

**Catalyst-free synthesis of α^1 -oxindole- α -hydroxyphosphonates via
phospha-aldol reaction of isatins employing *N*-heterocyclic phosphine
(NHP)-thiourea**

Nagaraju Molleti and Jun Yong Kang^{*}

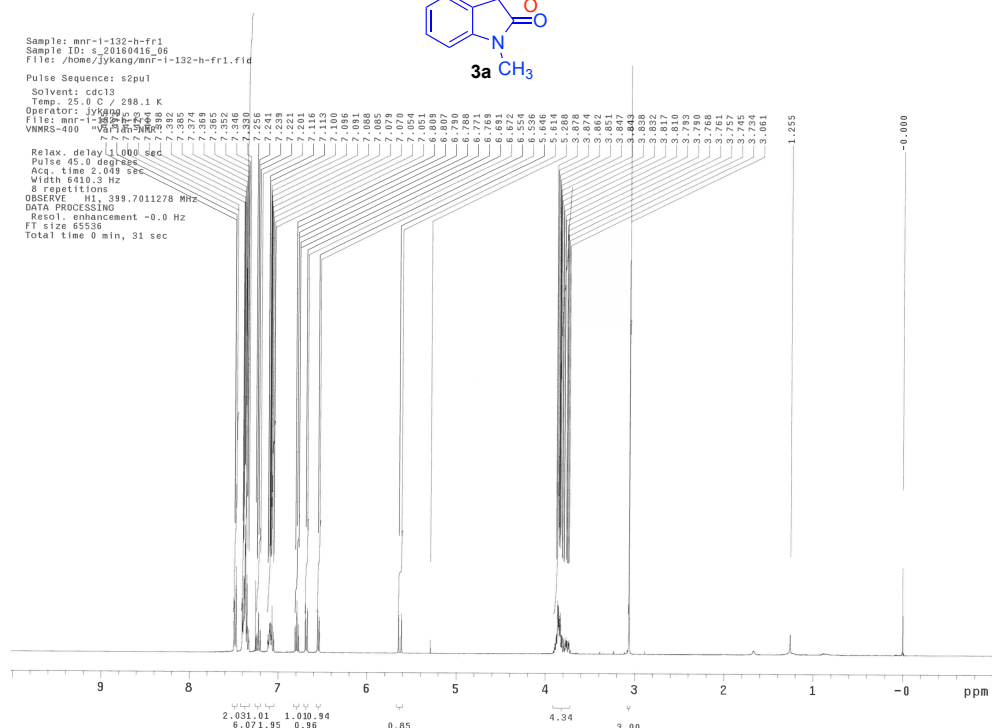
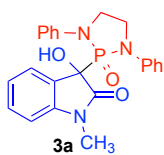
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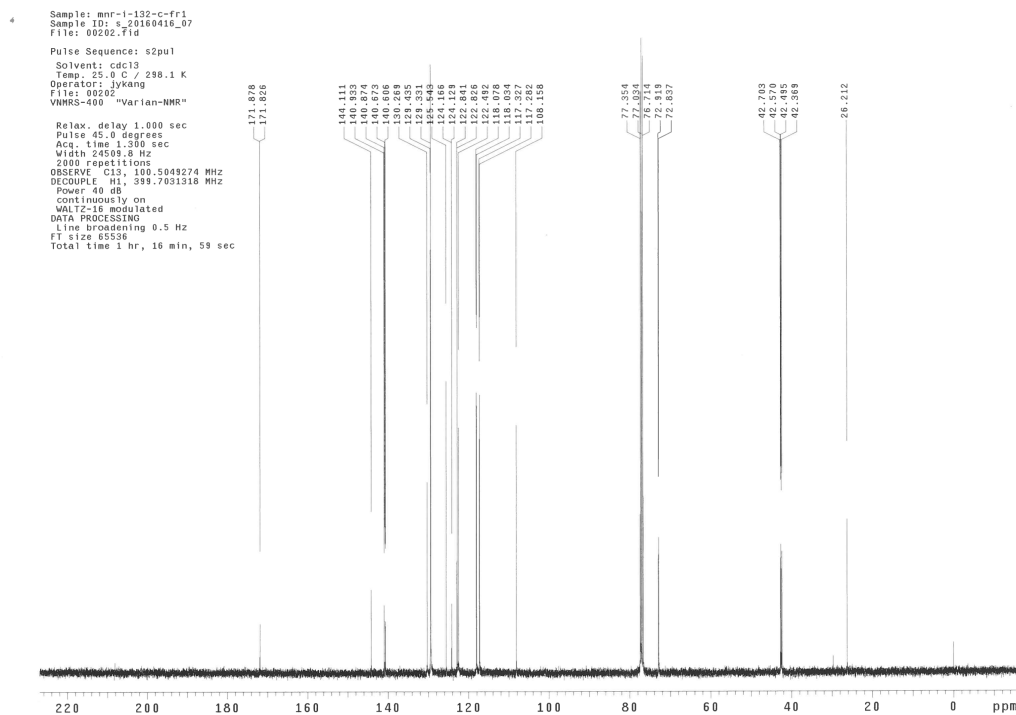
Supporting Information

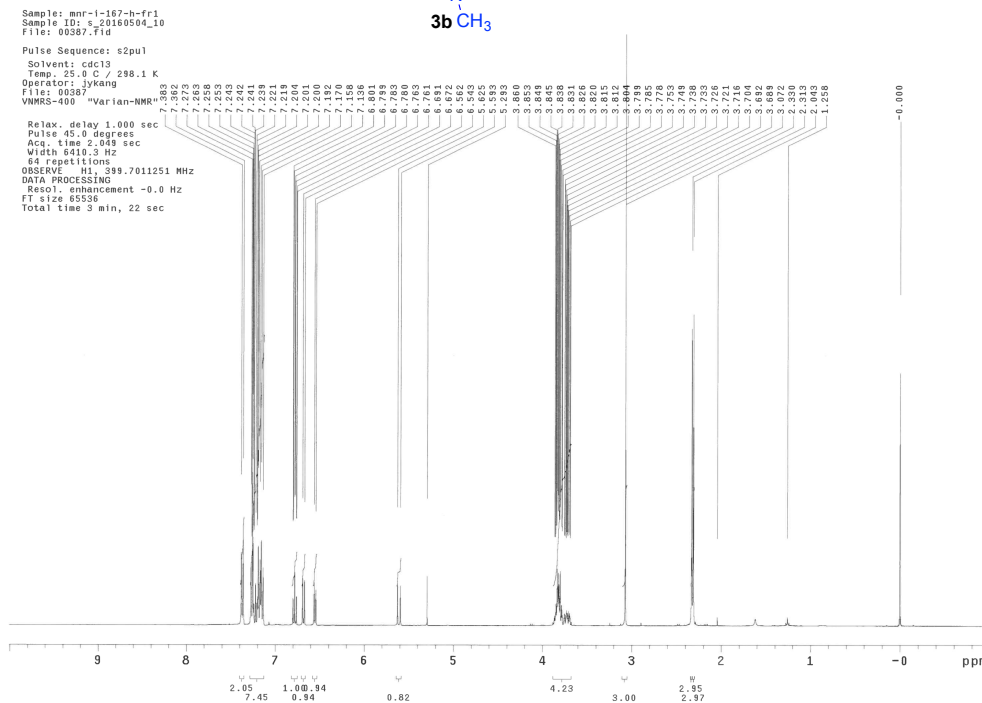
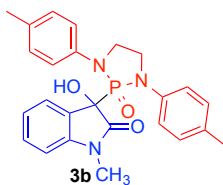
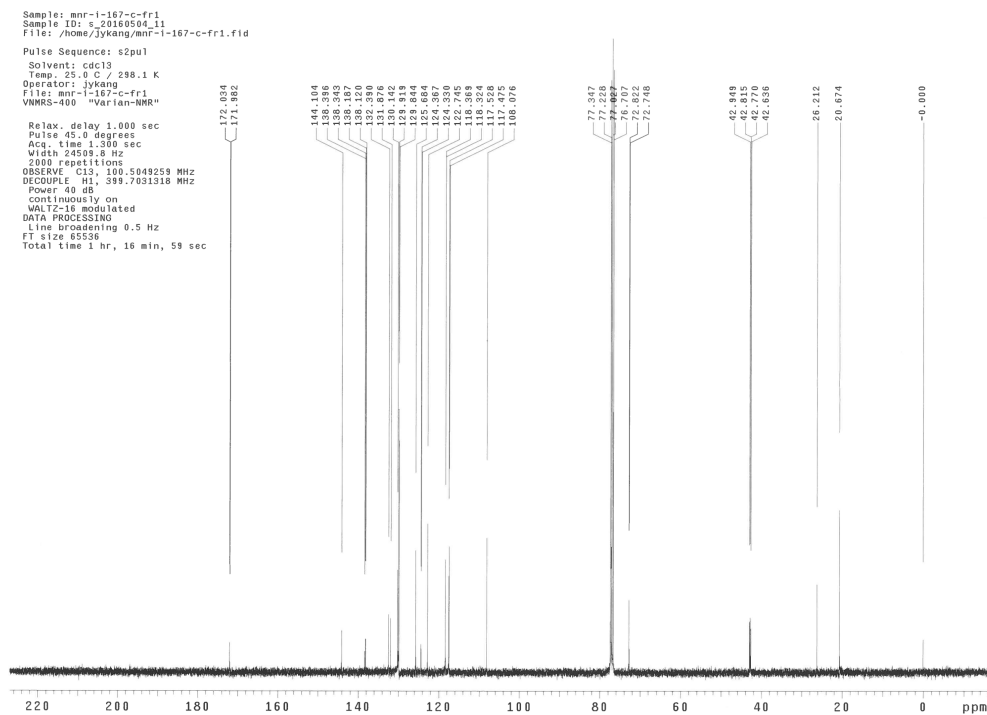
¹ H and ¹³ C NMR Spectra.....	S2
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¹H NMR (400 MHz) in CDCl₃

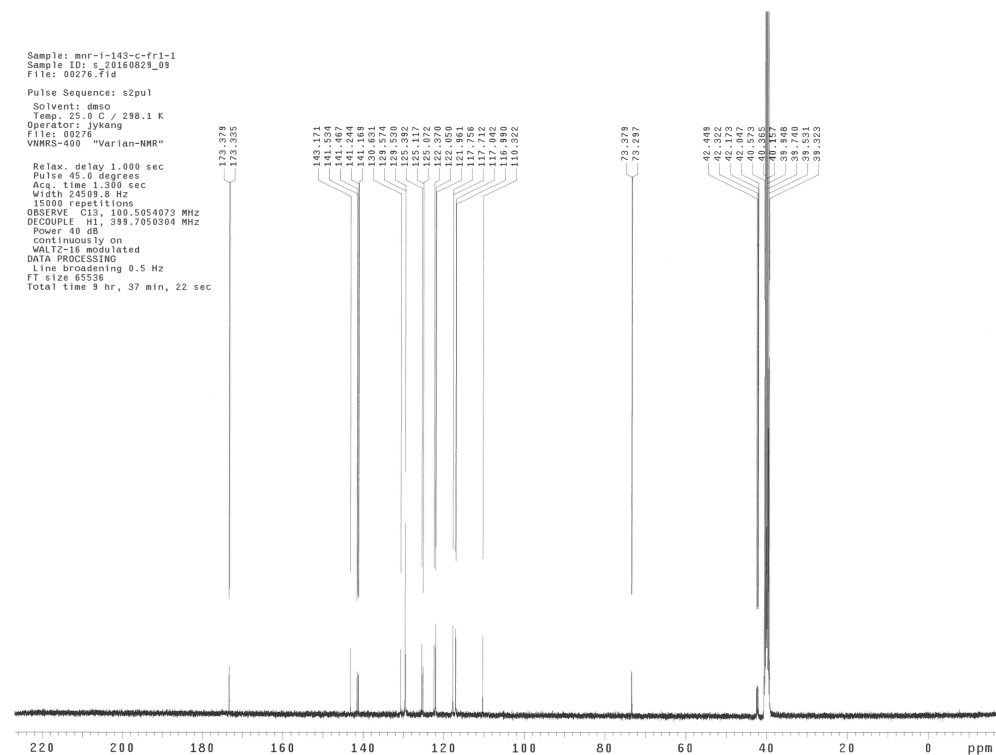
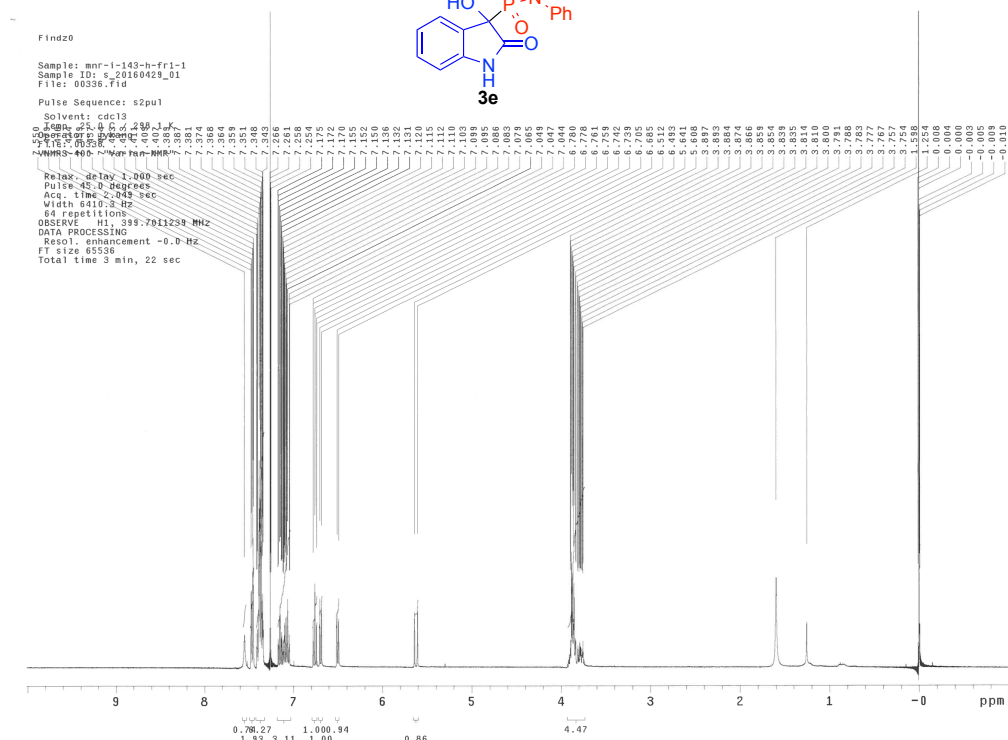
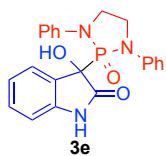


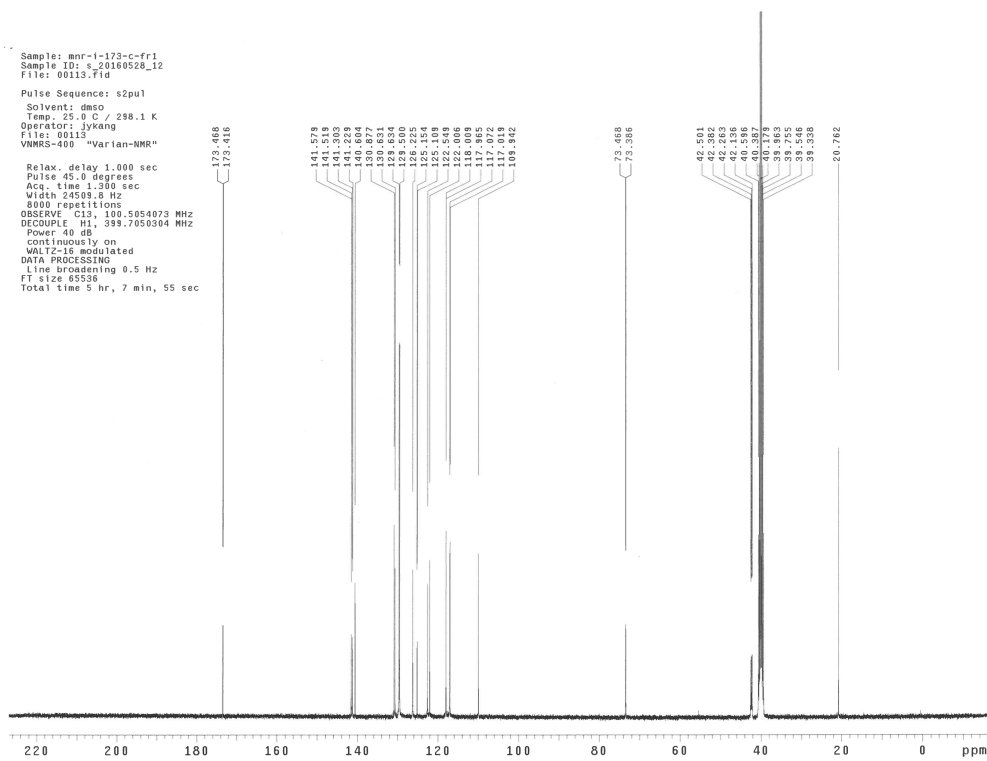
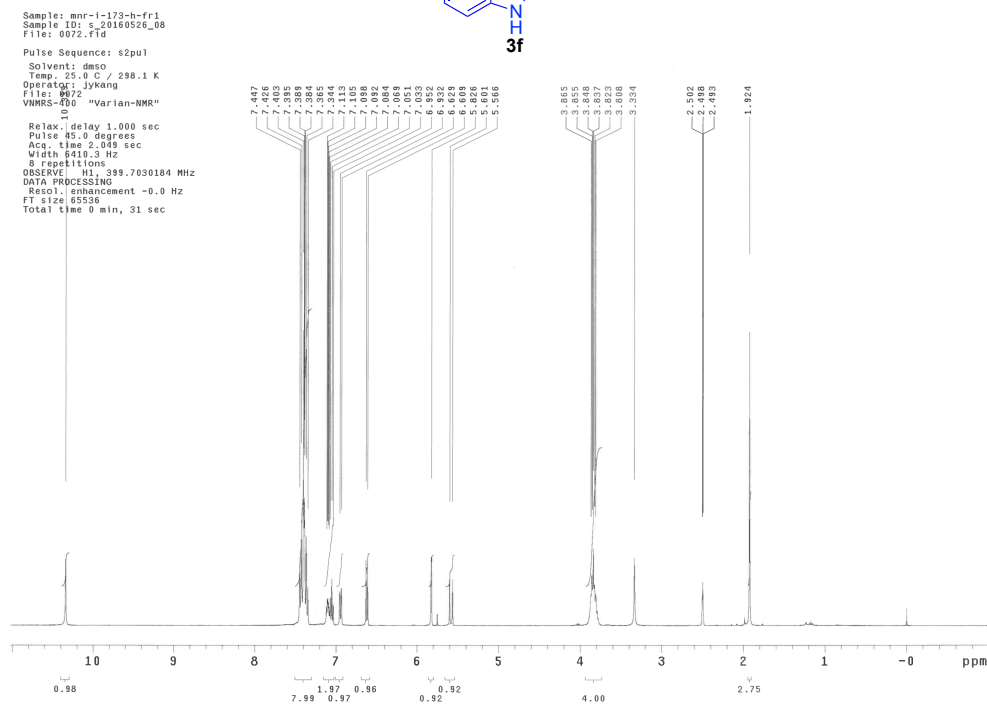
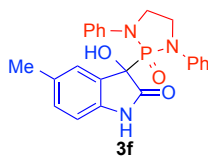
^{13}C NMR (100.5 MHz) in CDCl_3

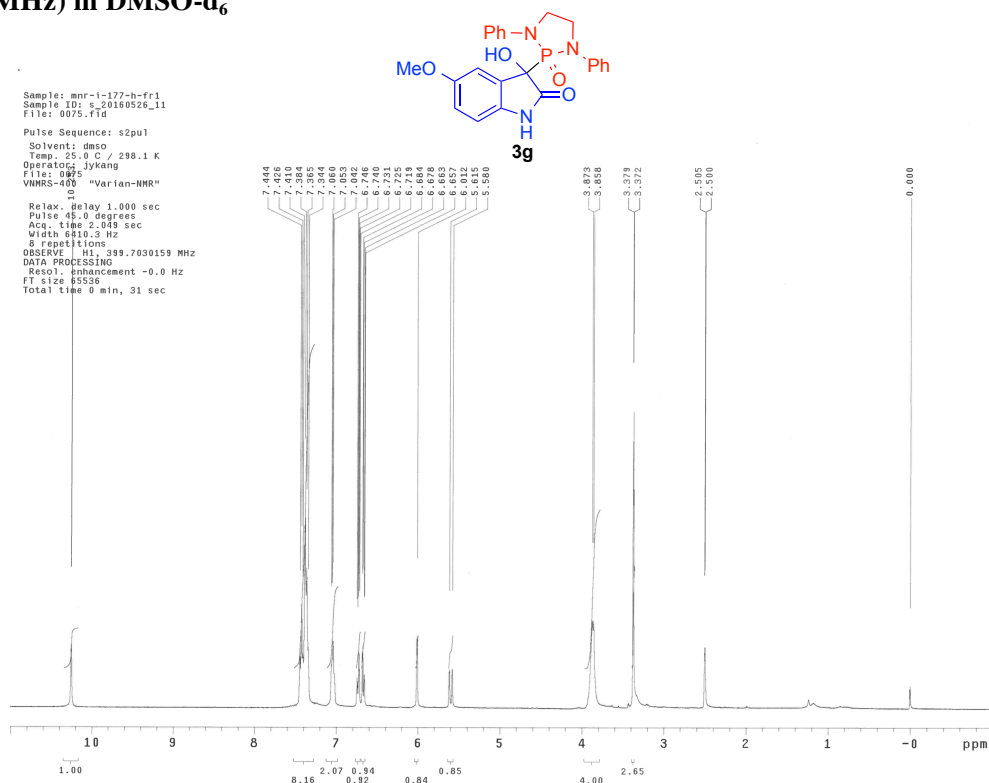
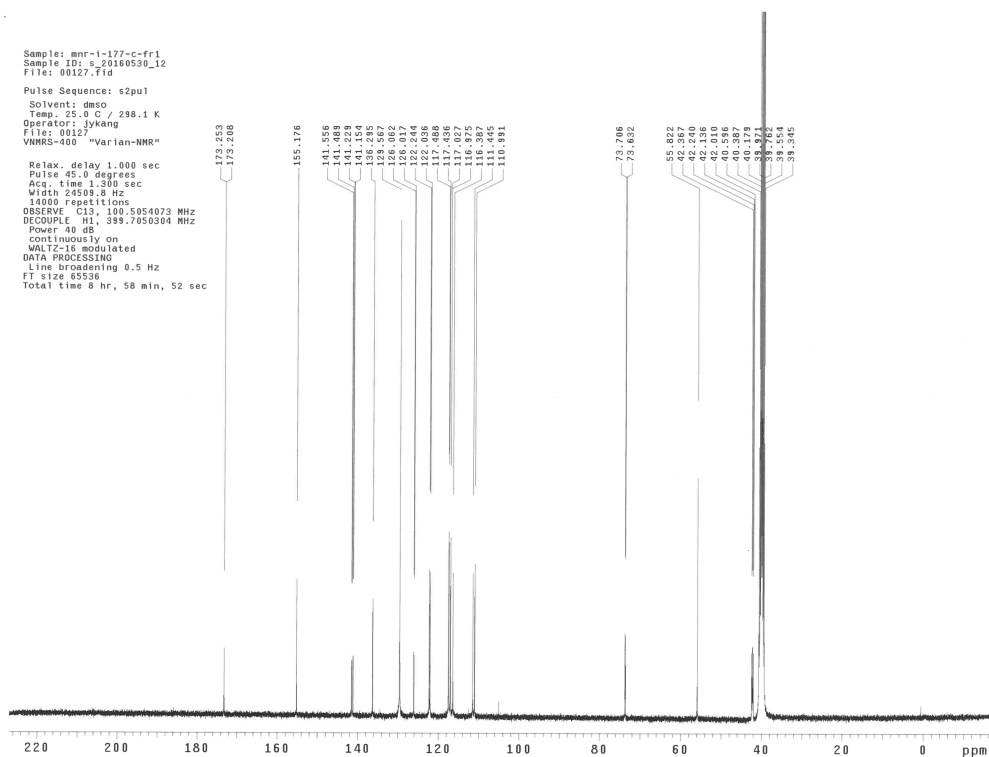


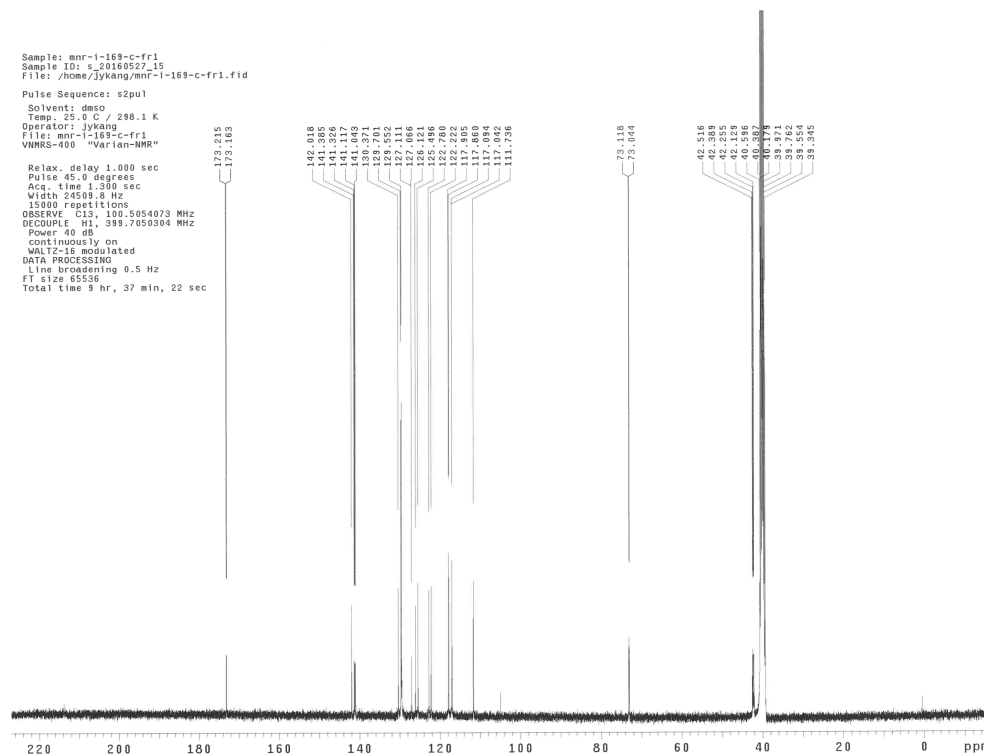
¹H NMR (400 MHz) in CDCl₃**¹³C NMR (100.5 MHz) in CDCl₃**

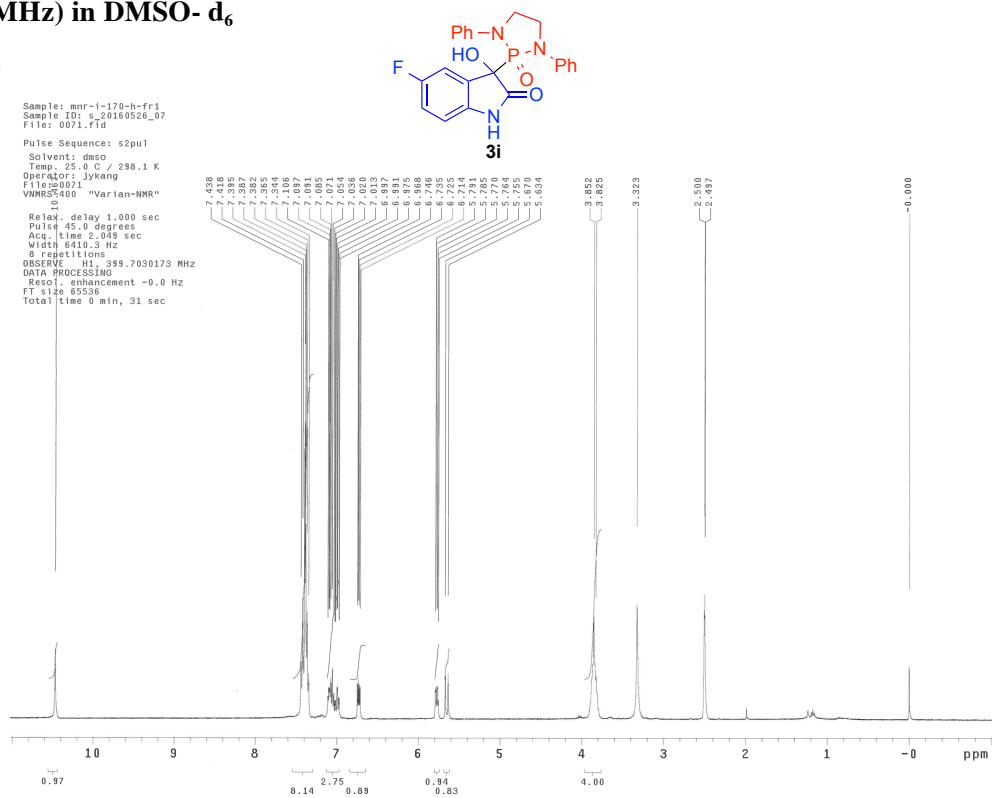
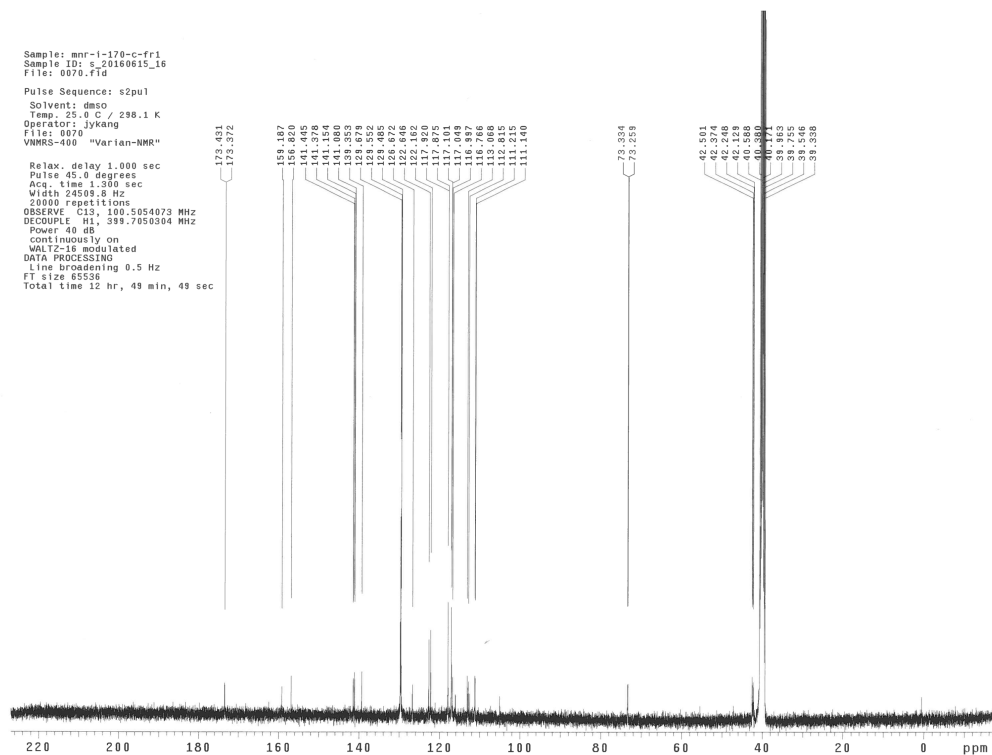
¹H NMR (400 MHz) in CDCl₃

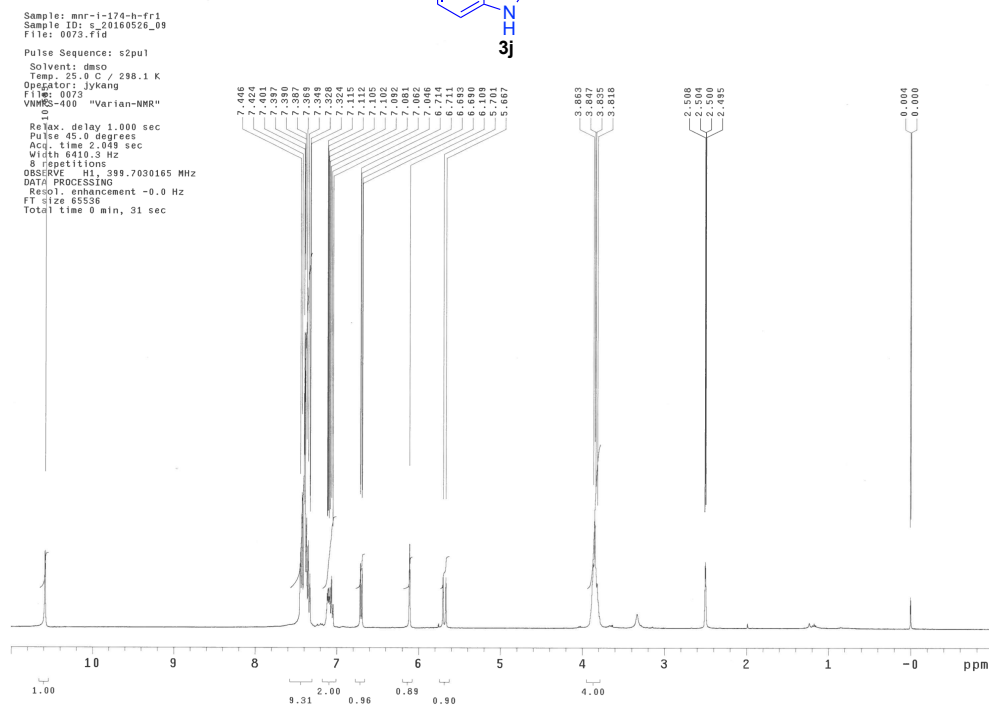
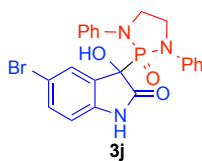
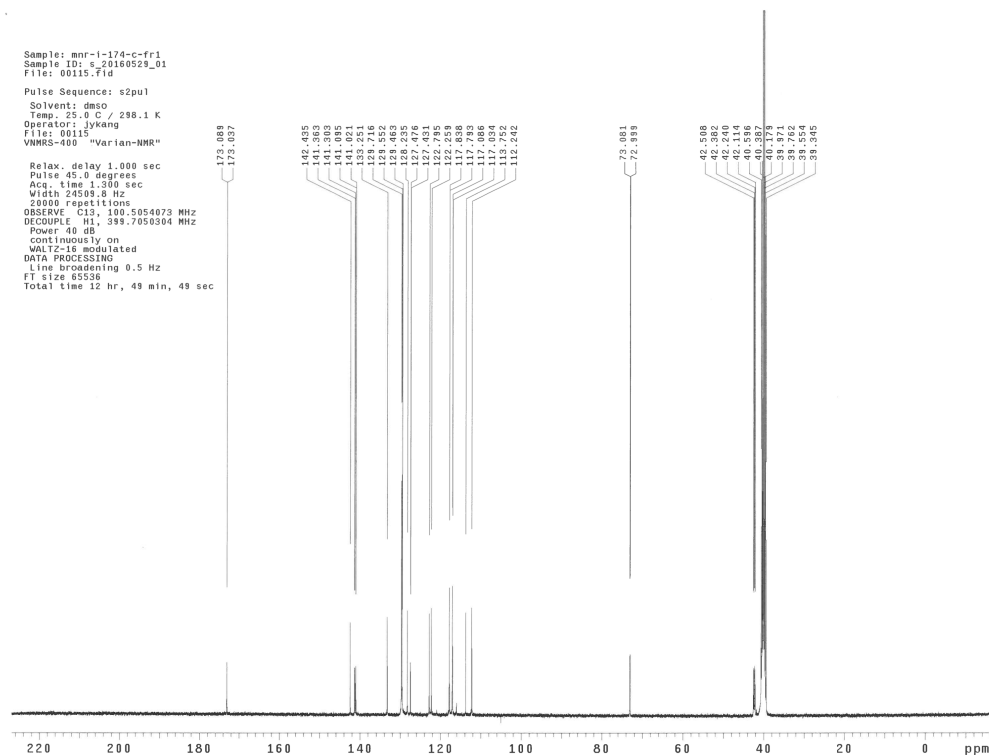


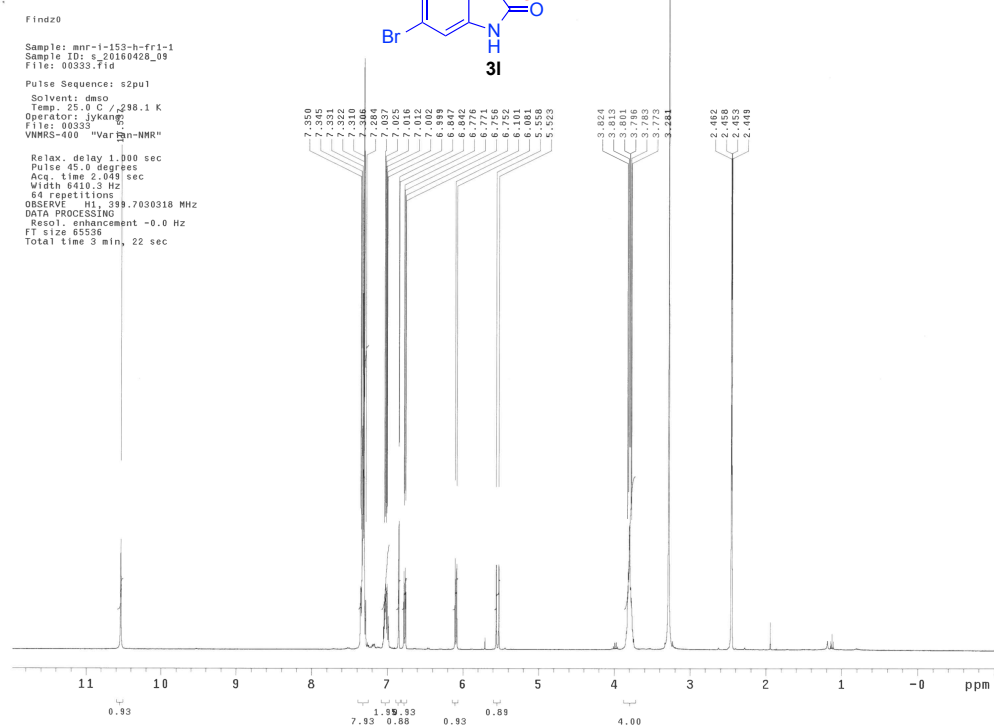
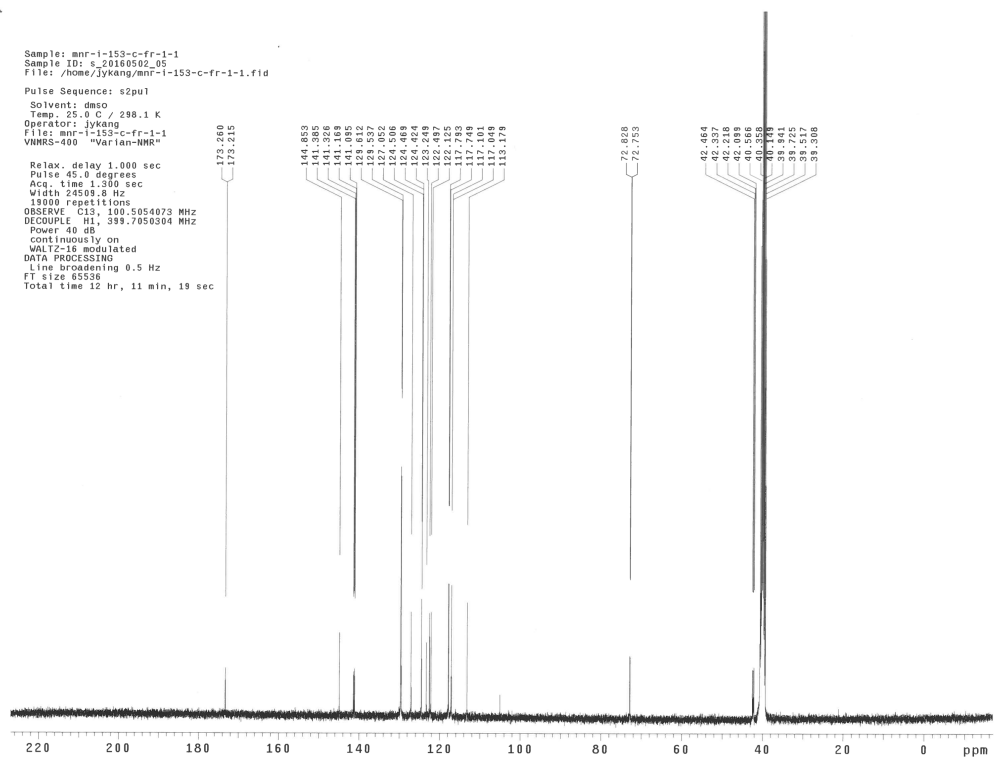


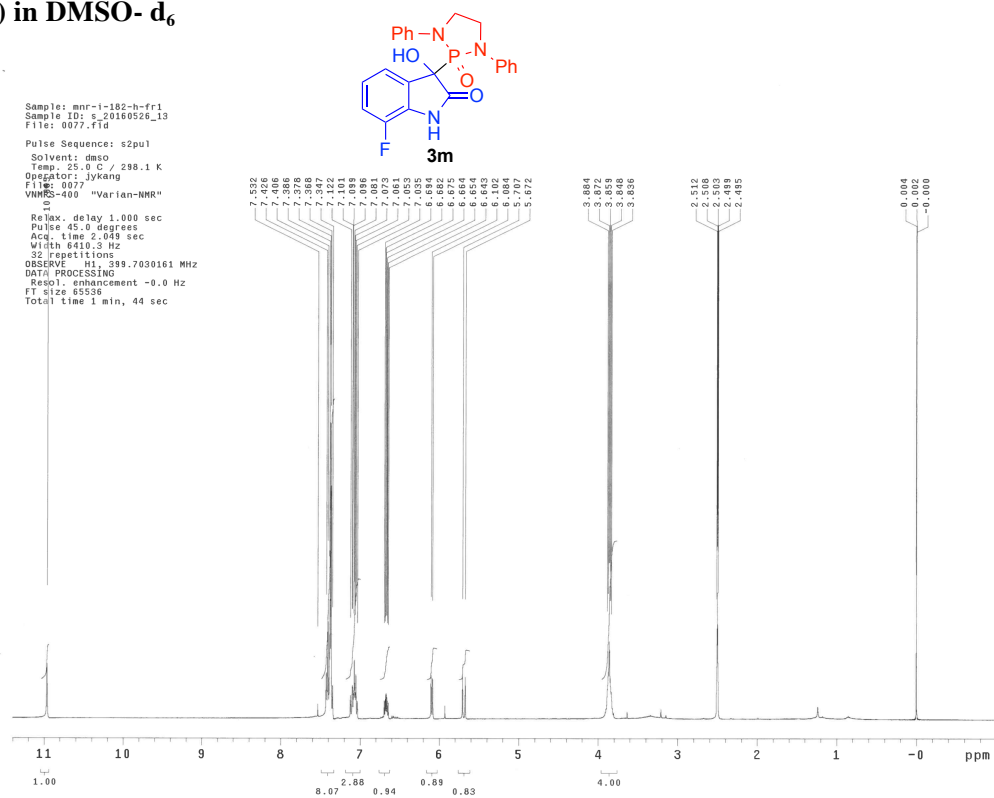
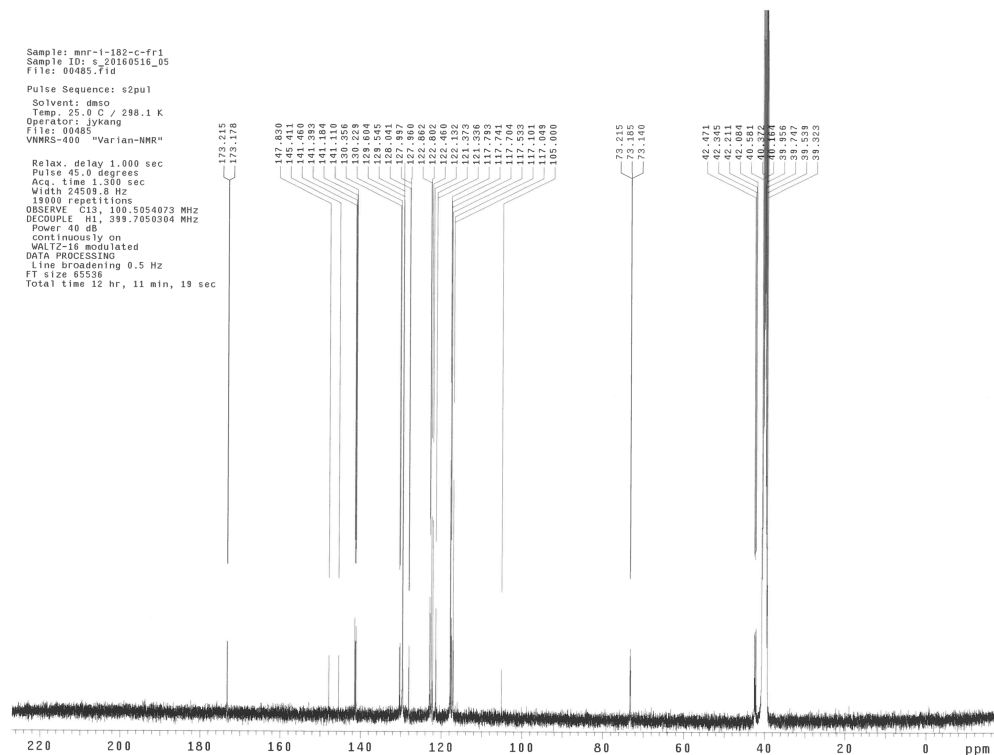
¹H NMR (400 MHz) in DMSO-d₆¹³C NMR (100.5 MHz) in DMSO-d₆

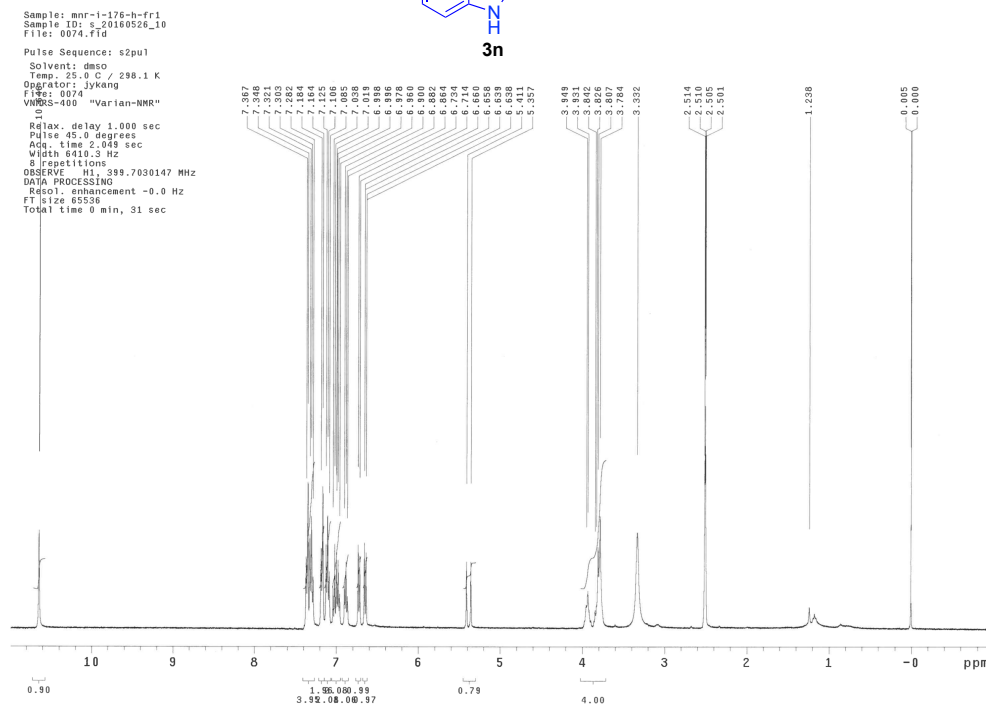
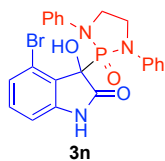
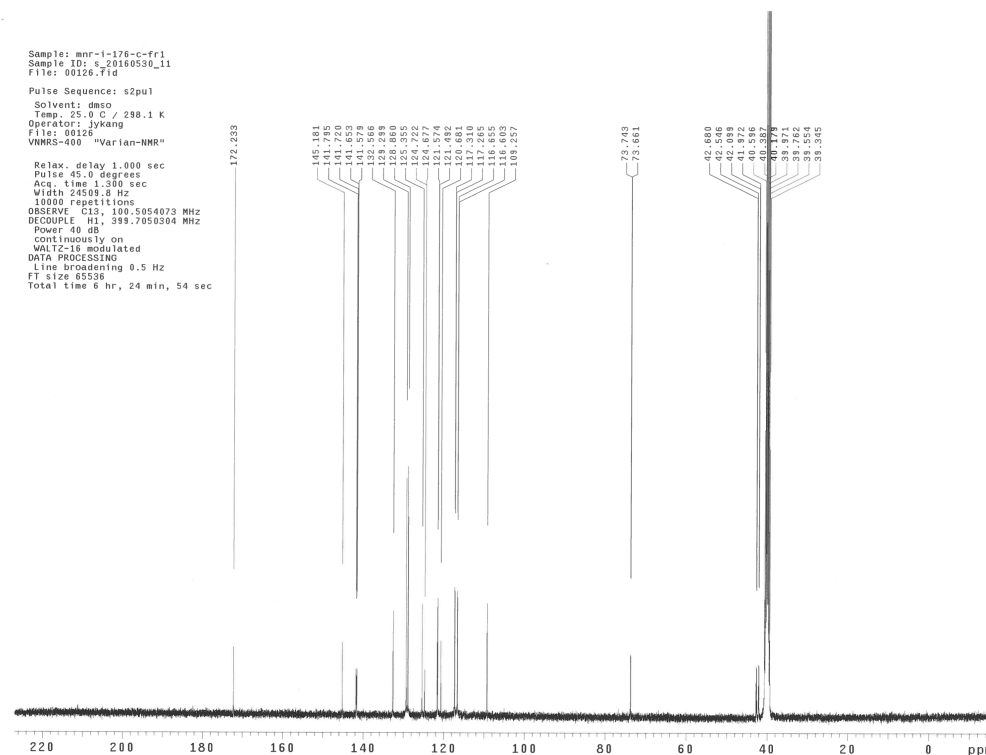


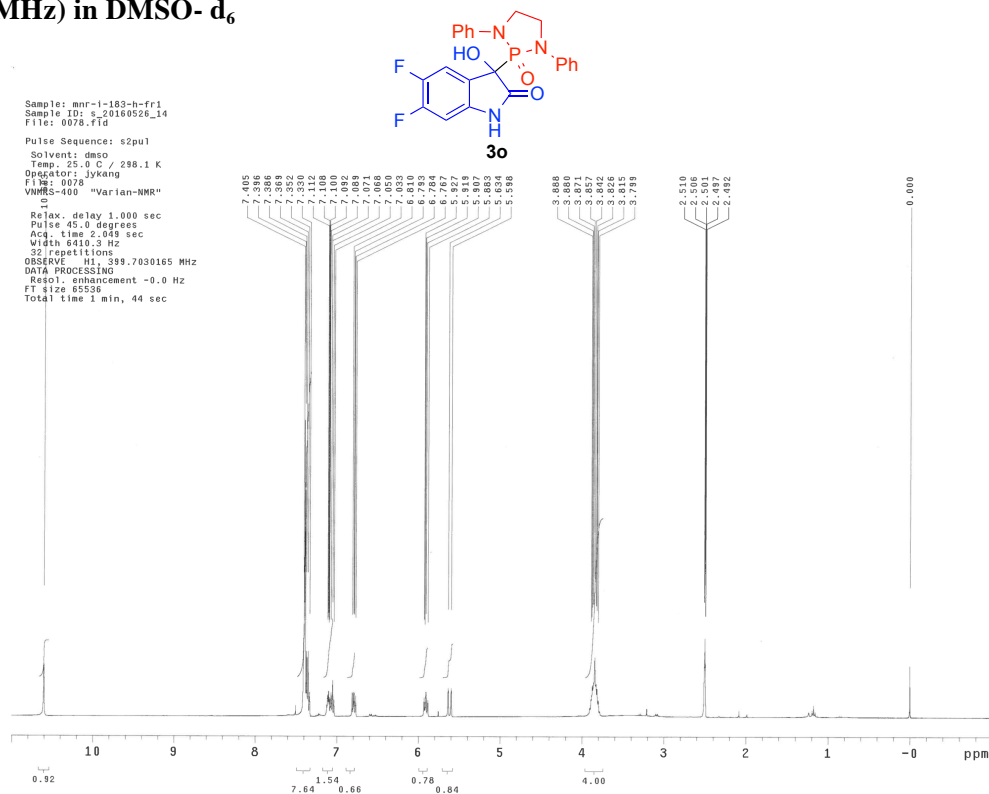
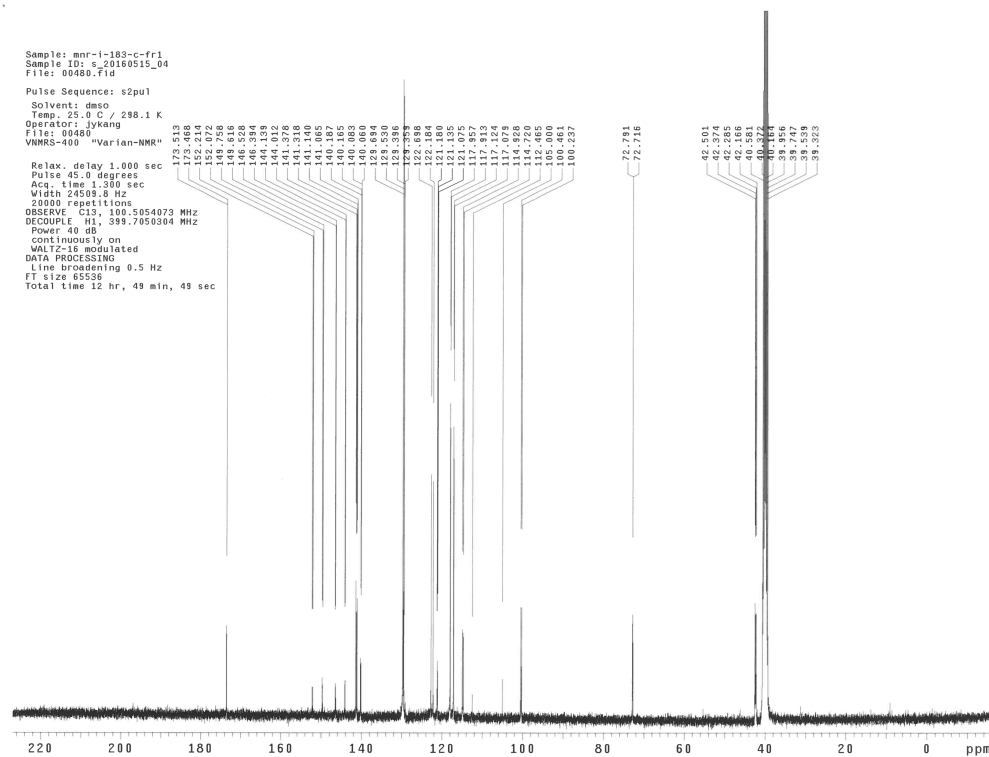
¹H NMR (400 MHz) in DMSO-*d*₆**¹³C NMR (100.5 MHz) in DMSO-*d*₆**

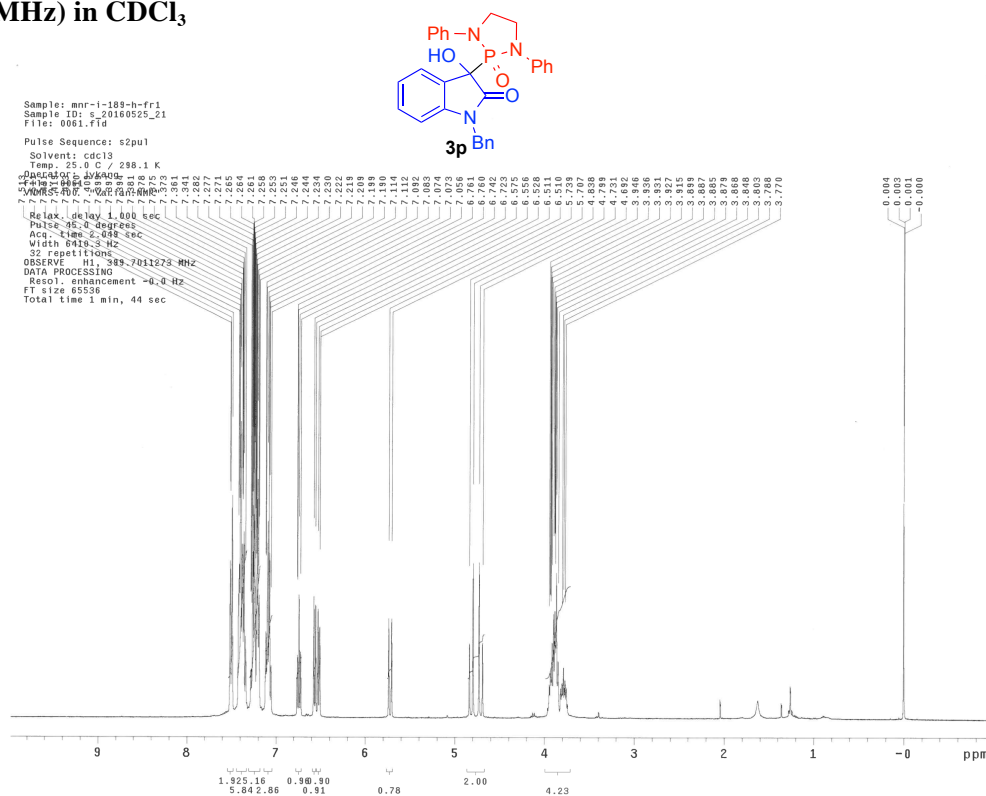
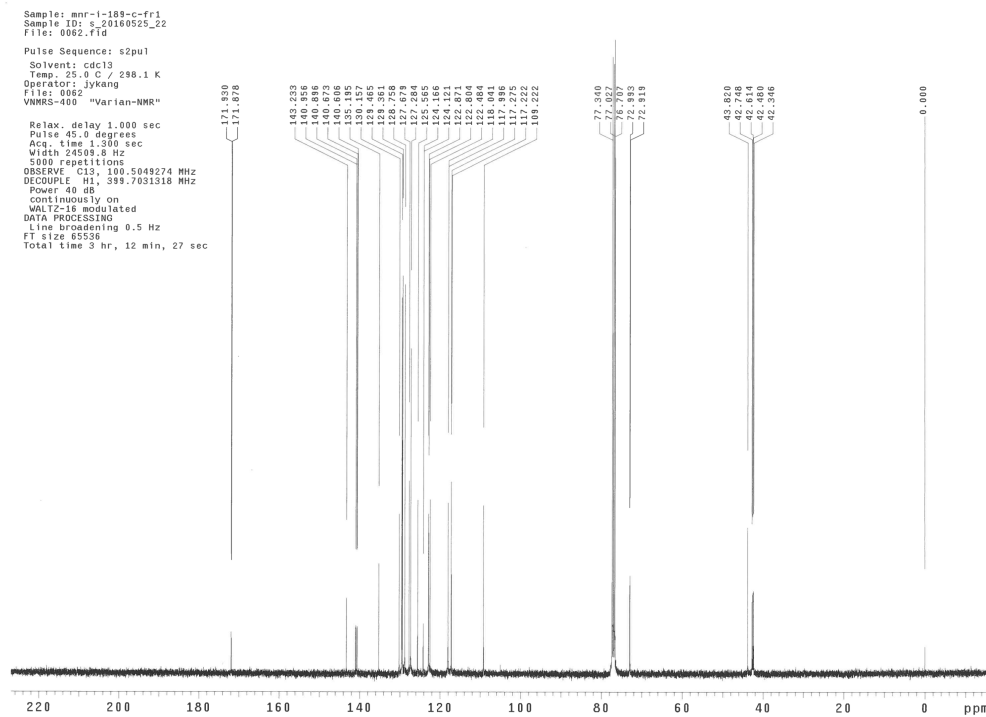
¹H NMR (400 MHz) in DMSO- d₆¹³C NMR (100.5 MHz) in DMSO- d₆

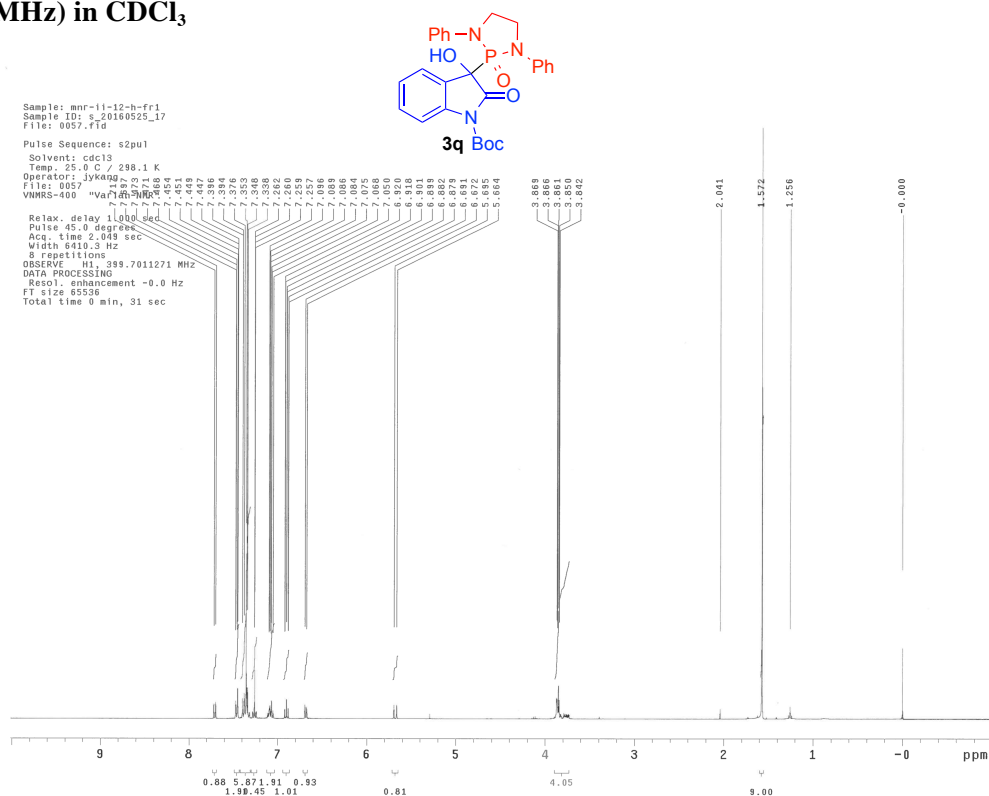
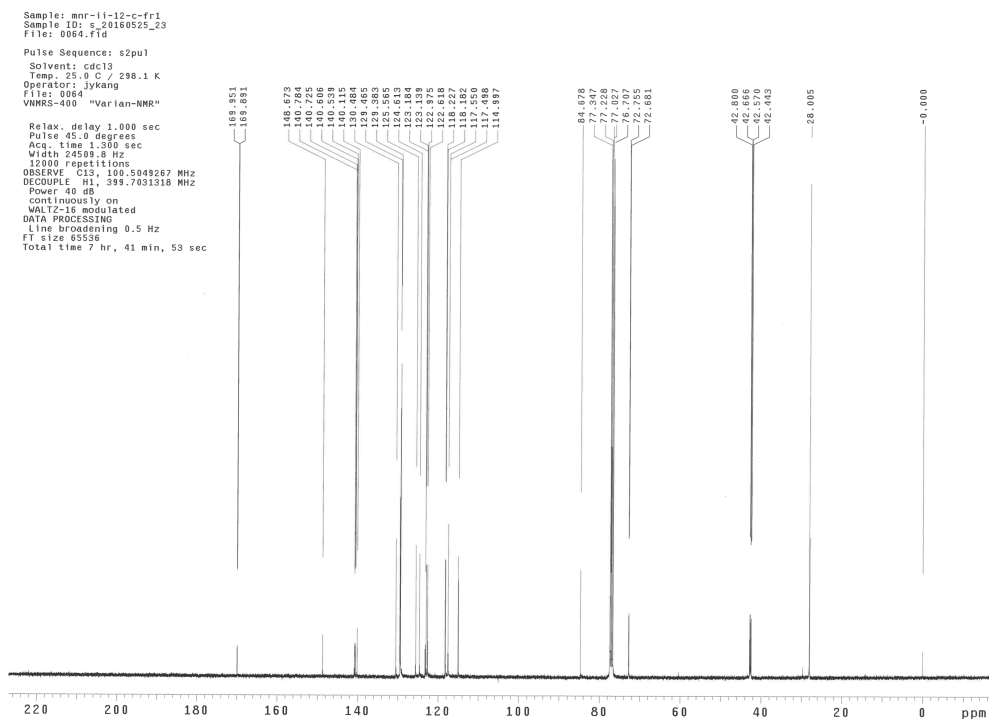
¹H NMR (400 MHz) in DMSO-*d*₆**¹³C NMR (100.5 MHz) in DMSO-*d*₆**

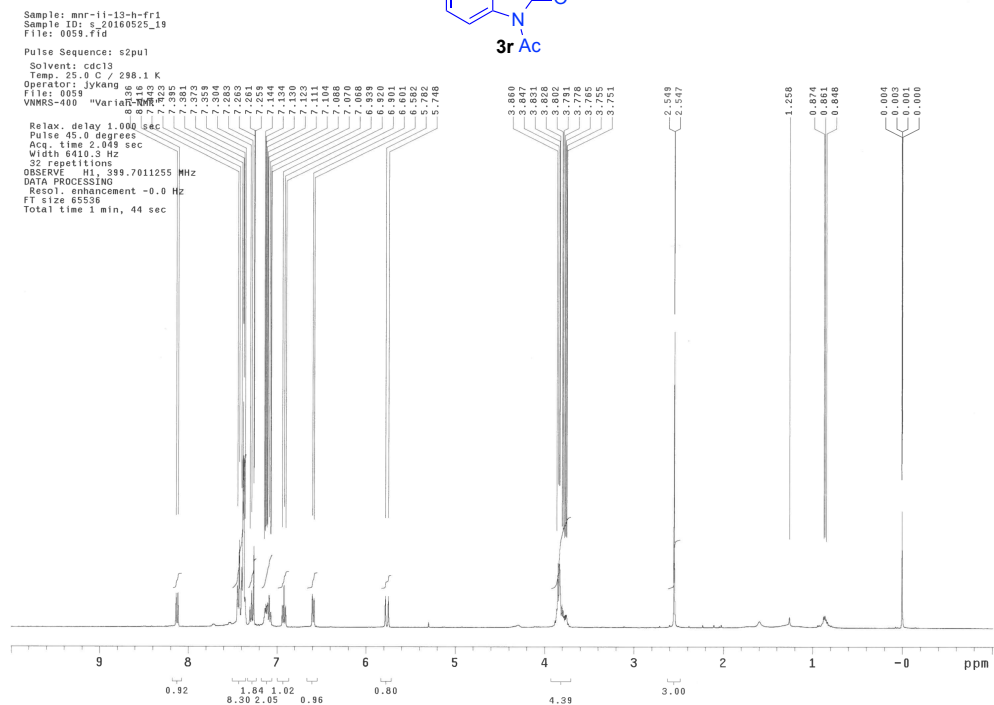
¹H NMR (400 MHz) in DMSO- d₆¹³C NMR (100.5 MHz) in DMSO- d₆

¹H NMR (400 MHz) in DMSO- d₆¹³C NMR (100.5 MHz) in DMSO- d₆

¹H NMR (400 MHz) in DMSO-*d*₆¹³C NMR (100.5 MHz) in DMSO-*d*₆

¹H NMR (400 MHz) in CDCl₃**¹³C NMR (100.5 MHz) in CDCl₃**

¹H NMR (400 MHz) in CDCl₃¹³C NMR (100.5 MHz) in CDCl₃



Sample: mnr-11-13-c-fr1
Sample ID: s_20160526_22
File: 0066.ftd

Pulse Sequence: szpu1
Solvent: cdcl3
Temp: 25.0 C / 298.1 K
Operator: jykang
Files: 0066
VNMR5-400 "Varian-NMR"

Relax. delay 1.000 sec
Pulse 45.0 degrees
Acq. time 1.360 sec
Width 24500.8 Hz
18000 repetitions
OBSERVE: C13, 100.5048267 MHz
DECOUPLE: H1, 399.7031316 MHz
Power 40 dB
continuously on
WALTZ-16 modulated
DATA PROCESSING
Line broadening 0.5 Hz
FT size 65536
Total time 11 hr, 32 min, 50 sec

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172.302
170.357
140.695
140.588
140.588
140.442
138.588
138.588
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138.353
138.267
138.267
128.370
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128.354
128.354
122.760
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118.100
118.100
117.513
117.461
116.575
77.340
77.228
77.097
72.971
72.897
42.815
42.674
42.603
42.398
26.412
-0.000

220 200 180 160 140 120 100 80 60 40 20 0 ppm

^1H NMR (400 MHz) in CDCl_3 