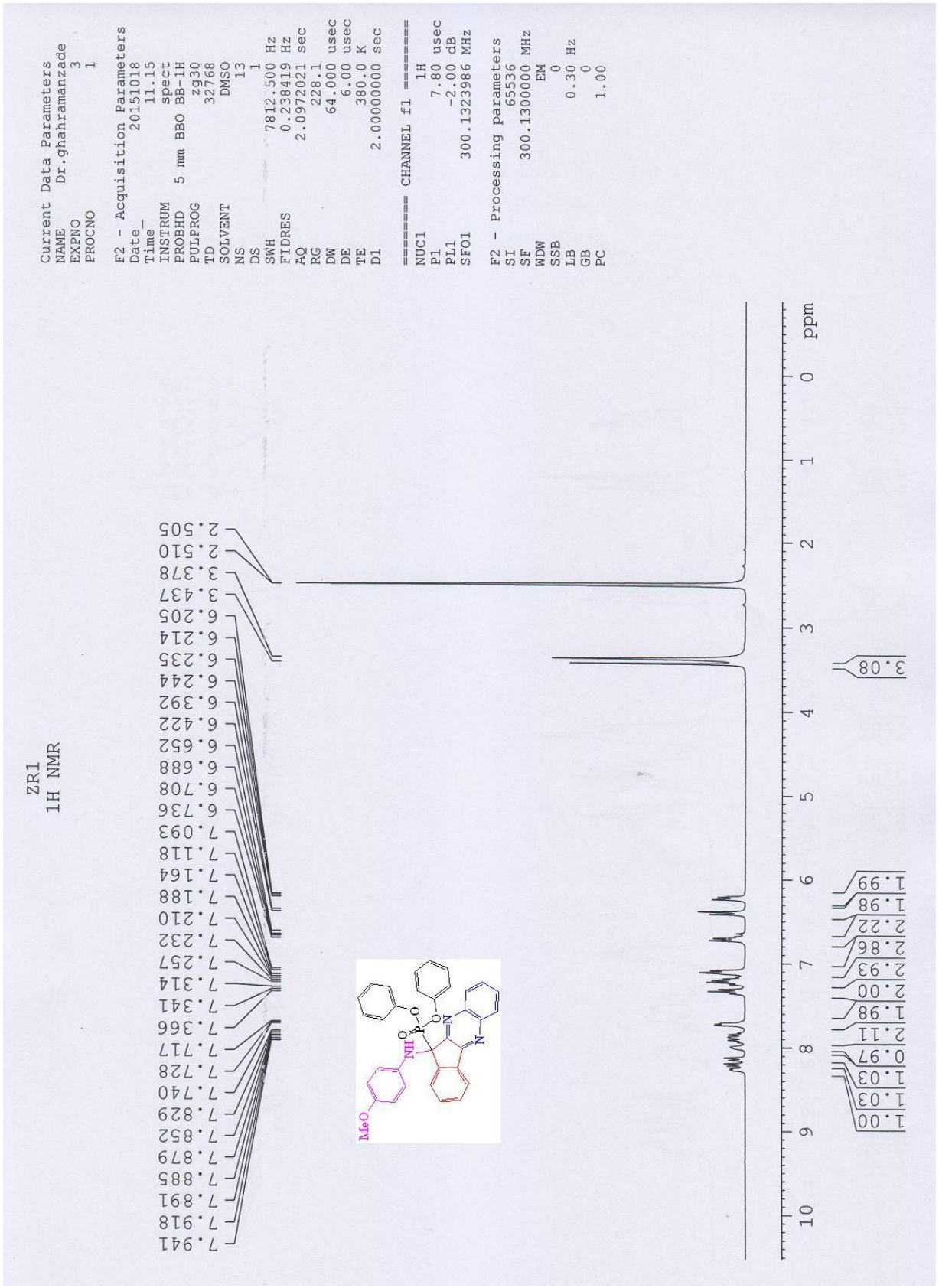
^{13}C NMR of 7e


BRUKER
Current Data Parameters
NAME 3H-3
EXPNO 966
PROCNO 1
F2 - Acquisition Parameters
Date_ 20140921
Time_ 14.38
INSTRUM spect
PROBHD 5 mm Multinucl
PULPROG zg
TD 32768
SOLVENT DMSO
NS 16
DS 0
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 2.0447731 sec
RG 1149.4
DW 62.400 usec
DE 6.00 usec
TE 300.0 K
D1 5.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 9.00 usec
PL1 -6.00 dB
SFO1 400.1336012 MHz
F2 - Processing parameters
SI 32768
SF 400.1300065 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
ppm
8.240
8.222
7.973
7.874
7.707
7.656
7.325
7.308
7.188
7.173
7.094
7.074
7.054
6.821
6.801
6.628
6.609
6.161
6.141
3.380
2.483
2.441
3.02
1.00
1.10
2.05
2.12
1.14
2.08
3.25
3.16
2.12
2.04
2.02
Me
Me
O
P
O
N
N
NH
O
Cl

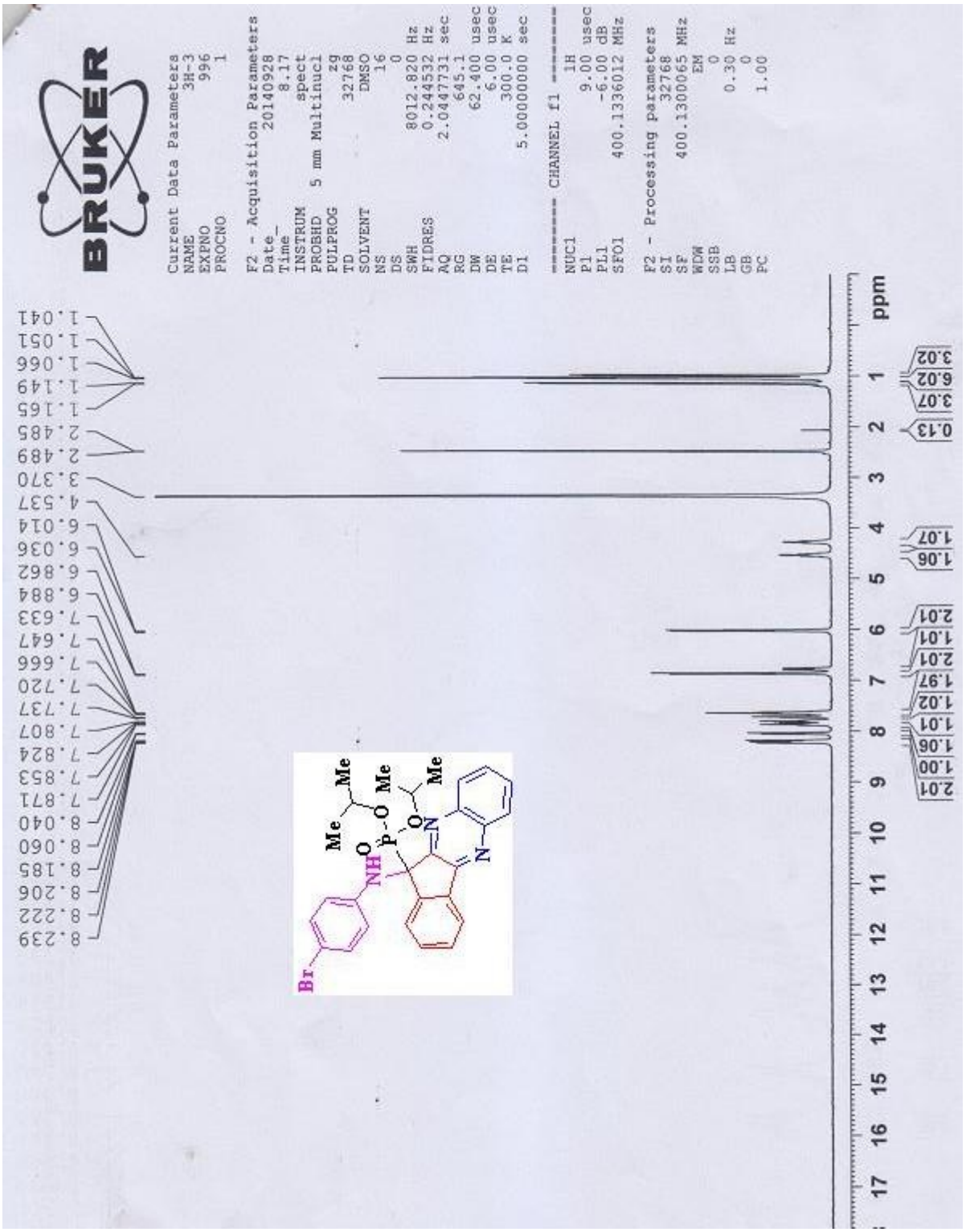
[1]H NMR of 7f


ZR2
1H NMR
Current Data Parameters
NAME Dr.ghahramanzade
EXPNO 4
PROCNO 1
F2 - Acquisition Parameters
Date_ 20151018
Time_ 11.19
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 32768
SOLVENT DMSO
NS 32
DS 1
SWH 7812.500 Hz
FIDRES 0.238419 Hz
AQ 2.0972021 sec
RG 228.1
DW 64.000 usec
DE 6.00 usec
TE 380.0 K
D1 2.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 7.80 usec
PL1 -2.00 dB
SFO1 300.1323986 MHz
F2 - Processing parameters
SI 65536
SF 300.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
1.834
1.850
2.505
2.509
3.370
5.645
5.667
6.311
6.434
6.461
6.716
6.740
7.077
7.106
7.133
7.161
7.185
7.207
7.230
7.255
7.308
7.334
7.359
7.705
7.727
7.744
7.815
7.839
7.866
7.884
7.911
7.939
7.963
5.94
1.00
1.12
1.03
1.76
1.34
2.08
2.06
3.00
2.87
2.40
0.99
0.96
0.99
Me
Me
NH
O
P
O
O
N
N
10
9
8
7
6
5
4
3
2
1
0
ppm

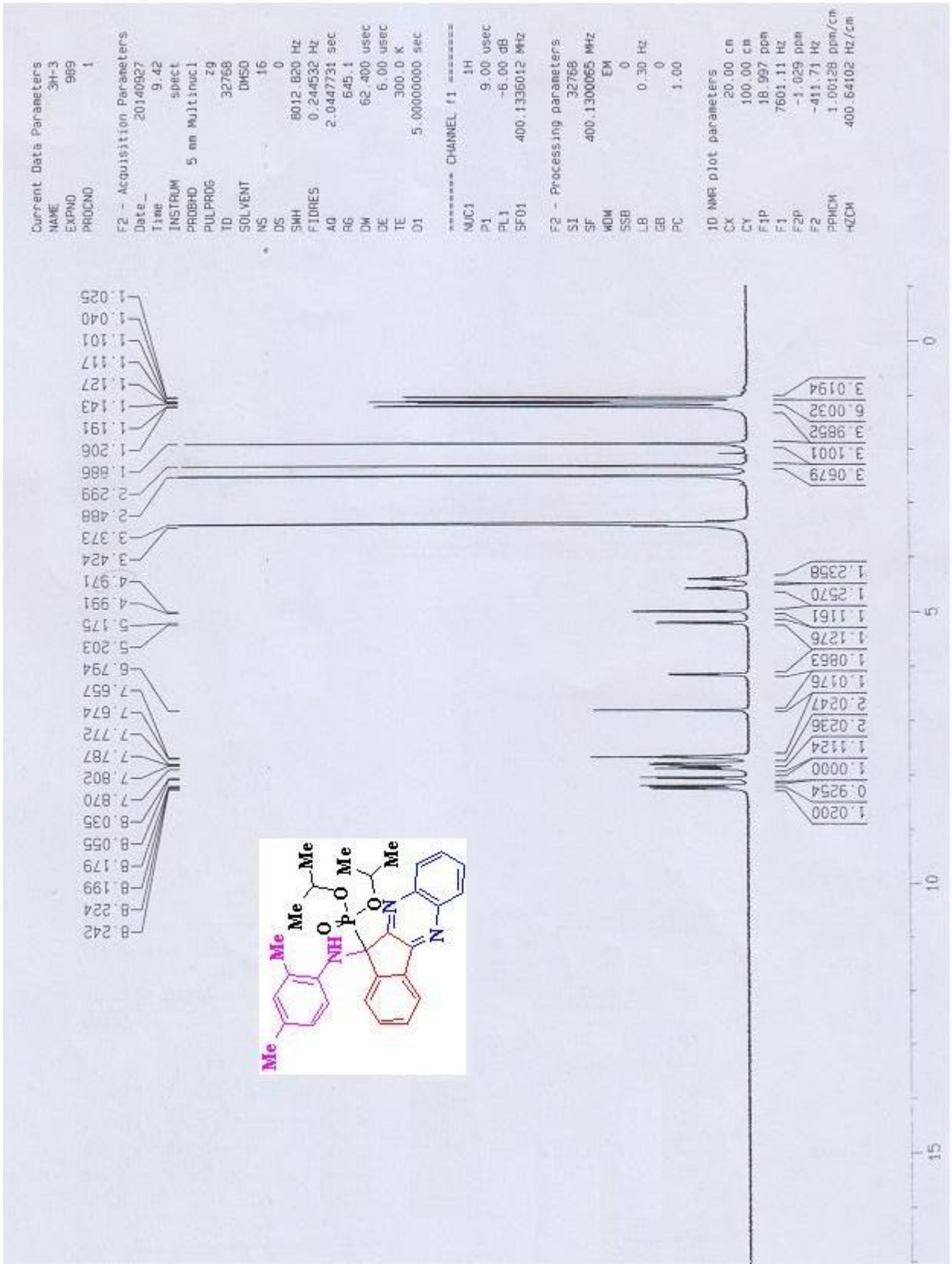
[1]H NMR of 7g


ZR1
1H NMR
Current Data Parameters
NAME Dr.ghahramanzade
EXPNO 3
PROCNO 1
F2 - Acquisition Parameters
Date_ 20151018
Time_ 11.15
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 32768
SOLVENT DMSO
NS 13
DS 1
SWH 7812.500 Hz
FIDRES 0.238419 Hz
AQ 2.0972021 sec
RG 228.1
DW 64.000 usec
DE 6.00 usec
TE 380.0 K
D1 2.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 7.80 usec
PL1 -2.00 dB
SFO1 300.1323986 MHz
F2 - Processing parameters
SI 65536
SF 300.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
7.941
7.918
7.891
7.885
7.879
7.852
7.829
7.740
7.728
7.717
7.366
7.341
7.314
7.257
7.232
7.210
7.188
7.164
7.118
7.093
6.736
6.708
6.688
6.652
6.422
6.392
6.244
6.235
6.214
6.205
3.437
3.378
2.510
2.505
MeO
NH
N
N
O
P
O
O
10 9 8 7 6 5 4 3 2 1 0 ppm
3.08
1.00
1.03
1.03
0.97
2.11
1.98
2.00
2.93
2.86
2.22
1.98
1.99

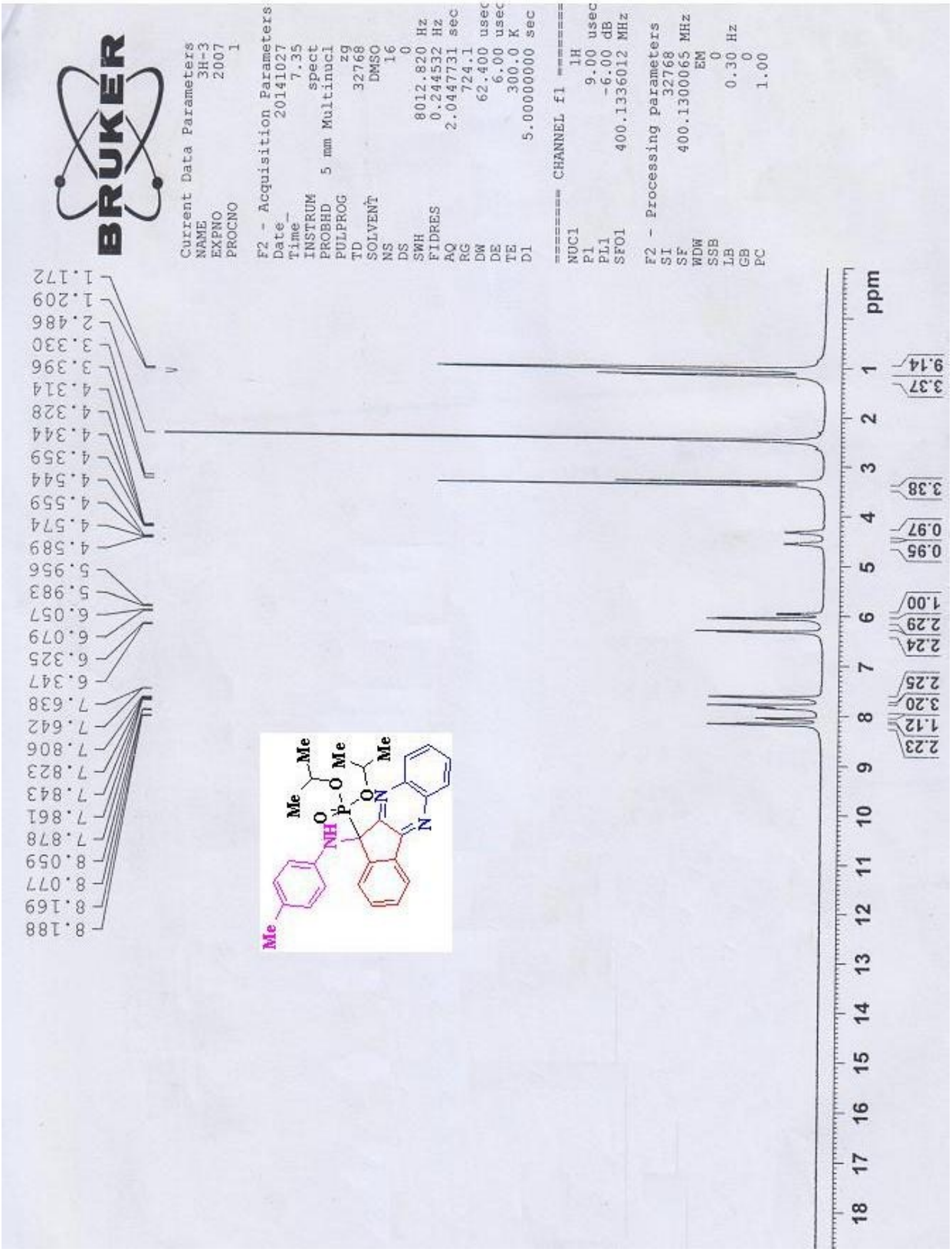
[1]H NMR of 7h


BRUKER
Current Data Parameters
NAME 3H-3
EXPNO 996
PROCNO 1
F2 - Acquisition Parameters
Date_ 20140928
Time 8.17
INSTRUM spect
PROBHD 5 mm Multinucl
PULPROG zg
TD 32768
SOLVENT DMSO
NS 16
DS 0
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 2.0447731 sec
RG 645.1
DW 62.400 usec
DE 6.00 usec
TE 300.0 K
D1 5.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 9.00 usec
PL1 -6.00 dB
SFO1 400.1336012 MHz
F2 - Processing parameters
SI 32768
SF 400.1300065 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
ppm
Me
Me
O
NH
P
O
Me
O
Me
N
N
Br

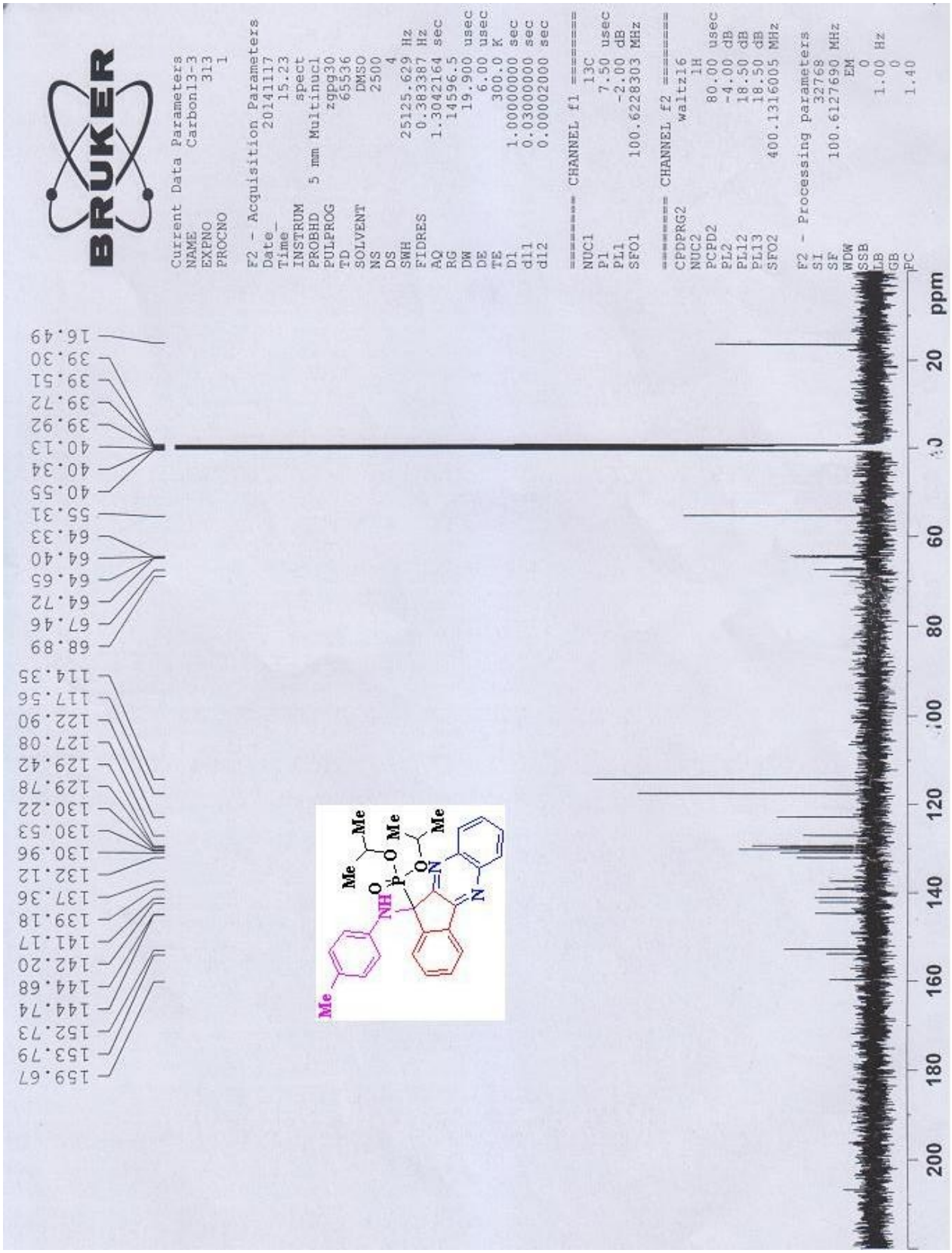
[1]H NMR of 7i


Current Data Parameters
NAME 3H-3
EXPNO 989
PROCNO 1
F2 - Acquisition Parameters
Date_ 20140927
Time 9.42
INSTRUM spect
PROBHD 5 mm Multinucl
PULPROG zg
TD 32768
SOLVENT DMSO
NS 16
DS 0
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 2.0447731 sec
RG 645.1
DW 62.400 usec
DE 6.00 usec
TE 300.0 K
D1 5.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 9.00 usec
PL1 -6.00 dB
SF01 400.1336012 MHz
F2 - Processing parameters
SI 32768
SF 400.1300065 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
1D NMR plot parameters
CX 20.00 cm
CY 100.00 cm
F1P 18.997 ppm
F1 7601.11 Hz
F2P -1.029 ppm
F2 -411.71 Hz
PPMCM 1.00128 ppm/cm
HZCM 400.64102 Hz/cm
1.025
1.040
1.101
1.117
1.127
1.143
1.191
1.206
1.886
2.299
2.488
3.373
3.424
4.971
4.991
5.175
5.203
6.794
7.657
7.674
7.772
7.787
7.802
7.870
8.035
8.055
8.179
8.199
8.224
8.242
3.0194
6.0032
3.9852
3.1001
3.0679
1.2358
1.2570
1.1161
1.1276
1.0863
1.0176
2.0247
2.0236
1.1124
1.0000
0.9254
1.0200
Me
Me
Me
Me
Me
Me
O
NH
P
O
O
N
N
0
5
10
15

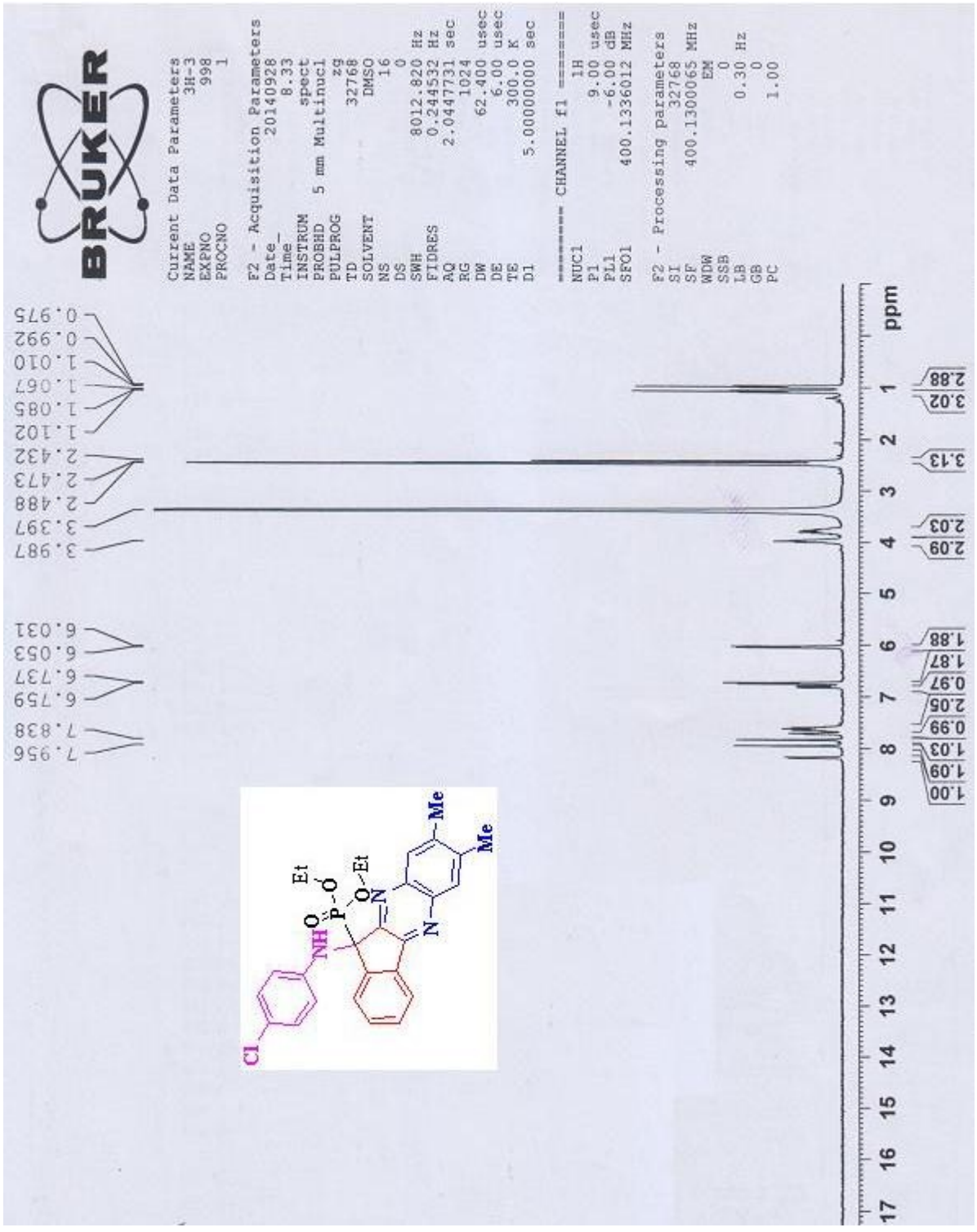
[1]H NMR of 7j


BRUKER
Current Data Parameters
NAME 3H-3
EXPNO 2007
PROCNO 1
F2 - Acquisition Parameters
Date_ 20141027
Time_ 7.35
INSTRUM spect
PROBHD 5 mm Multinucl
PULPROG zg
TD 32768
SOLVENT DMSO
NS 16
DS 0
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 2.0447731 sec
RG 724.1
DW 62.400 usec
DE 6.00 usec
TE 300.0 K
D1 5.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 9.00 usec
PL1 -6.00 dB
SFO1 400.1336012 MHz
F2 - Processing parameters
SI 32768
SF 400.1300065 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
ppm
Me
Me
Me
Me
O
NH
P
O
O
N
N
Me
8.188
8.169
8.077
8.059
7.878
7.861
7.843
7.823
7.806
7.642
7.638
6.347
6.325
6.079
6.057
5.983
5.956
4.589
4.574
4.559
4.544
4.359
4.344
4.328
4.314
3.396
3.330
2.486
1.209
1.172
9.14
3.37
3.38
0.97
0.95
1.00
2.29
2.24
2.25
3.20
1.12
2.23

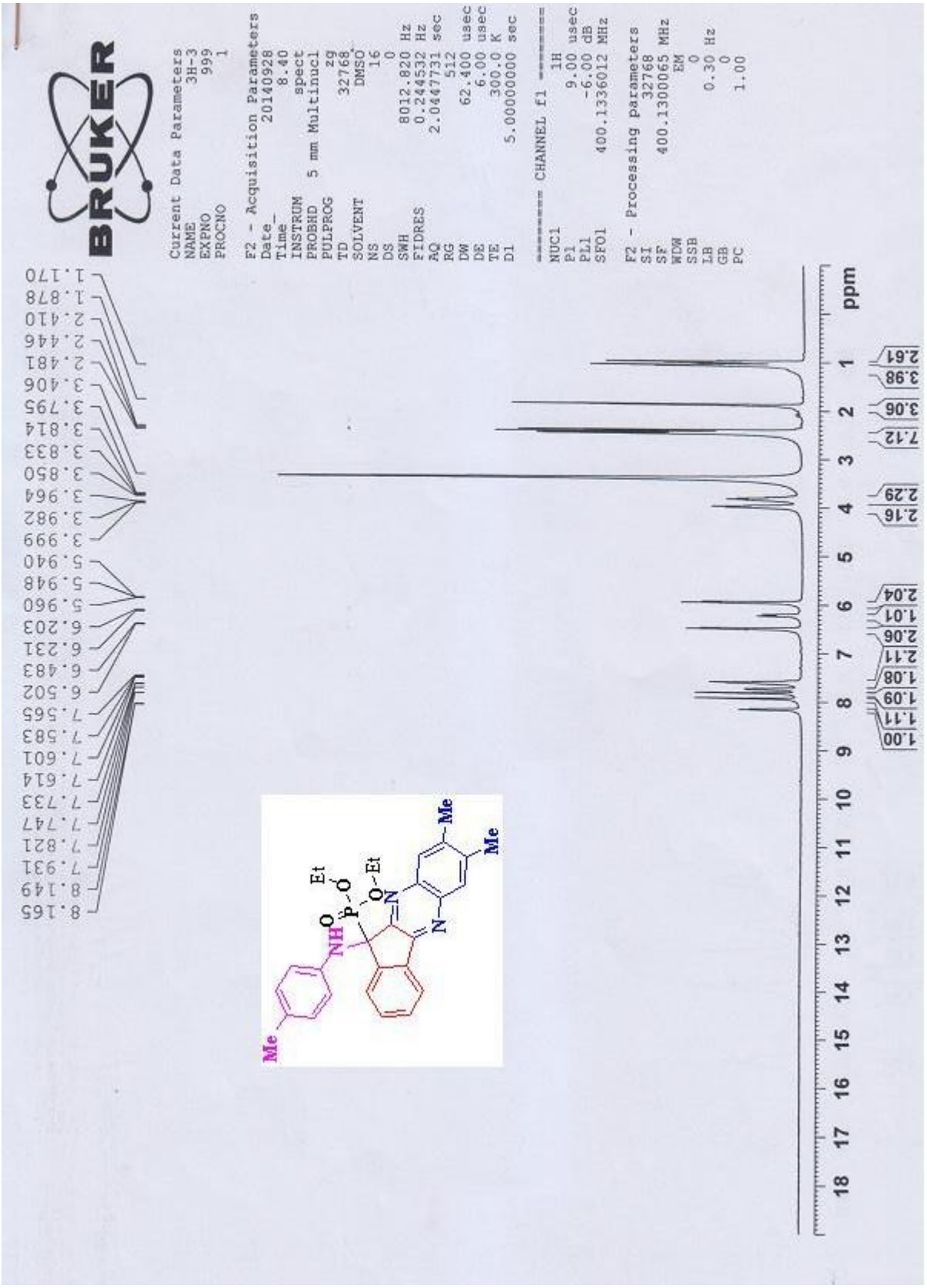
[1]H NMR of 7k


BRUKER
Current Data Parameters
NAME Carbon13-3
EXPNO 313
PROCNO 1
F2 - Acquisition Parameters
Date_ 20141117
Time_ 15.23
INSTRUM spect
PROBHD 5 mm Multinucl
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 2500
DS 4
SWH 25125.629 Hz
FIDRES 0.383387 Hz
AQ 1.3042164 sec
RG 14596.5
DW 19.900 usec
DE 6.00 usec
TE 300.0 K
D1 1.00000000 sec
d11 0.03000000 sec
d12 0.00002000 sec
======== CHANNEL f1 ========
NUC1 13C
P1 7.50 usec
PL1 -2.00 dB
SFO1 100.6228303 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -4.00 dB
PL12 18.50 dB
PL13 18.50 dB
SFO2 400.1316005 MHz
F2 - Processing parameters
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
16.49
39.30
39.51
39.72
39.92
40.13
40.34
40.55
55.31
64.33
64.40
64.65
64.72
67.46
68.89
114.35
117.56
122.90
127.08
129.42
129.78
130.22
130.53
130.96
132.12
137.36
139.18
141.17
142.20
144.68
144.74
152.73
153.79
159.67
Me
Me
Me
Me
Me
NH
O
P
O
O
N
N
200
180
160
140
120
100
80
60
40
20
ppm

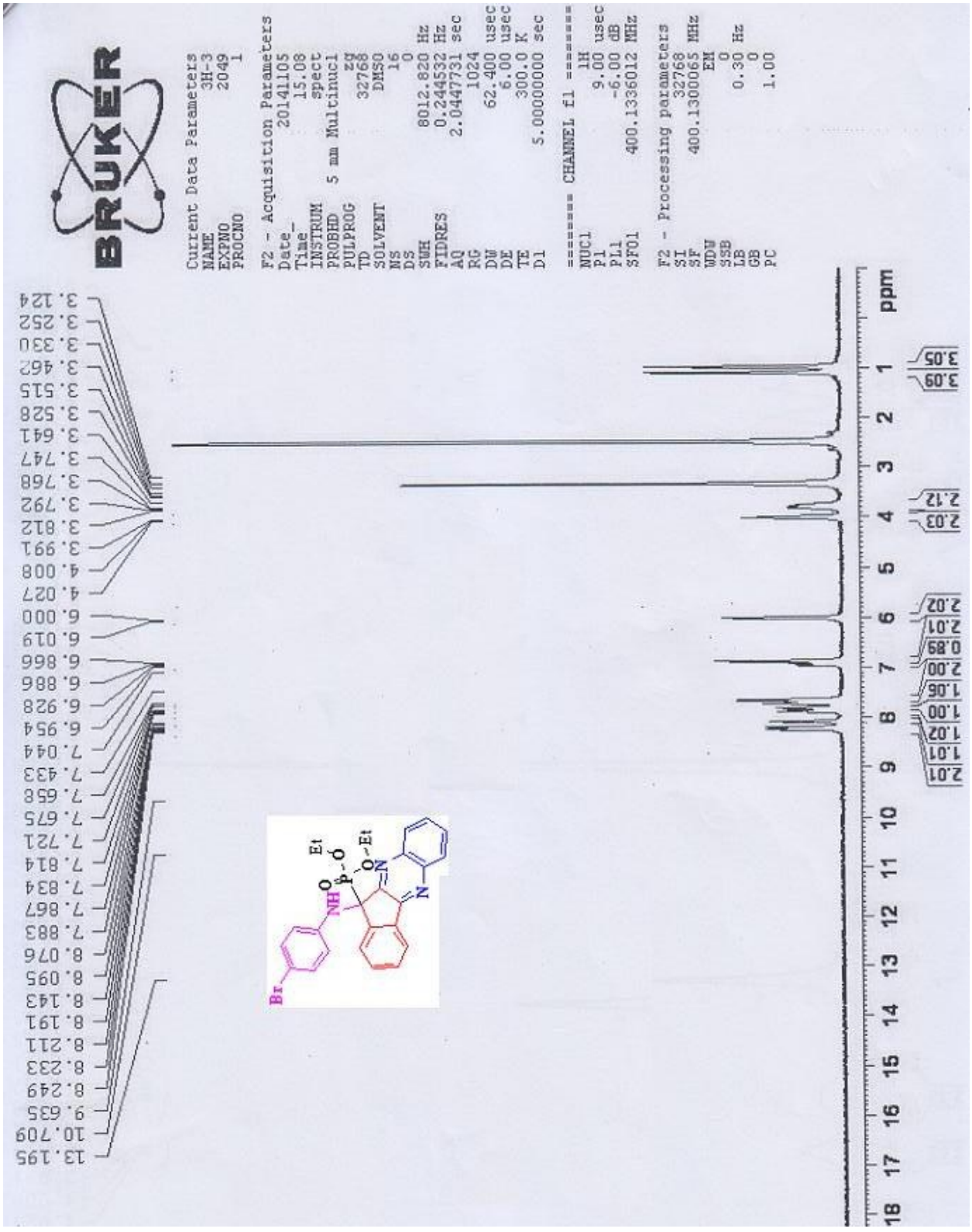
^{13}C NMR of 7k


BRUKER
Current Data Parameters
NAME 3H-3
EXPNO 998
PROCNO 1
F2 - Acquisition Parameters
Date_ 20140928
Time_ 8.33
INSTRUM spect
PROBHD 5 mm Multinucl
PULPROG zg
TD 32768
SOLVENT DMSO
NS 16
DS 0
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 2.0447731 sec
RG 1024
DW 62.400 usec
DE 6.00 usec
TE 300.0 K
D1 5.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 9.00 usec
PL1 -6.00 dB
SFO1 400.1336012 MHz
F2 - Processing parameters
SI 32768
SF 400.1300065 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
ppm
Et
Et
Me
Me
Cl
NH

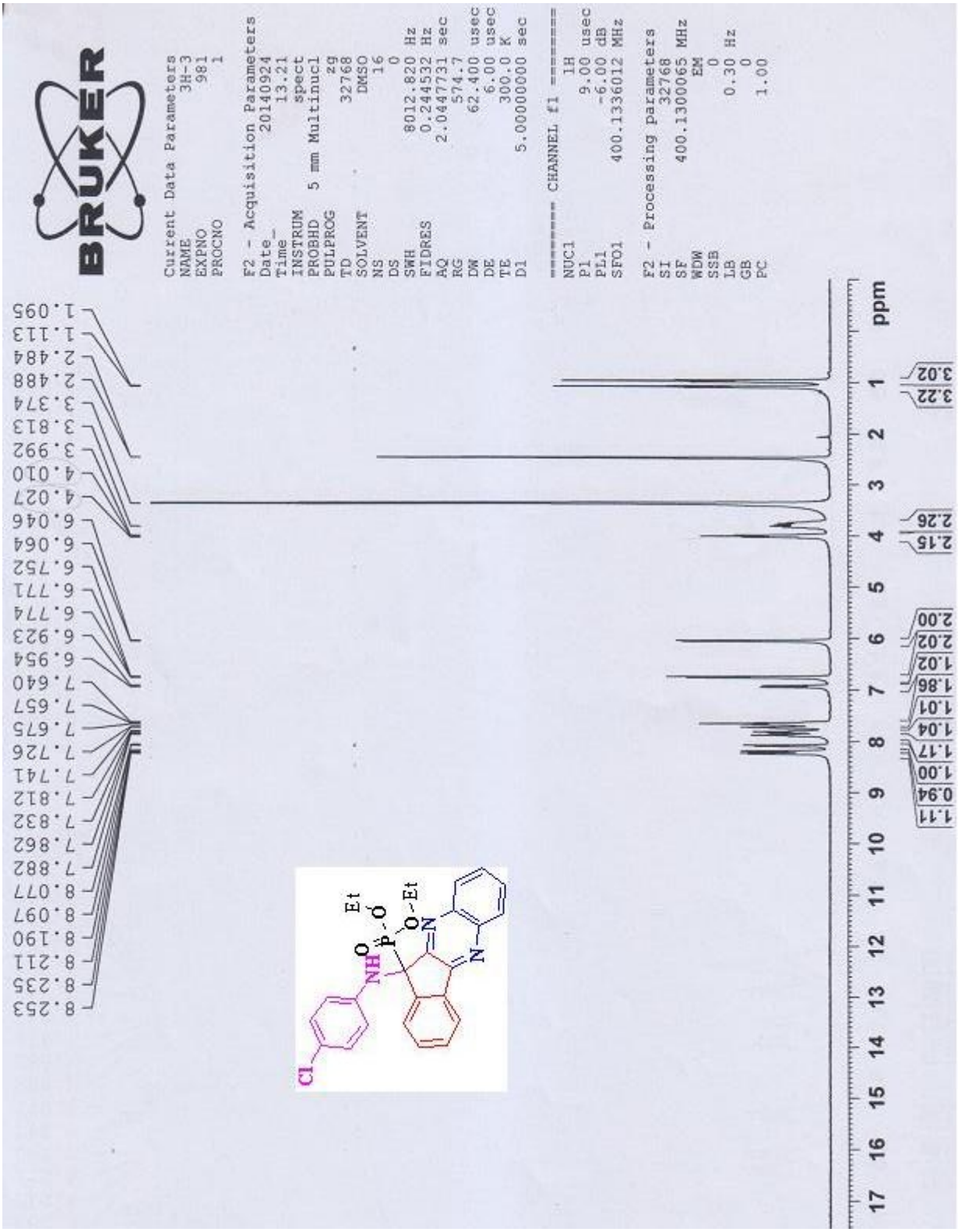
[1]H NMR of 7l


BRUKER
Current Data Parameters
NAME 3H-3
EXPNO 999
PROCNO 1
F2 - Acquisition Parameters
Date_ 20140928
Time_ 8.40
INSTRUM spect
PROBHD 5 mm Multinucl
PULPROG zg
TD 32768
SOLVENT DMSO
NS 16
DS 0
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 2.0447731 sec
RG 512
DW 62.400 usec
DE 6.00 usec
TE 300.0 K
D1 5.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 9.00 usec
PL1 -6.00 dB
SFO1 400.1336012 MHz
F2 - Processing parameters
SI 32768
SF 400.1300065 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
ppm
Me
NH
O
P
Et
O
O
Et
N
N
Me
Me

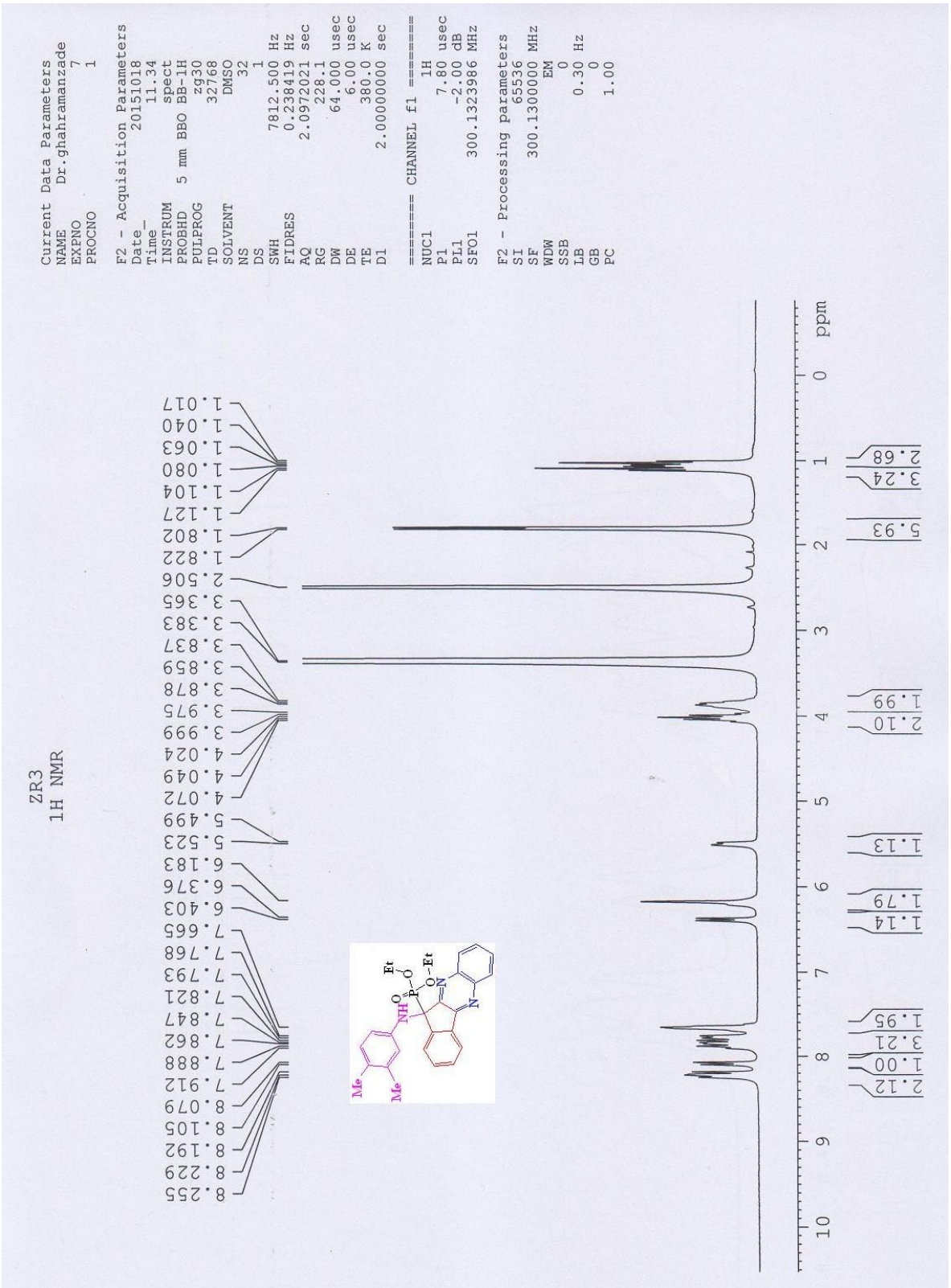
[1]H NMR of 7m


BRUKER
Current Data Parameters
NAME 3H-3
EXPNO 2049
PROCNO 1
F2 - Acquisition Parameters
Date_ 20141105
Time 15.08
INSTRUM spect
PROBHD 5 mm Multinucl
PULPROG zg
TD 32768
SOLVENT DMSO
NS 16
DS 0
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 2.0447731 sec
RG 1024
DW 62.400 usec
DE 6.00 usec
TE 300.0 K
D1 5.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 9.00 usec
PL1 -6.00 dB
SFO1 400.1336012 MHz
F2 - Processing parameters
SI 32768
SF 400.1300065 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
ppm
3.09
3.05
2.03
2.12
2.01
2.02
0.89
2.00
1.06
1.00
1.02
1.01
2.01
3.124
3.252
3.330
3.462
3.515
3.528
3.641
3.747
3.768
3.792
3.812
3.991
4.008
4.027
6.000
6.019
6.866
6.886
6.928
6.954
7.044
7.433
7.658
7.675
7.721
7.814
7.834
7.867
7.883
8.076
8.095
8.143
8.191
8.211
8.233
8.249
9.635
10.709
13.195
Et
O
P
O
NH
O
Et
N
N
Br

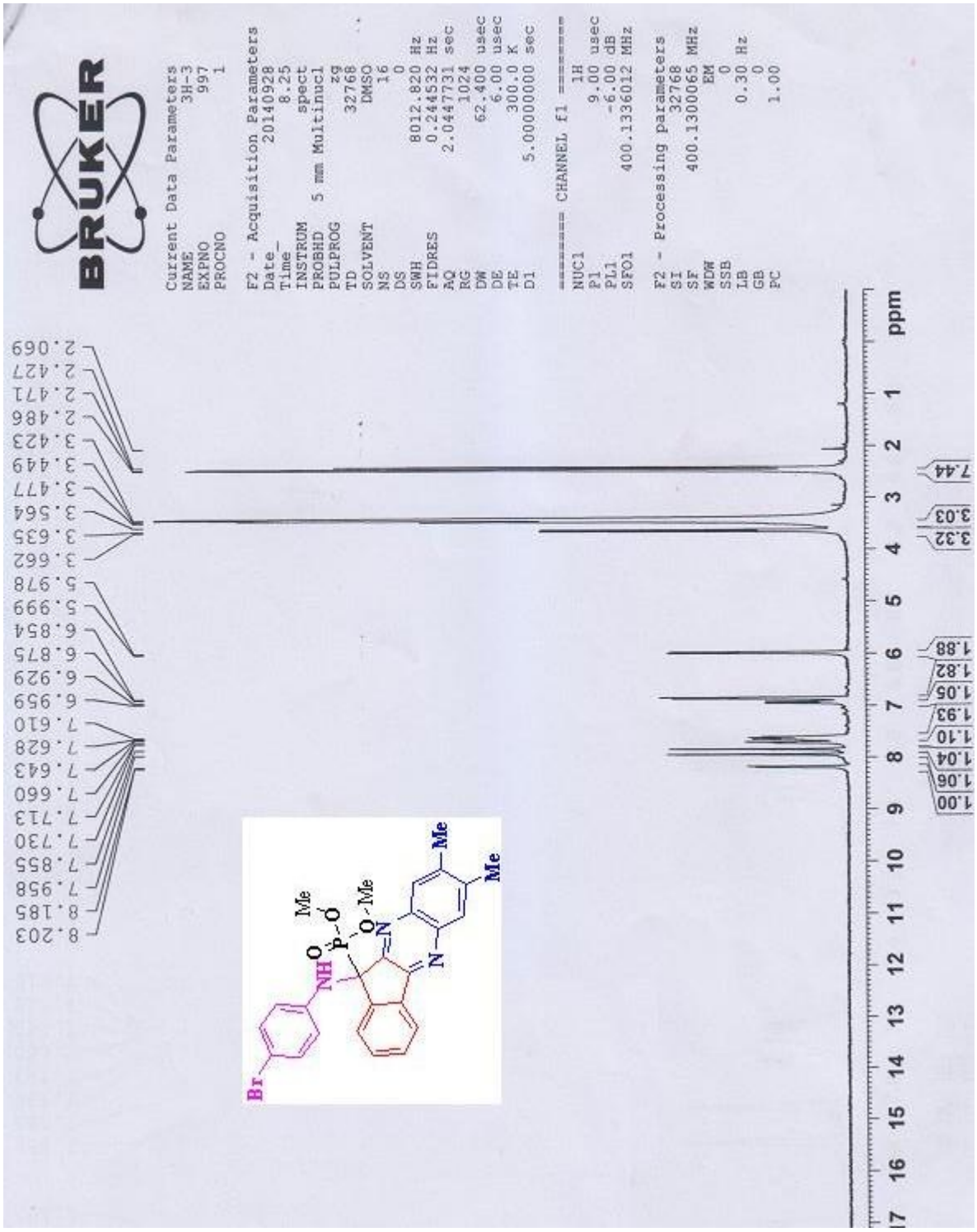
[1]H NMR of 7n


BRUKER
Current Data Parameters
NAME 3H-3
EXPNO 981
PROCNO 1
F2 - Acquisition Parameters
Date_ 20140924
Time_ 13.21
INSTRUM spect
PROBHD 5 mm Multinucl
PULPROG zg
TD 32768
SOLVENT DMSO
NS 16
DS 0
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 2.0447731 sec
RG 574.7
DW 62.400 usec
DE 6.00 usec
TE 300.0 K
D1 5.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 9.00 usec
PL1 -6.00 dB
SFO1 400.1336012 MHz
F2 - Processing parameters
SI 32768
SF 400.1300065 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
ppm
1.095
1.113
2.484
2.488
3.374
3.813
3.992
4.010
4.027
6.046
6.064
6.752
6.771
6.774
6.923
6.954
7.640
7.657
7.675
7.726
7.741
7.812
7.832
7.862
7.882
8.077
8.097
8.190
8.211
8.235
8.253
3.02
3.22
2.15
2.26
2.00
2.02
1.02
1.86
1.01
1.04
1.17
1.00
0.94
1.11
Et
O
NH
P
O
Et
N
N
Cl

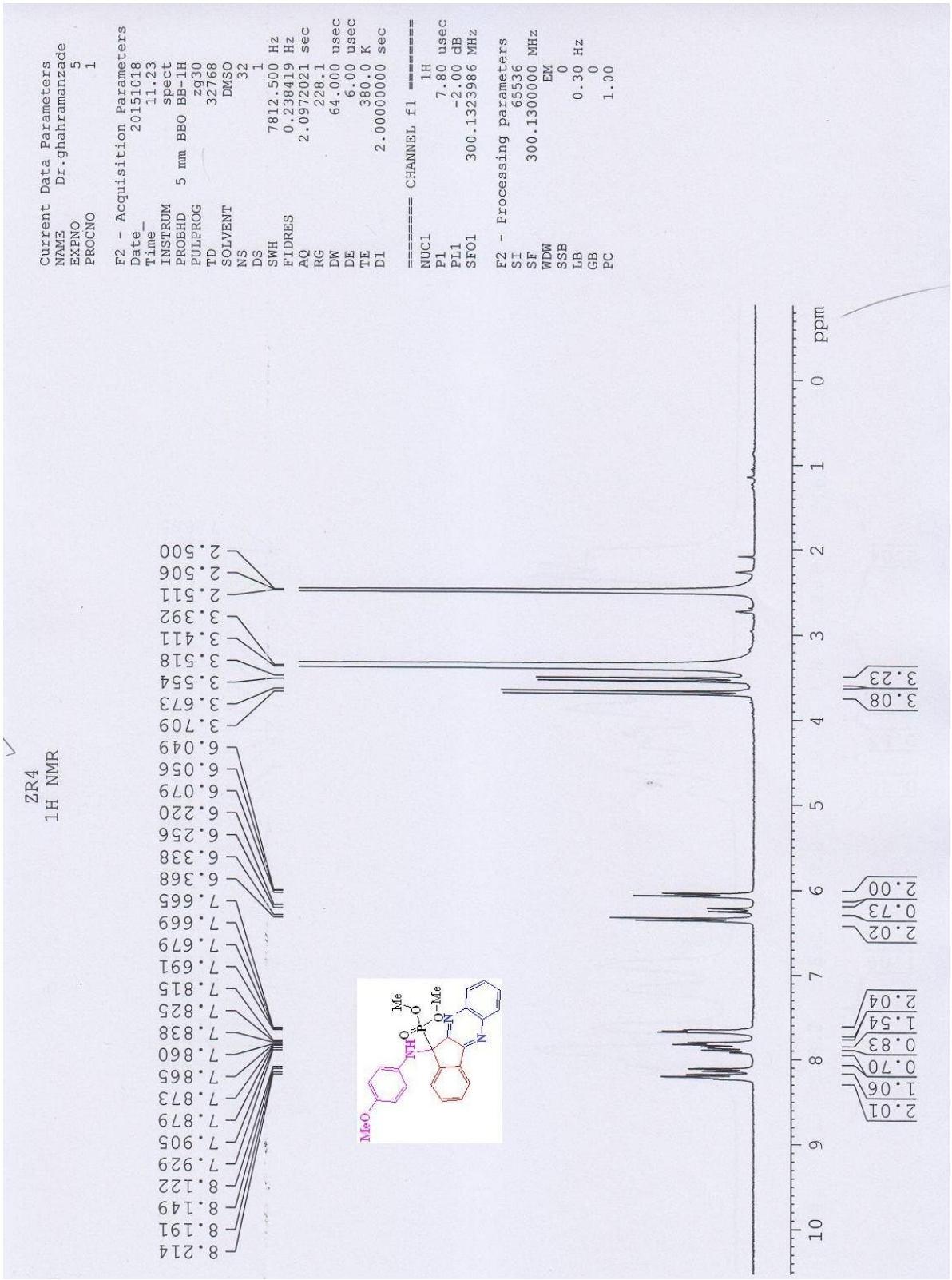
[1]H NMR of 7o


ZR3
1H NMR
Current Data Parameters
NAME Dr.ghahramanzade
EXPNO 7
PROCNO 1
F2 - Acquisition Parameters
Date_ 20151018
Time_ 11.34
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 32768
SOLVENT DMSO
NS 32
DS 1
SWH 7812.500 Hz
FIDRES 0.238419 Hz
AQ 2.0972021 sec
RG 228.1
DW 64.000 usec
DE 6.00 usec
TE 380.0 K
D1 2.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 7.80 usec
PL1 -2.00 dB
SFO1 300.1323986 MHz
F2 - Processing parameters
SI 65536
SF 300.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
8.255
8.229
8.192
8.105
8.079
7.912
7.888
7.862
7.847
7.821
7.793
7.768
7.665
6.403
6.376
6.183
5.523
5.499
4.072
4.049
4.024
3.999
3.975
3.878
3.859
3.837
3.383
3.365
2.506
1.822
1.802
1.127
1.104
1.080
1.063
1.040
1.017
Et
O
P
O
NH
O
Et
N
N
Me
Me
10
9
8
7
6
5
4
3
2
1
0
ppm
2.12
1.00
3.21
1.95
1.14
1.79
1.13
2.10
1.99
5.93
3.24
2.68

[1]H NMR of 7p


BRUKER
Current Data Parameters
NAME 3H-3
EXPNO 997
PROCNO 1
F2 - Acquisition Parameters
Date_ 20140928
Time 8.25
INSTRUM spect
PROBHD 5 mm Multinucl
PULPROG zg
TD 32768
SOLVENT DMSO
NS 16
DS 0
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 2.0447731 sec
RG 1024
DW 62.400 usec
DE 6.00 usec
TE 300.0 K
D1 5.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 9.00 usec
PL1 -6.00 dB
SFO1 400.1336012 MHz
F2 - Processing parameters
SI 32768
SF 400.1300065 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
ppm
2.069
2.427
2.471
2.486
3.423
3.449
3.477
3.564
3.635
3.662
5.978
5.999
6.854
6.875
6.929
6.959
7.610
7.628
7.643
7.660
7.713
7.730
7.855
7.958
8.185
8.203
7.44
3.03
3.32
1.88
1.82
1.05
1.93
1.10
1.04
1.06
1.00
Me
Me
Me
O
NH
P
O
O
N
N
Br

[1]H NMR of 7q


ZR4
1H NMR
Current Data Parameters
NAME Dr.ghahramanzade
EXPNO 5
PROCNO 1
F2 - Acquisition Parameters
Date_ 20151018
Time 11.23
INSTRUM spect
PROBHD 5 mm BBO BB-1H
PULPROG zg30
TD 32768
SOLVENT DMSO
NS 32
DS 1
SWH 7812.500 Hz
FIDRES 0.238419 Hz
AQ 2.0972021 sec
RG 228.1
DW 64.000 usec
DE 6.00 usec
TE 380.0 K
D1 2.00000000 sec
======== CHANNEL f1 ========
NUC1 1H
P1 7.80 usec
PL1 -2.00 dB
SFO1 300.1323986 MHz
F2 - Processing parameters
SI 65536
SF 300.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
8.214
8.191
8.149
8.122
7.929
7.905
7.879
7.873
7.865
7.860
7.838
7.825
7.815
7.691
7.679
7.669
7.665
6.368
6.338
6.256
6.220
6.079
6.056
6.049
3.709
3.673
3.554
3.518
3.411
3.392
2.511
2.506
2.500
MeO
NH
Me
O-Me
2.01
1.06
0.70
0.83
1.54
2.04
2.02
0.73
2.00
3.08
3.23
ppm

[1]H NMR of 7r