

Supporting Information

Consecutive Lossen rearrangement/transamidation reaction of hydroxamic acids under catalyst- and additive-free conditions

Mengmeng Jia,^a Heng Zhang,^a Yongjia Lin,^a Dimei Chen,^a Yanmei Chen,^b and Yuanzhi Xia^{a,b,*}

^a College of Chemistry and Materials Engineering, Wenzhou University, Wenzhou 325035, China

^b Hubei Key Laboratory of Processing and Application of Catalytic materials, Huanggang Normal
University, Huanggang 438000, China

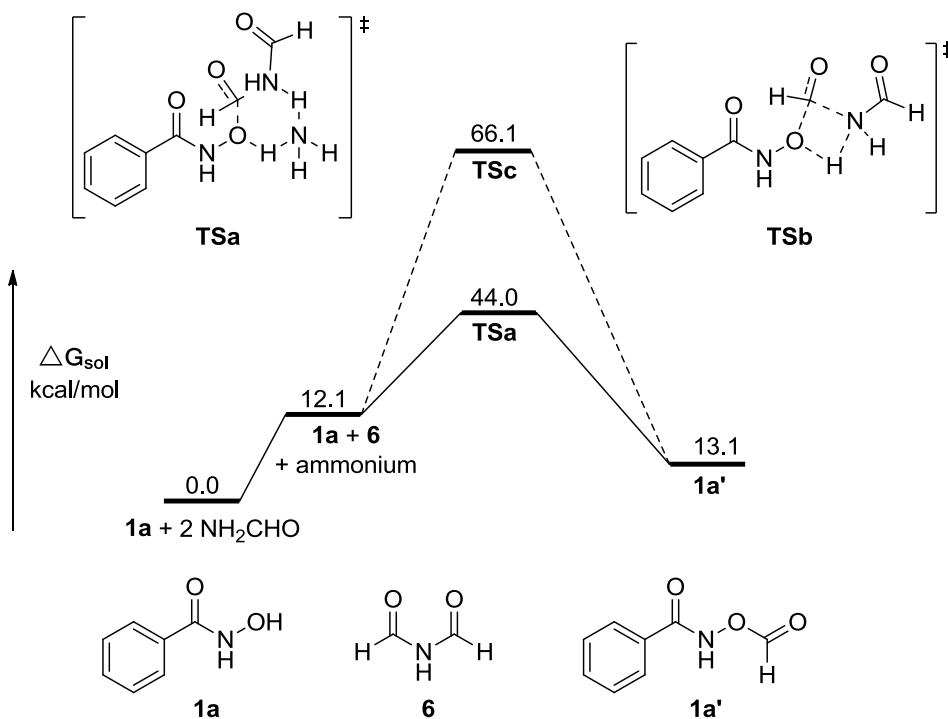
E-mail: xyz@wzu.edu.cn

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1. Predicted Energies for Generation of 1a' with Diformylimide

Calculations were done to investigate the possible generation of diformylimide (**6**) as a formylating agent to form **1a'**, however, the energy would be as high as 44.0 via a 6-membered ring TS (**TSa**). This energy is much higher than that shown in Scheme 2, indicating the diformylimide **6** should not be an efficient formylating agent in the reaction.



2. Calculated Cartesian Coordinates and Energies

1a			
C	-3.62323900	0.08607300	0.18973800
C	-2.25664100	-0.02132100	-0.03454500
C	-1.47054000	1.13093100	-0.11532100
C	-2.06526100	2.38764000	0.00661000
C	-3.43046000	2.49084400	0.23343900
C	-4.20939600	1.34072900	0.32901300
H	-4.23548400	-0.81209700	0.24261300
H	-1.80596300	-1.00183300	-0.18425100
H	-1.43486000	3.27027500	-0.07917400
H	-3.89093000	3.47179000	0.33472400
H	-5.28079700	1.42307600	0.50323200
C	-0.00741400	1.08316000	-0.33627200
O	0.65722800	2.01433100	-0.77819300
N	0.60849400	-0.10845600	-0.03807800
H	0.30786500	-0.61811900	0.78631400
O	1.99443000	-0.07115900	-0.09132500
H	2.15391600	0.85377300	-0.38943100

Energies:

Sum of electronic and zero-point Energies = -475.671662

Sum of electronic and thermal Enthalpies = -475.662288

Sum of electronic and thermal Free Energies = -475.705213

Electronic energies = -475.8037364

Single point energies in solution = -475.811981800

NH₂CHO

N	-1.77501100	0.96517300	-0.21099500
H	-1.19945900	0.82986100	-1.02826700
H	-2.76624900	0.77269600	-0.26928000
C	-1.25883600	1.38859800	0.97253000
H	-0.16210900	1.56111700	0.90533900
O	-1.89805800	1.56283400	1.98475800

Energies:

Sum of electronic and zero-point Energies = -169.748427

Sum of electronic and thermal Enthalpies = -169.743454

Sum of electronic and thermal Free Energies = -169.773760

Electronic energies = -169.7936007

Single point energies in solution = -169.802301036

TS1

C	-3.64848100	1.77098200	1.96145900
C	-2.73832900	1.00044400	1.24709900
C	-2.17555700	1.48828600	0.06458700
C	-2.56488800	2.74382800	-0.40568600
C	-3.47130000	3.51352300	0.30922200
C	-4.01202700	3.03114800	1.49814800
H	-4.08598200	1.37812200	2.87780500
H	-2.49795300	-0.00368900	1.59622200
H	-2.13921800	3.09506100	-1.34321200

H	-3.76172800	4.49458600	-0.06300500
H	-4.72624200	3.63264100	2.05801500
C	-1.19080600	0.72846500	-0.75745700
O	-1.11724500	0.90623000	-1.98795400
N	-0.41577800	-0.12688600	-0.06916000
H	-0.43733000	-0.11657600	0.94561900
O	0.52080900	-0.92810300	-0.59800100
H	0.62246200	-0.88206300	-2.12658600
N	1.14658500	-0.17822100	-2.78413200
H	1.57777100	-0.53064700	-3.63993200
H	0.38295500	0.52148300	-2.91417900
C	2.08617200	0.35193800	-1.74236200
H	2.81722500	-0.41384800	-1.44444000
O	2.06308100	1.49925100	-1.41843700

Energies:

Sum of electronic and zero-point Energies = -645.379103

Sum of electronic and thermal Enthalpies = -645.366356

Sum of electronic and thermal Free Energies = -645.417496

Electronic energies = -645.5569559

Single point energies in solution = -645.578309467

1a'

C	-1.53272400	2.30923600	1.46377600
C	-1.07941000	1.01413900	1.24550800
C	-0.94677600	0.53422800	-0.05992400
C	-1.28461100	1.35624300	-1.13685800
C	-1.72116400	2.65461300	-0.91592100
C	-1.84463100	3.13229900	0.38589800
H	-1.64617500	2.67796300	2.48163000
H	-0.84342800	0.36956600	2.08895000
H	-1.19866800	0.95058900	-2.14285500
H	-1.97317900	3.29401100	-1.75986100
H	-2.19337100	4.14872600	0.56149900
C	-0.52858900	-0.85526400	-0.38496700
O	-0.91008400	-1.43170300	-1.39141100
N	0.24935900	-1.56036800	0.52721000
H	0.74622000	-2.36155700	0.08119800
O	1.14253800	-0.82083300	1.33227800
H	1.64217700	-4.32895900	-1.50036100
N	1.46347900	-3.34270500	-1.33111900
H	2.25195200	-2.81426800	-1.69786500
H	0.64972600	-3.06930900	-1.88387200
C	2.17237000	-0.26792100	0.64908200
H	2.80564400	0.25473100	1.38566500
O	2.36063400	-0.33362400	-0.53039900

Energies:

Sum of electronic and zero-point Energies = -645.431763

Sum of electronic and thermal Enthalpies = -645.417723

Sum of electronic and thermal Free Energies = -645.471854

Electronic energies = -645.6120075

Single point energies in solution = -645.615191152

TS2

C	-4.02560700	2.05296300	1.77216900
C	-3.08408000	1.16799100	1.26186900
C	-2.11958900	1.61934900	0.35667900
C	-2.11978100	2.95732400	-0.04063700
C	-3.06413300	3.83926100	0.46750900
C	-4.01631400	3.38823900	1.37771000
H	-4.77681400	1.69741500	2.47567700
H	-3.08890300	0.11954800	1.55121900
H	-1.36912900	3.27994900	-0.75963800
H	-3.06108900	4.88140400	0.15216700
H	-4.75820600	4.07879700	1.77622300
C	-1.06541200	0.72217000	-0.20878500
O	-0.30153100	1.10937300	-1.10218000
N	-0.97247000	-0.47217500	0.46330400
H	0.20798000	0.03021000	1.28602000
O	0.01902300	-1.29918300	-0.20409900
H	1.38147400	0.75911900	0.33058300
N	1.31154000	0.37829400	1.28760800
H	1.91248800	-0.44126300	1.36412100
H	1.54624200	1.08121800	1.98553500
C	-0.37174600	-1.79082700	-1.39369800
H	-1.41416400	-1.51177200	-1.63959900
O	0.35019800	-2.47557300	-2.05990300

Energies:

Sum of electronic and zero-point Energies = -645.396693

Sum of electronic and thermal Enthalpies = -645.383397

Sum of electronic and thermal Free Energies = -645.436147

Electronic energies = -645.5733252

Single point energies in solution = -645.5733252

1a''

C	-1.88657900	0.92898600	3.67081000
C	-1.47939000	0.17799300	2.57400300
C	-0.98138200	0.80414800	1.42727400
C	-0.90456100	2.19624400	1.40865000
C	-1.31030700	2.95096100	2.50404200
C	-1.80398400	2.32003200	3.64236700
H	-2.27323300	0.42567700	4.55847300
H	-1.53952700	-0.90818100	2.58516600
H	-0.51377800	2.64894000	0.49817200
H	-1.24183700	4.03951200	2.47094000
H	-2.12281900	2.90771800	4.50430900
C	-0.51203600	0.06552100	0.18312500
O	-0.11502800	0.72860500	-0.78984200
N	-0.61568800	-1.24838500	0.37384800
O	-0.16492700	-1.91072500	-0.83665600

C	-0.12753500	-3.21472300	-0.66225800
H	-0.42773100	-3.50068800	0.36846900
O	0.19529900	-4.00389300	-1.52304400

Energies:

Sum of electronic and zero-point Energies = -588.408914

Sum of electronic and thermal Enthalpies = -588.397765

Sum of electronic and thermal Free Energies = -588.446255

Electronic energies = -588.5365148

Single point energies in solution = -588.616630238

NH₄⁺

N	1.81196400	-0.80454300	0.00000000
H	2.15482100	-1.77458600	-0.00000100
H	2.15491400	-0.31944200	0.84007300
H	2.15491400	-0.31944300	-0.84007200
H	0.78353700	-0.80454300	0.00000000

Energies:

Sum of electronic and zero-point Energies = -56.802092

Sum of electronic and thermal Enthalpies = -56.798296

Sum of electronic and thermal Free Energies = -56.821754

Electronic energies = -56.8516768

Single point energies in solution = -56.9835233624

TS3

C	-2.19706100	1.07347900	3.60509800
C	-2.10658800	0.26817700	2.47668500
C	-1.30111700	0.65595100	1.40553400
C	-0.57568900	1.84571200	1.47685300
C	-0.66854700	2.64926900	2.60644500
C	-1.47956600	2.26643200	3.67333000
H	-2.82554400	0.76835700	4.44208100
H	-2.65098300	-0.67320800	2.41113600
H	0.06038100	2.12458200	0.63743900
H	-0.10086500	3.57854800	2.65989800
H	-1.54642100	2.89467600	4.56119100
C	-1.57574400	-0.02888600	-0.10028000
O	-2.42722900	0.32082200	-0.87871700
N	-0.60647100	-0.69860500	0.35596100
O	-0.19384500	-2.04797000	-1.11688600
C	0.56032000	-2.93611000	-0.60141200
H	0.78945400	-2.76699000	0.48908400
O	1.04357000	-3.92219600	-1.16029200

Energies:

Sum of electronic and zero-point Energies = -588.363391

Sum of electronic and thermal Enthalpies = -588.352112

Sum of electronic and thermal Free Energies = -588.401096

Electronic energies = -588.4862543

Single point energies in solution = -645.556547143

3a'

C	-0.59704700	2.53036800	2.59362400
C	-1.47770000	1.59469900	2.06793800
C	-0.98142600	0.52714000	1.31632900
C	0.38921500	0.40257900	1.09412000
C	1.25997100	1.34500400	1.62508800
C	0.77224000	2.41045800	2.37565100
H	-0.98679900	3.36112300	3.17902800
H	-2.55048700	1.68213900	2.23379300
H	0.75144500	-0.43736900	0.50561800
H	2.32946500	1.24410500	1.45029300
H	1.45838000	3.14636700	2.78989400
C	-2.98942100	-0.74833800	0.69182600
O	-4.07984600	-1.15560200	0.54116500
N	-1.82970700	-0.43524000	0.77242800

Energies:

Sum of electronic and zero-point Energies = -399.360875

Sum of electronic and thermal Enthalpies = -399.352794

Sum of electronic and thermal Free Energies = -399.393390

Electronic energies = -399.4647583

Single point energies in solution = -399.460751906

HCO₂NH₄

N	-0.27855200	0.78347700	-1.13915100
H	-0.17776700	0.06213400	-1.84862500
H	0.55111000	1.37838400	-1.17618500
H	-1.08351100	1.35097200	-1.39193700
H	0.02890900	0.39340200	0.53550200
O	0.43716700	0.33695600	1.45881200
C	1.52693500	1.07834100	1.47030800
H	2.00513600	1.04198200	2.46641700
O	1.97406800	1.72085400	0.54597700

Energies:

Sum of electronic and zero-point Energies = -246.127417

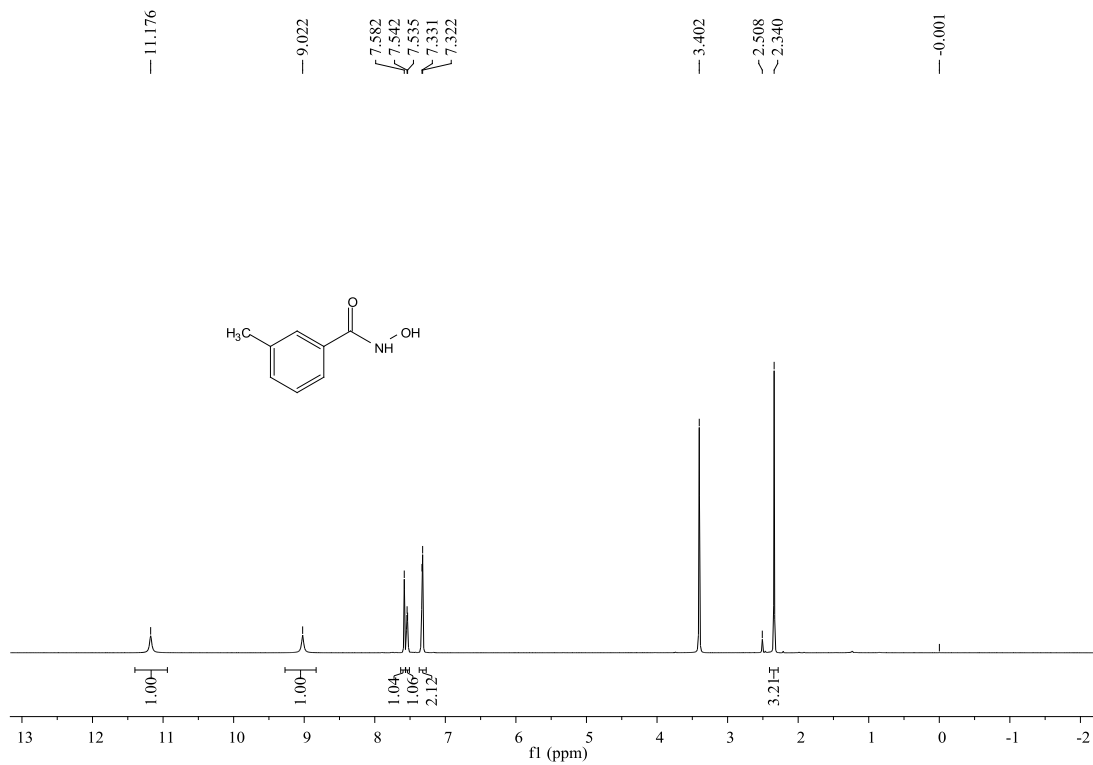
Sum of electronic and thermal Enthalpies = -246.120417

Sum of electronic and thermal Free Energies = -246.156284

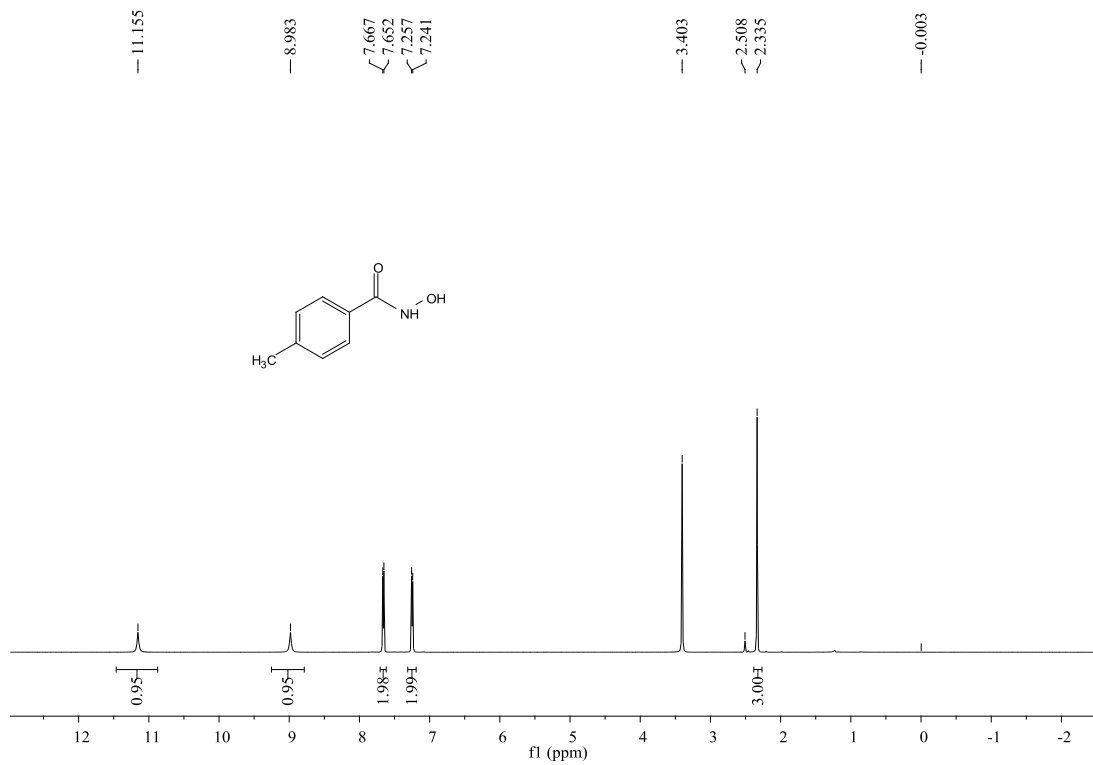
Electronic energies = -246.1997263

Single point energies in solution = -246.201232912

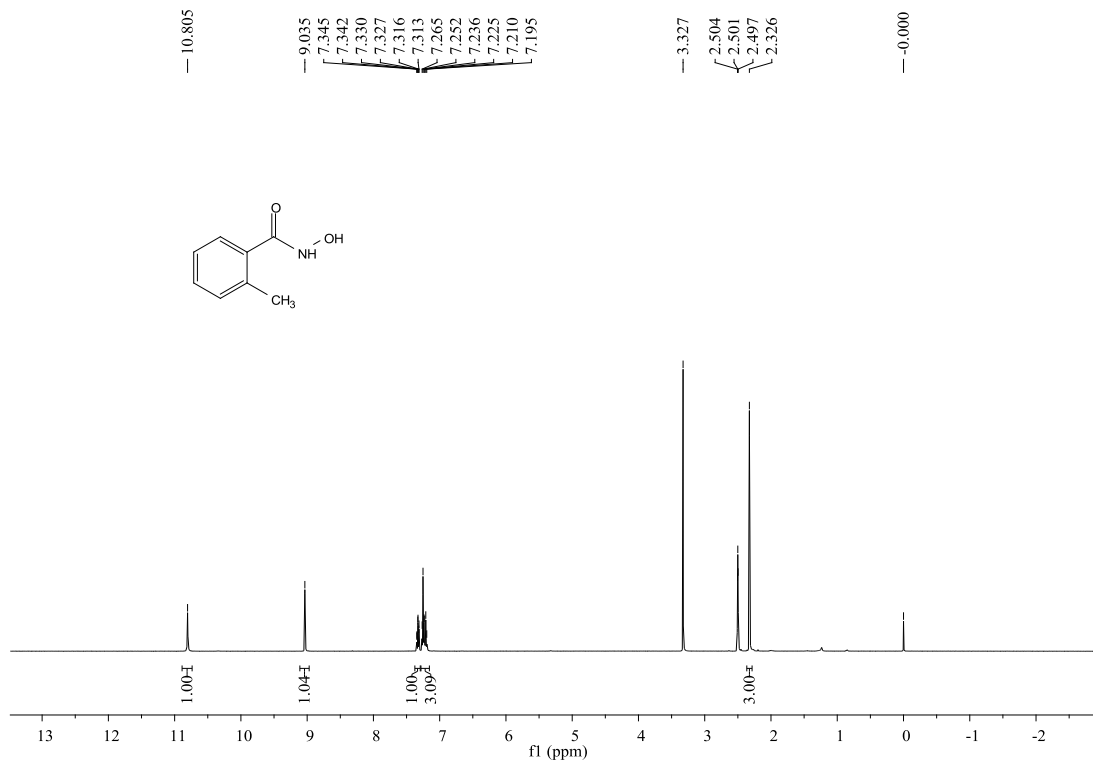
3. Copy of NMR Spectra



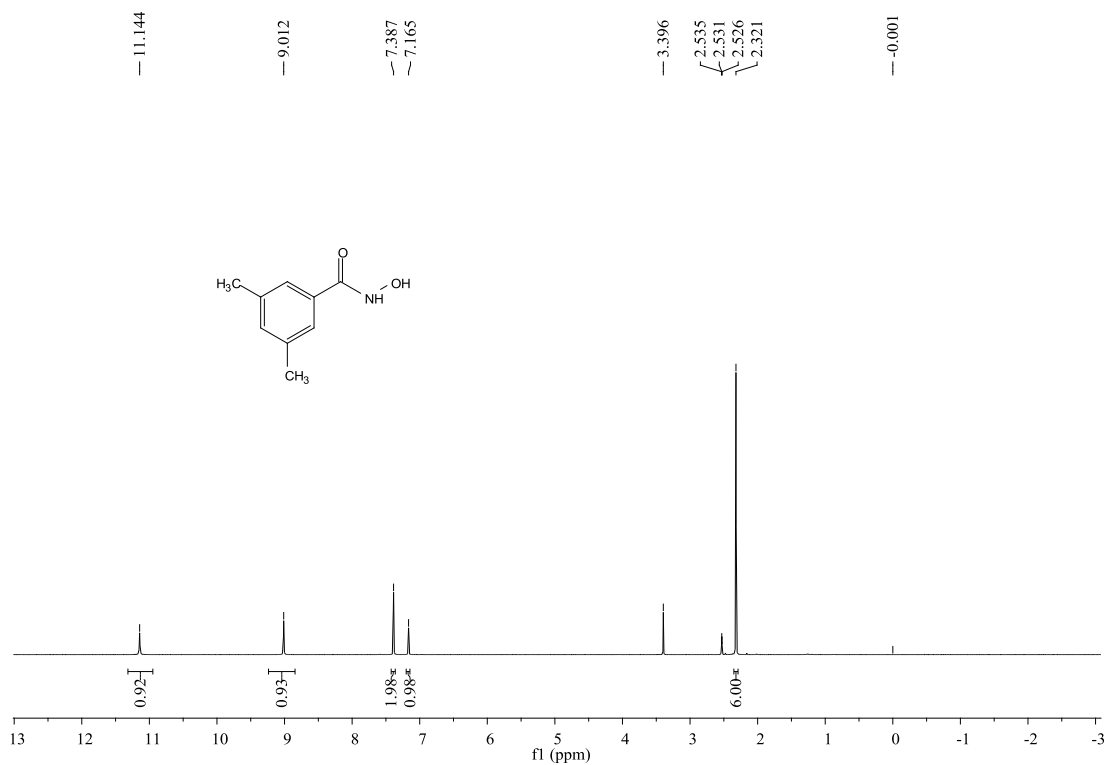
¹H NMR: *N*-hydroxy-3-methylbenzamide (**1b**)



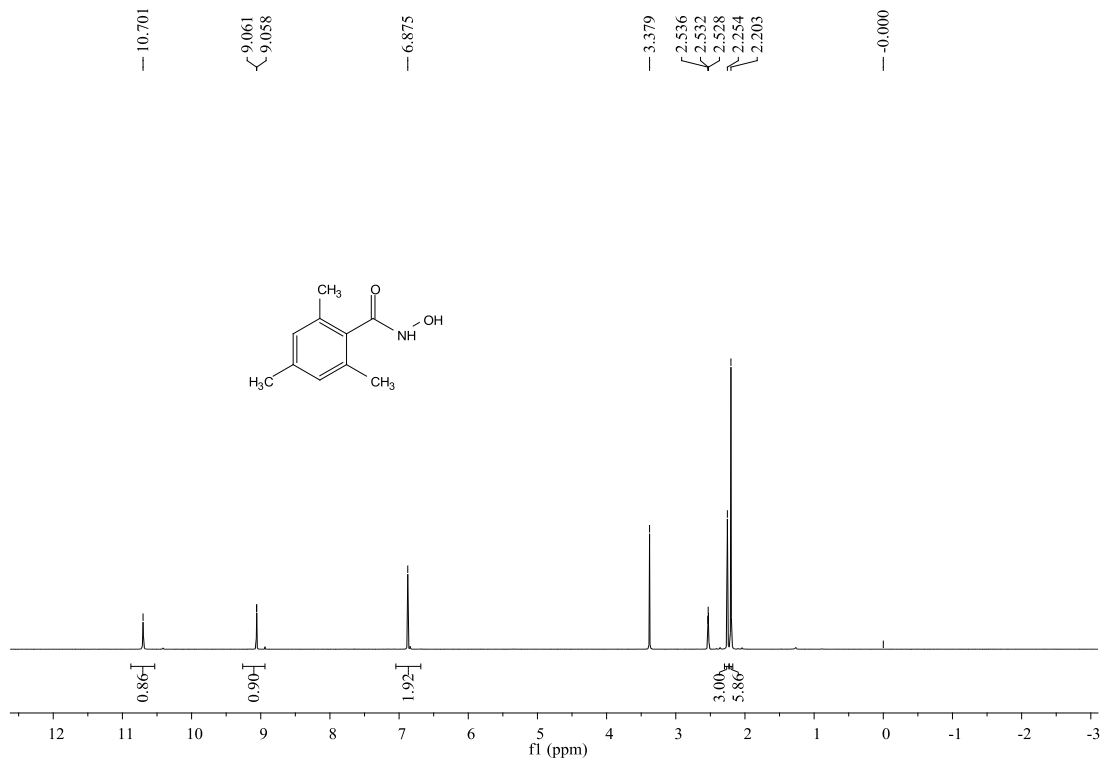
¹H NMR: *N*-hydroxy-4-methylbenzamide (**1c**)



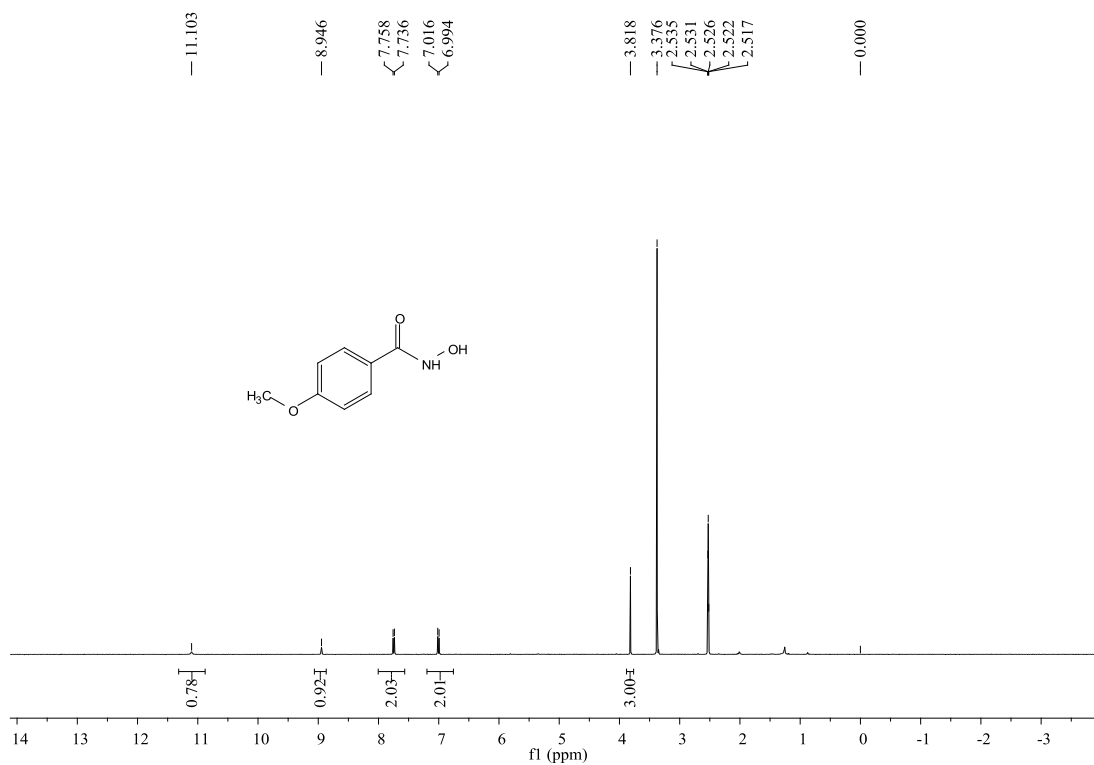
¹H NMR: *N*-hydroxy-2-methylbenzamide (**1d**)



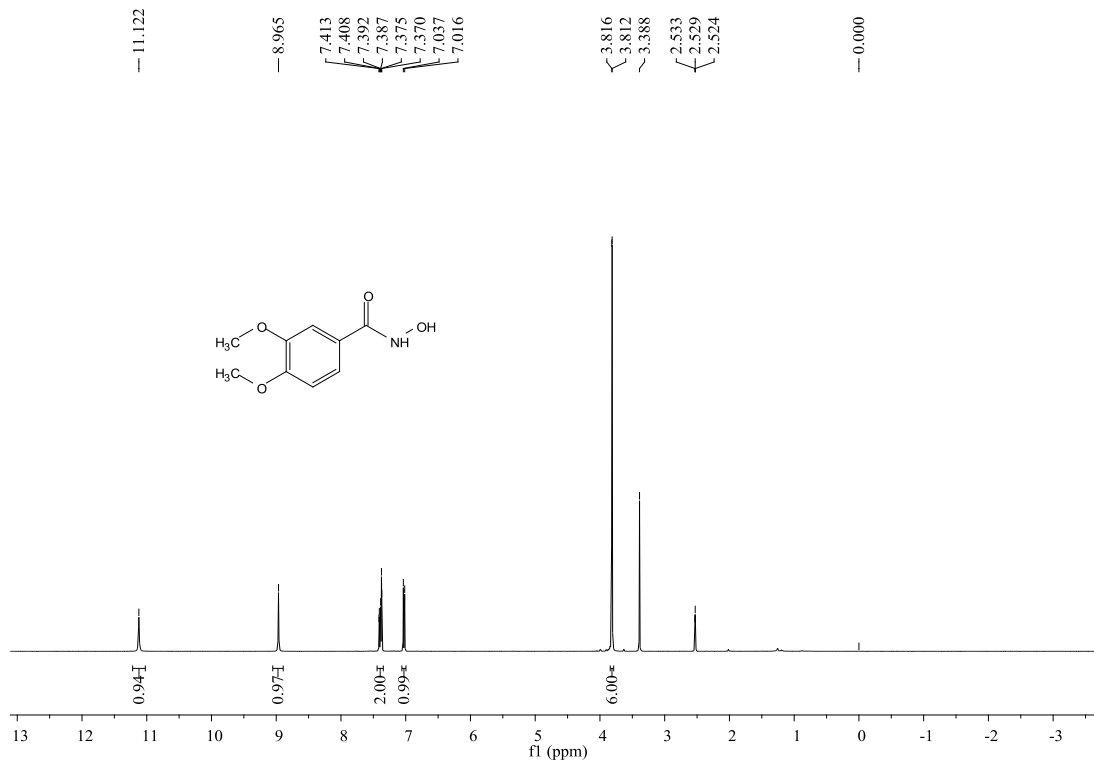
¹H NMR: *N*-hydroxy-3,5-dimethylbenzamide (**1e**)



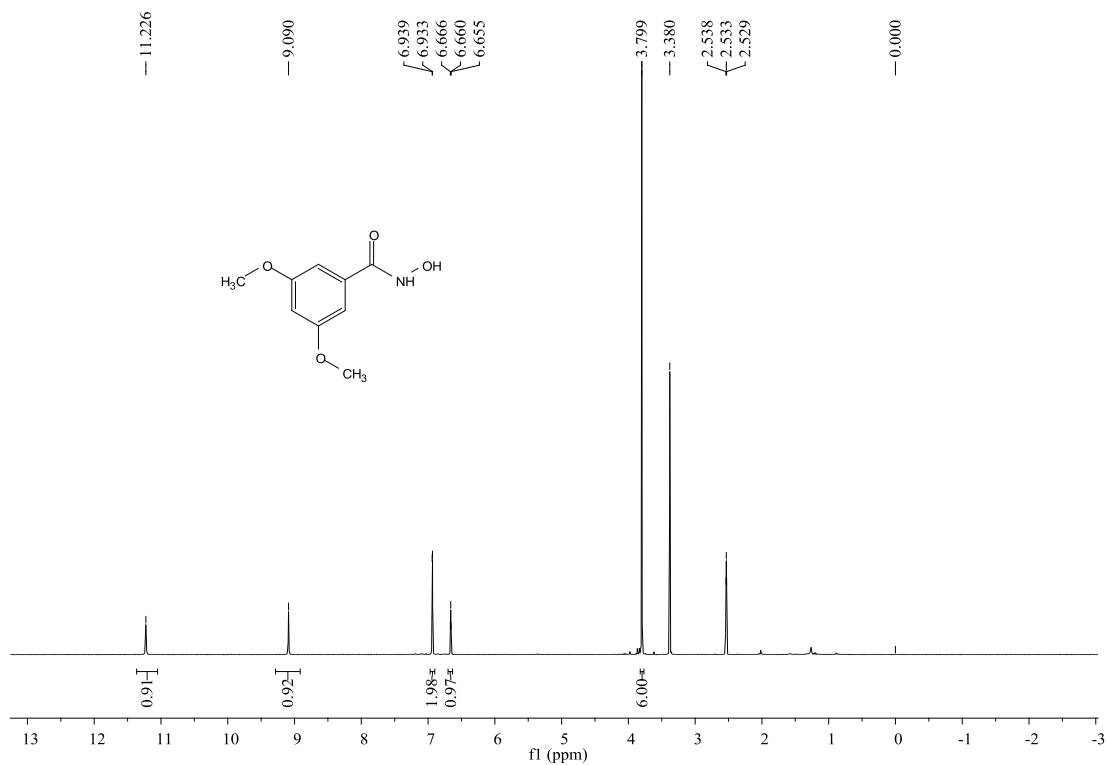
¹H NMR: *N*-hydroxy-2,4,6-trimethylbenzamide (**1f**)



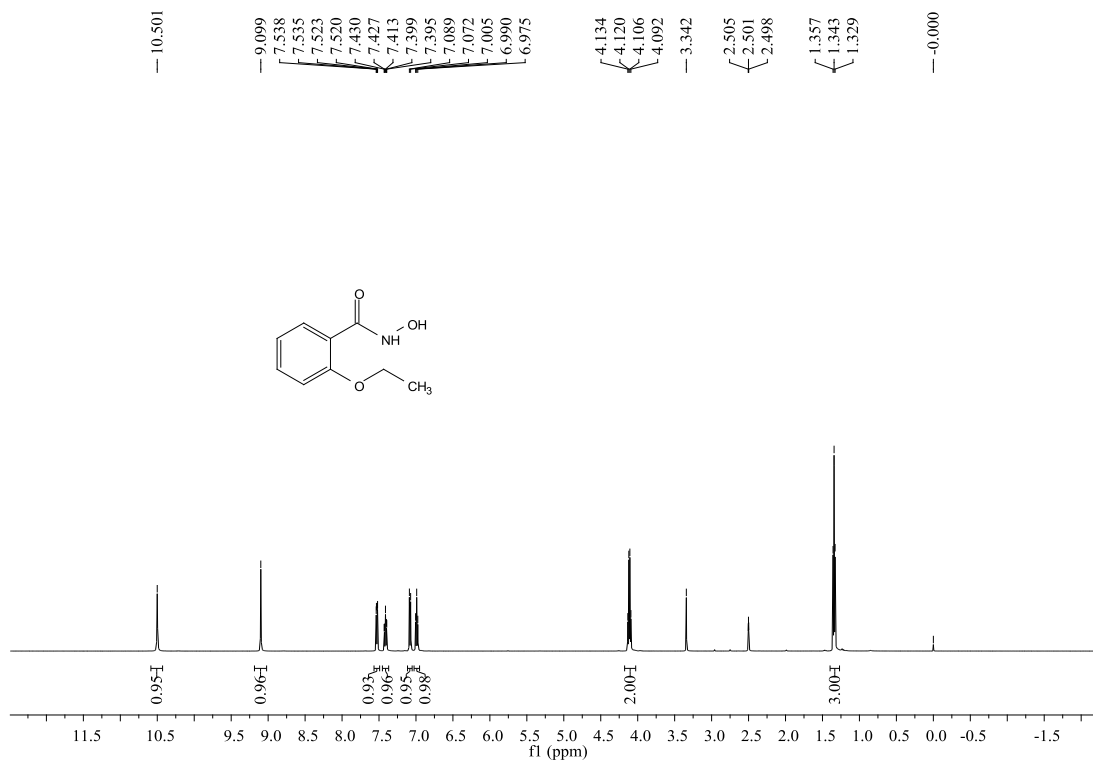
¹H NMR: *N*-hydroxy-4-methoxybenzamide (**1g**)



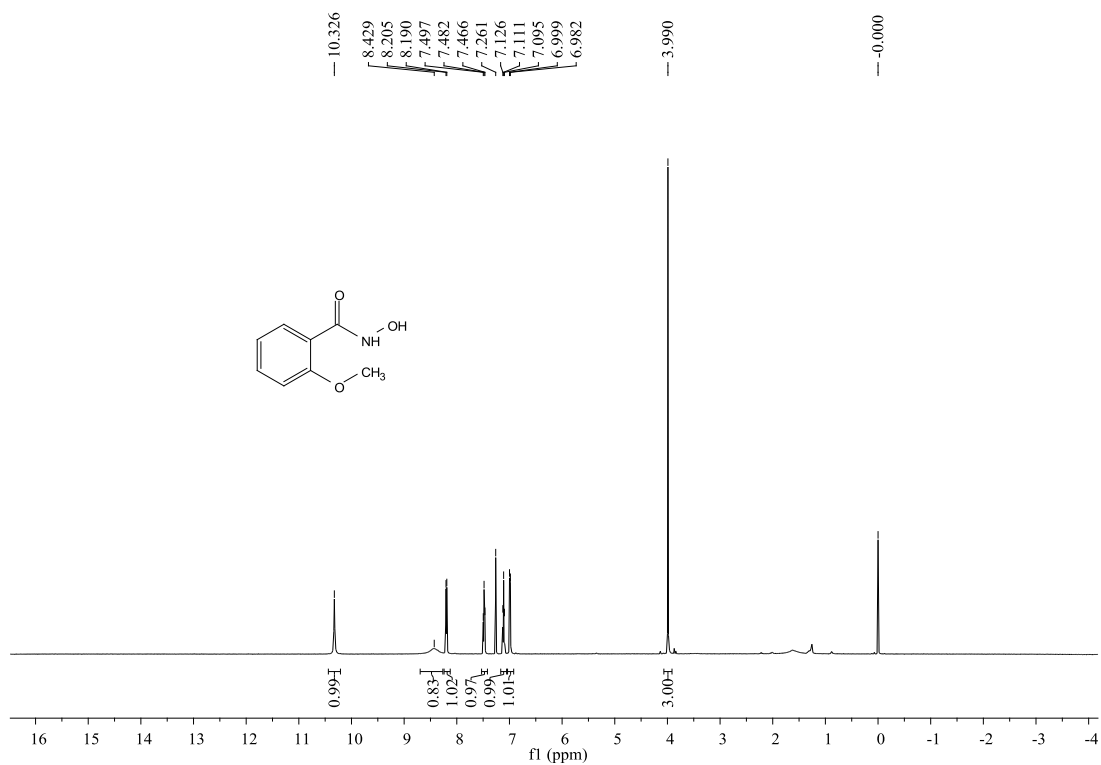
¹H NMR: *N*-hydroxy-4, 5-dimethoxybenzamide (**1h**)



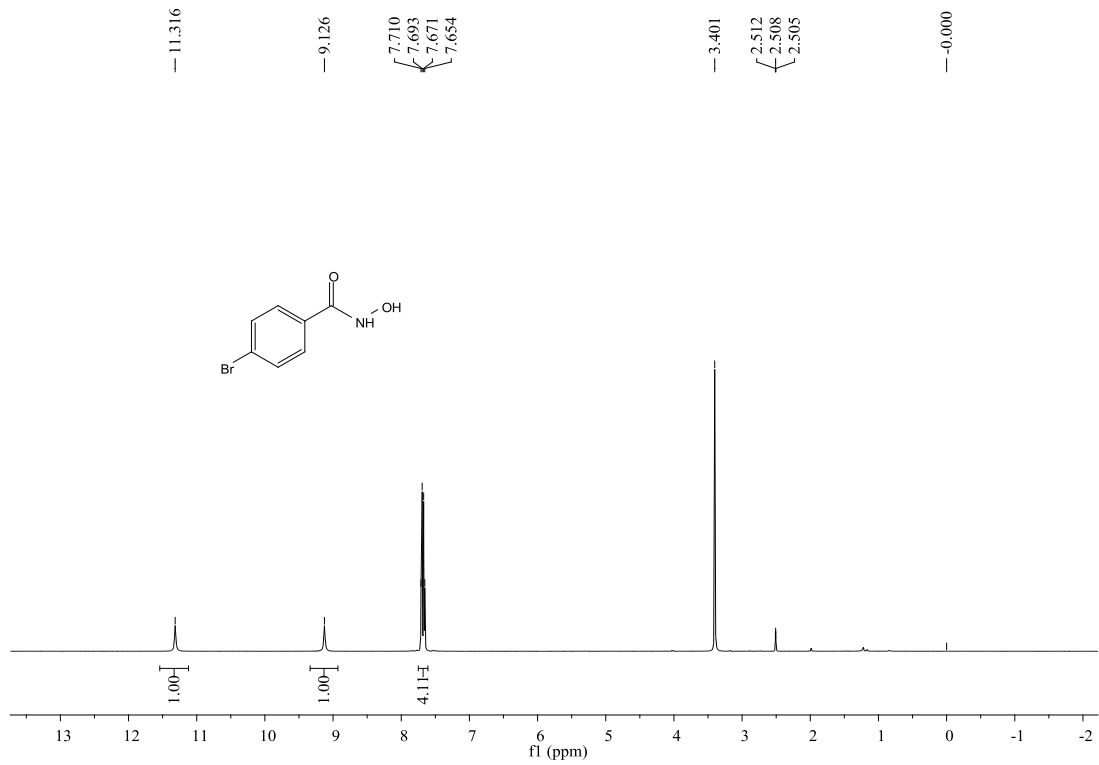
¹H NMR: *N*-hydroxy-3, 5-dimethoxybenzamide (**1i**)



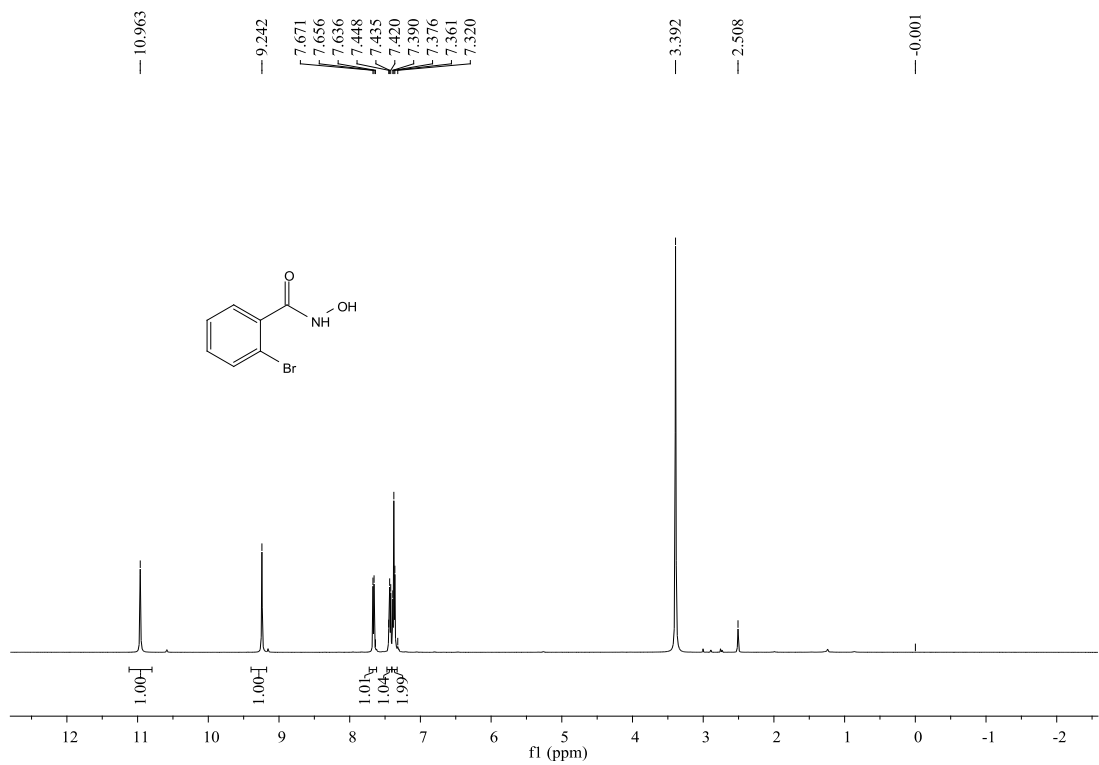
¹H NMR: 2-ethoxy-*N*-hydroxybenzamide (**1j**)



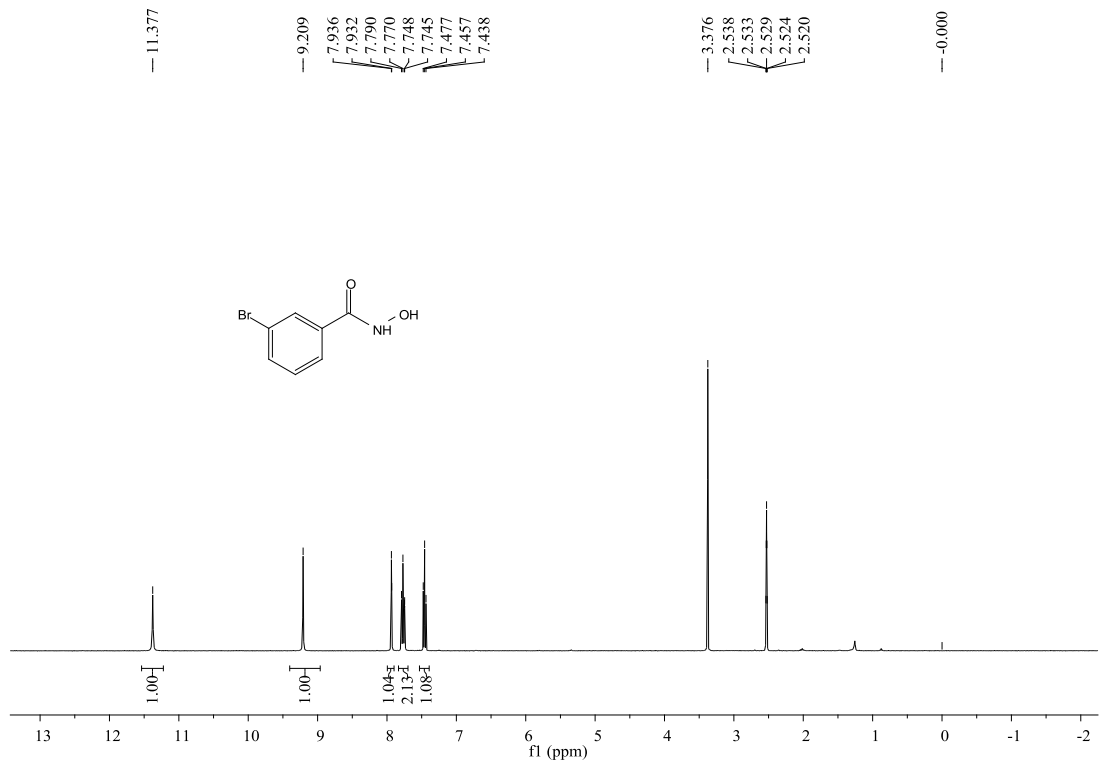
¹H NMR: *N*-hydroxy-2-methoxybenzamide (**1k**)



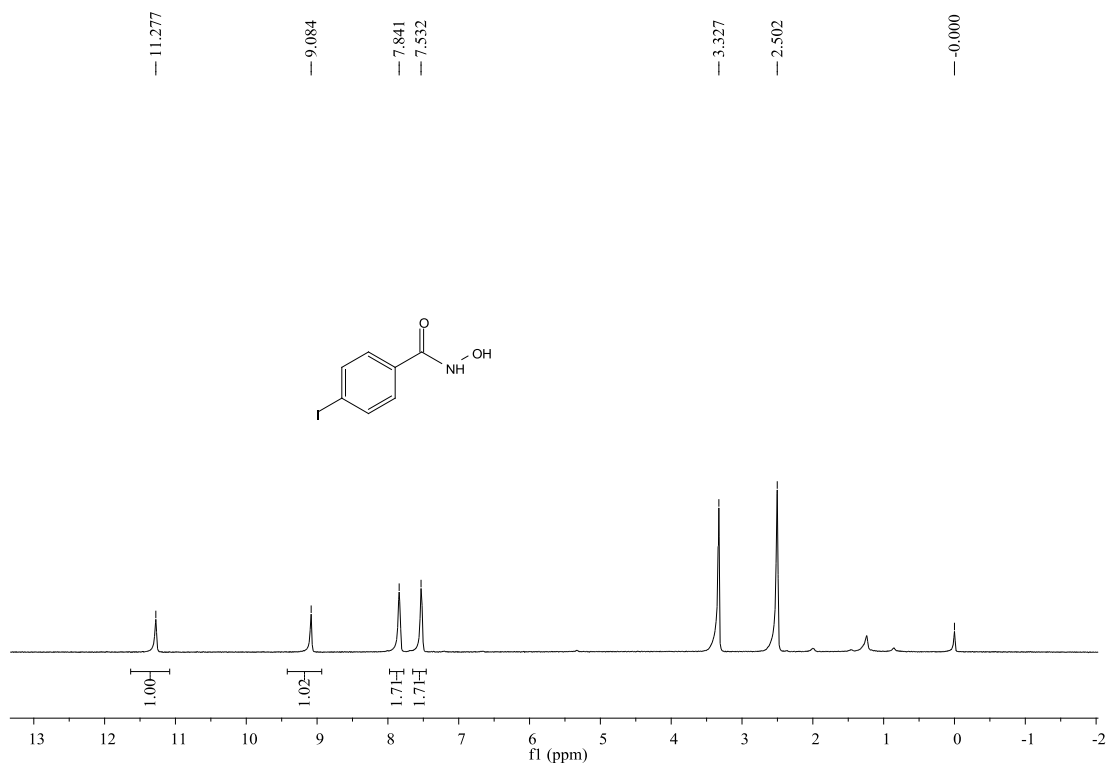
$^1\text{H NMR}$: 4-bromo-*N*-hydroxybenzamide (**1m**)



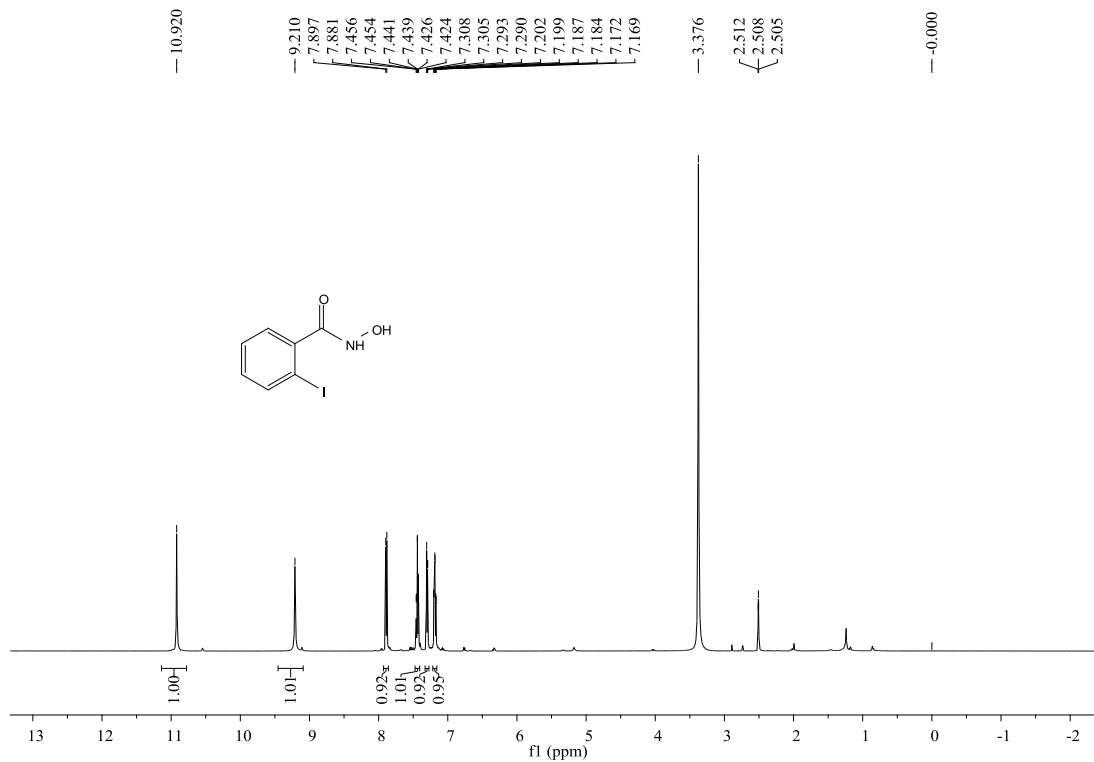
$^1\text{H NMR}$: 2-bromo-*N*-hydroxybenzamide (**1n**)



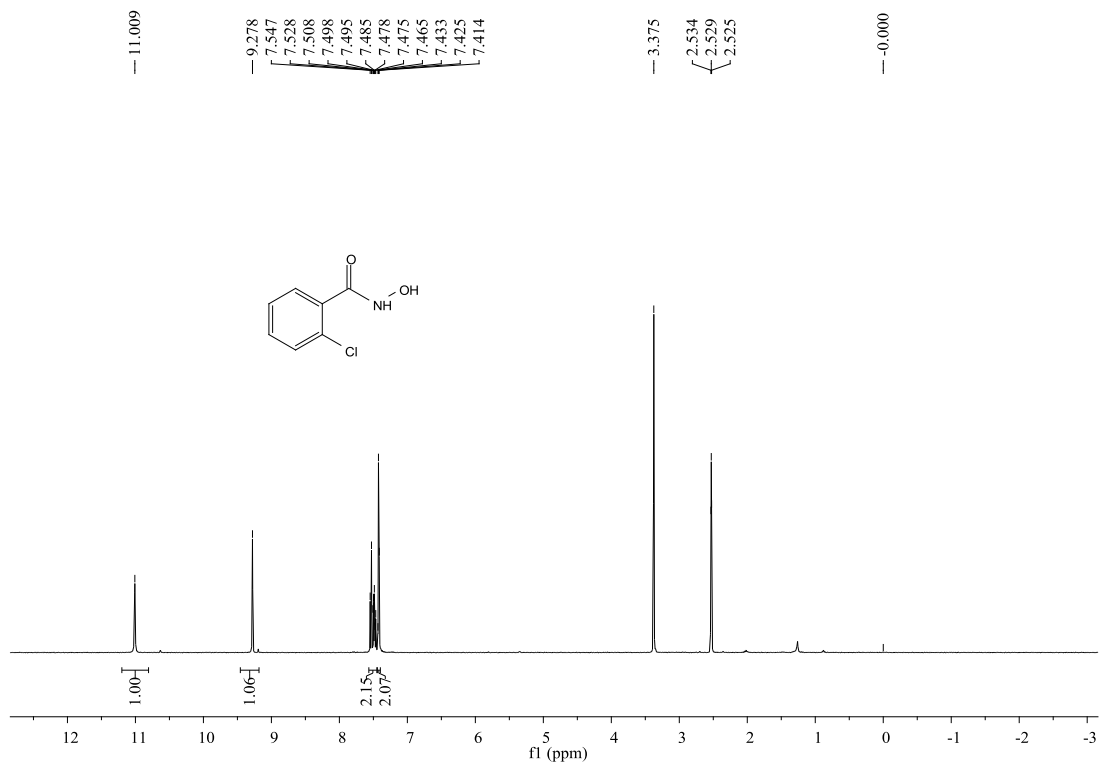
$^1\text{H NMR}$: 3-bromo-*N*-hydroxybenzamide (**1o**)



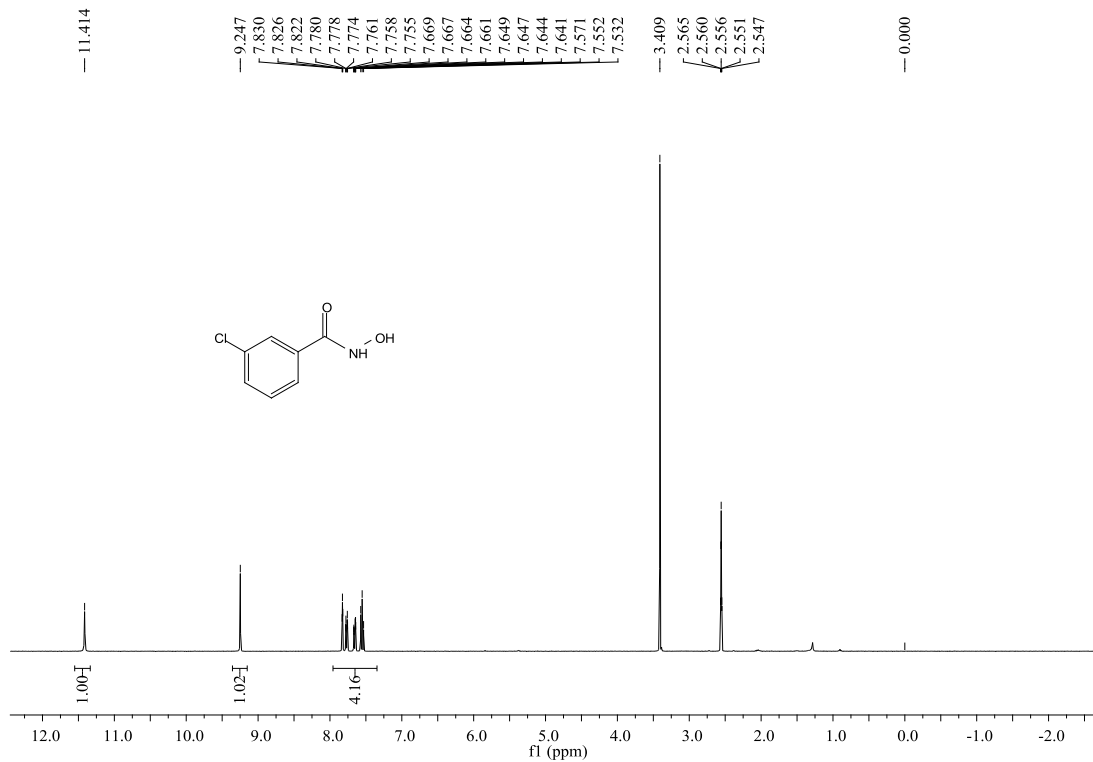
$^1\text{H NMR}$: *N*-hydroxy-4-iodobenzamide (**1p**)



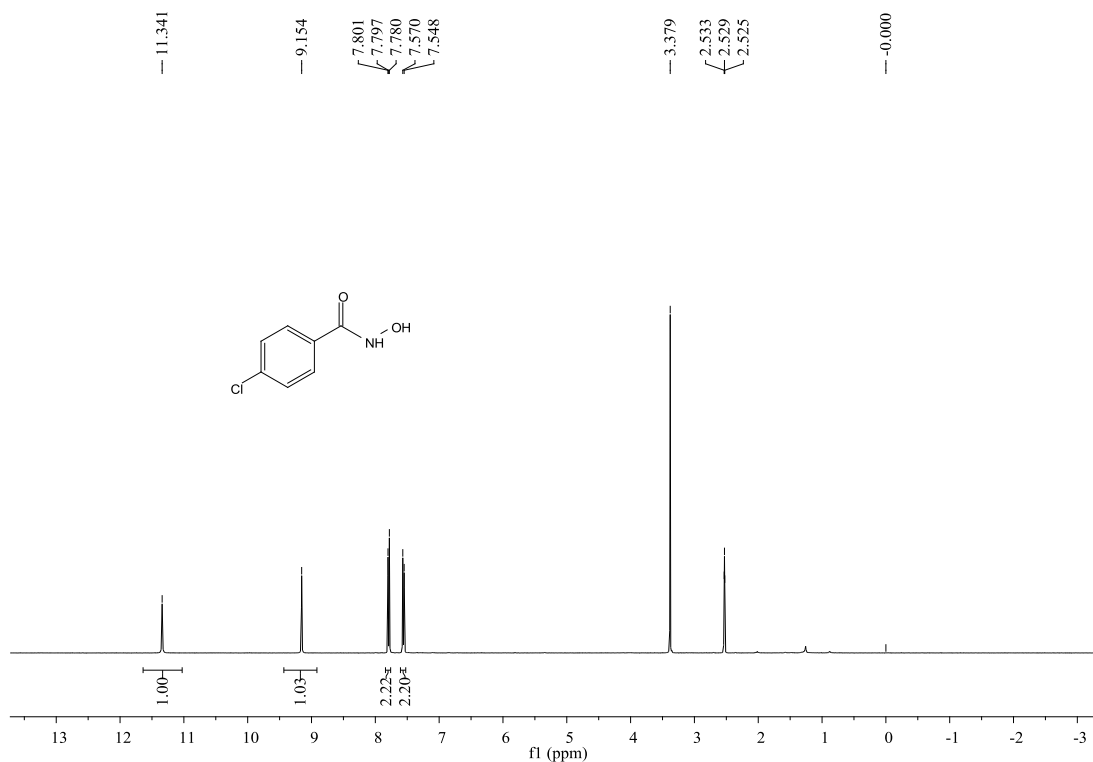
$^1\text{H NMR}$: *N*-hydroxy-2-iodobenzamide (**1q**)



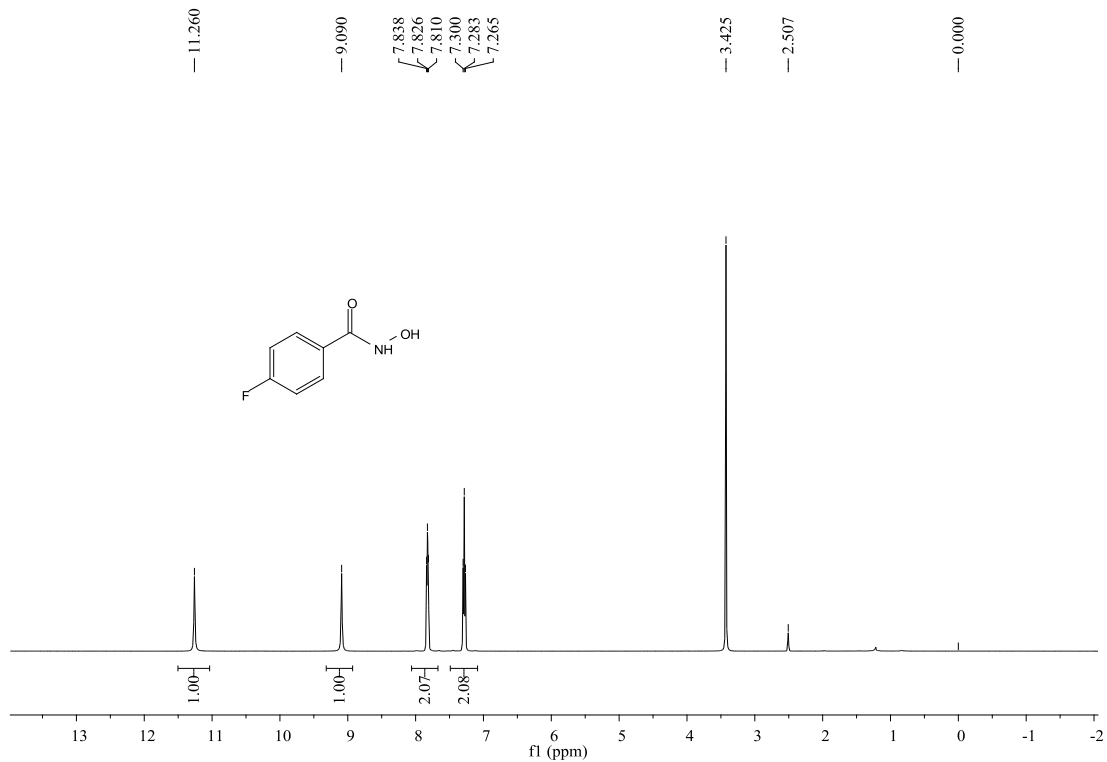
$^1\text{H NMR}$: 3-chloro-*N*-hydroxybenzamide (**1r**)



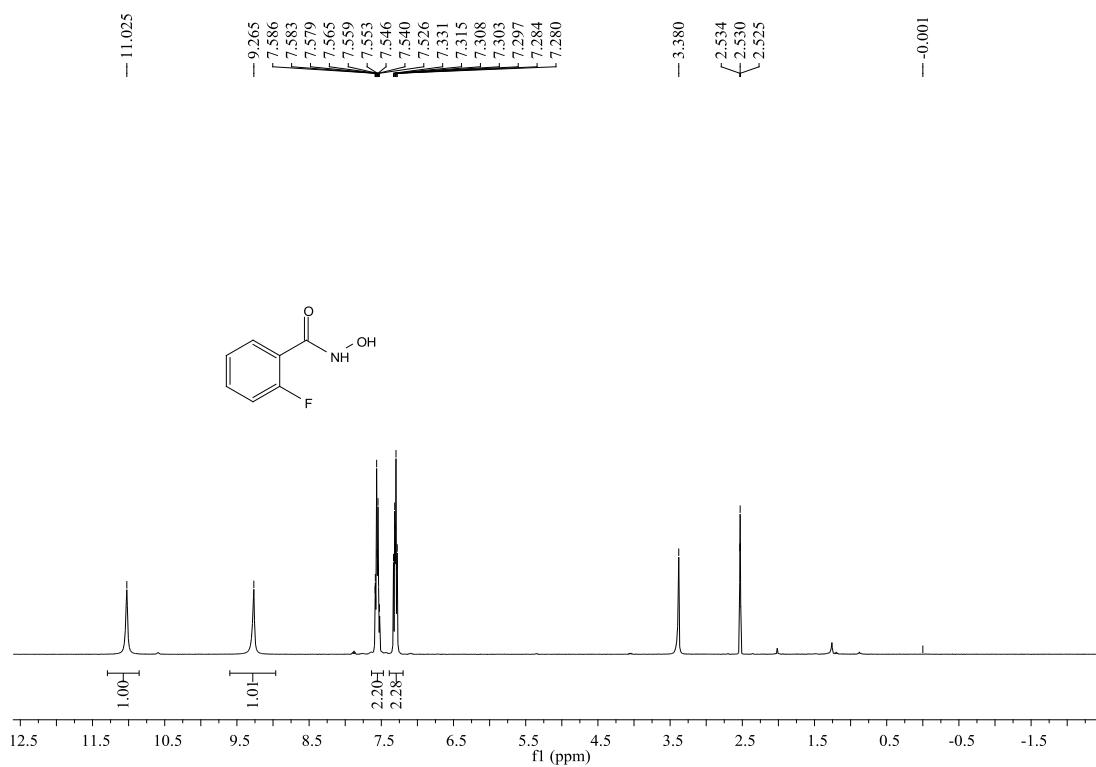
¹H NMR: 3-chloro-*N*-hydroxybenzamide (1s)



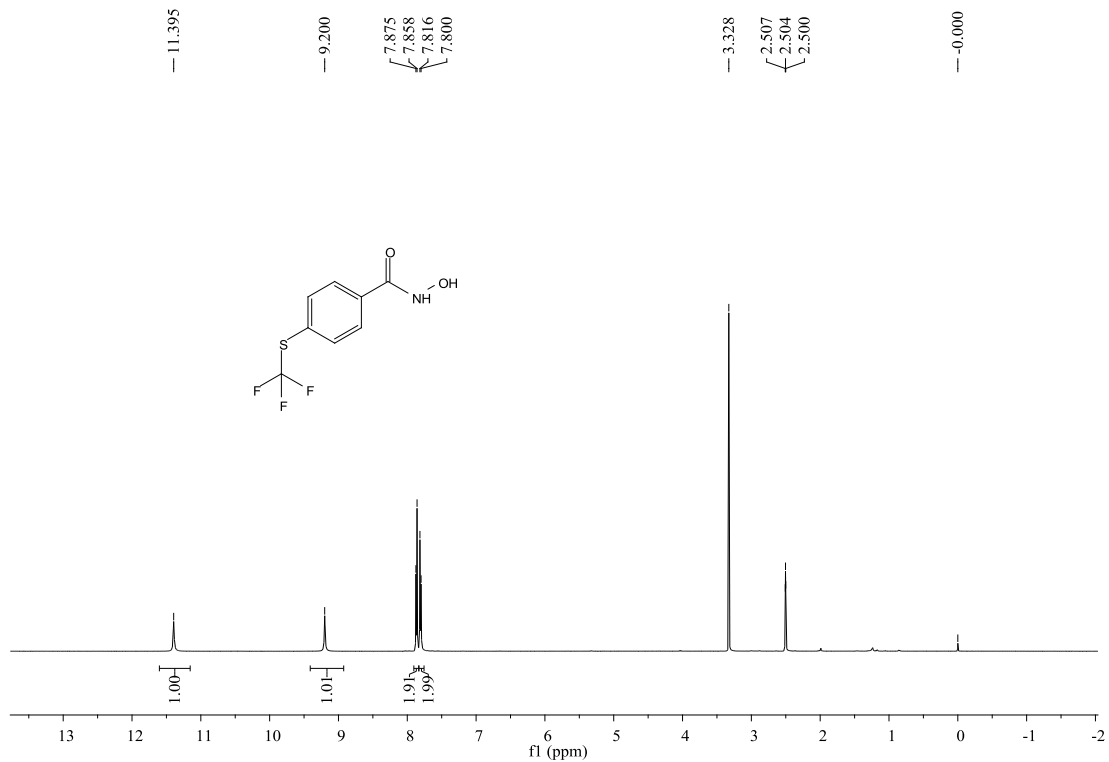
¹H NMR: 4-chloro-*N*-hydroxybenzamide (1t)



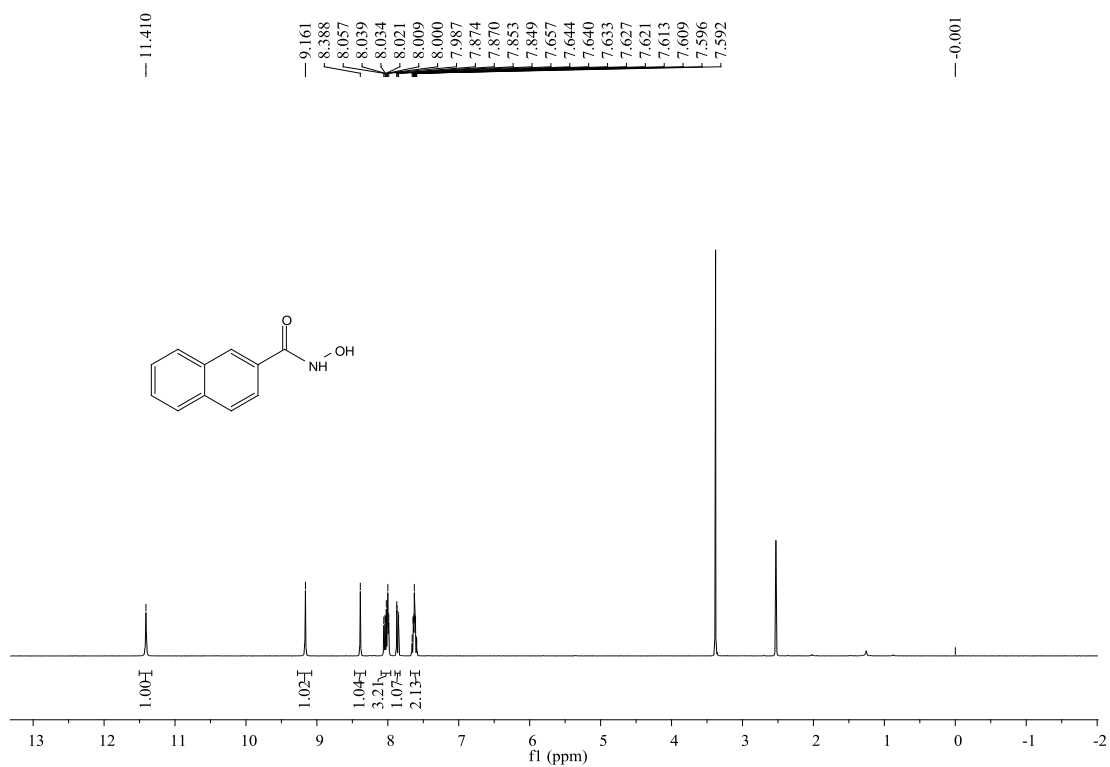
$^1\text{H NMR}$: 4-fluoro-*N*-hydroxybenzamide (**1u**)



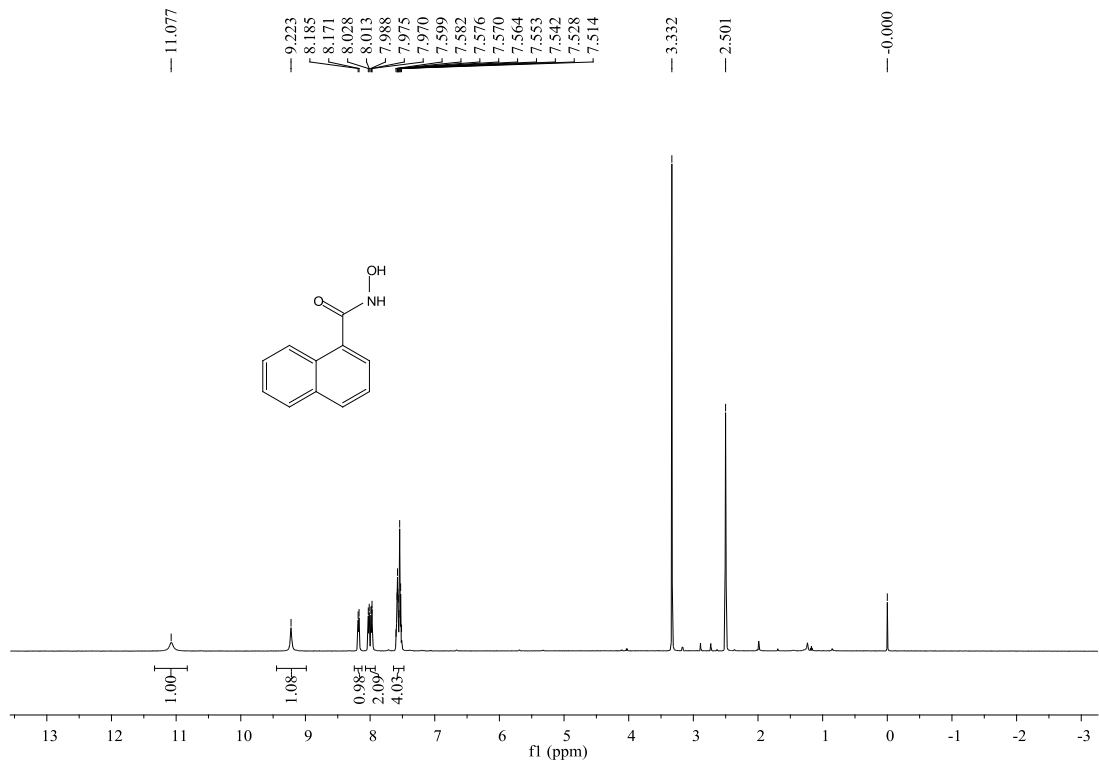
$^1\text{H NMR}$: 2-fluoro-*N*-hydroxybenzamide (**1v**)



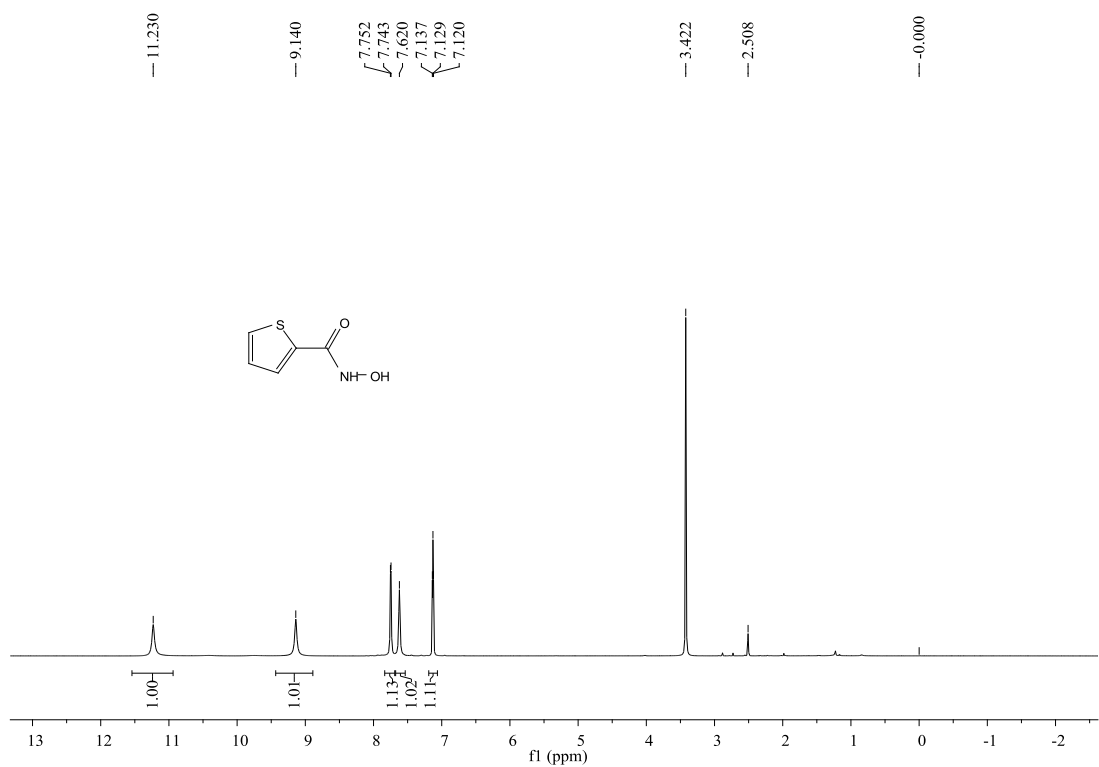
$^1\text{H NMR}$: *N*-hydroxy-4-((trifluoromethyl)thio)benzamide (**1w**):



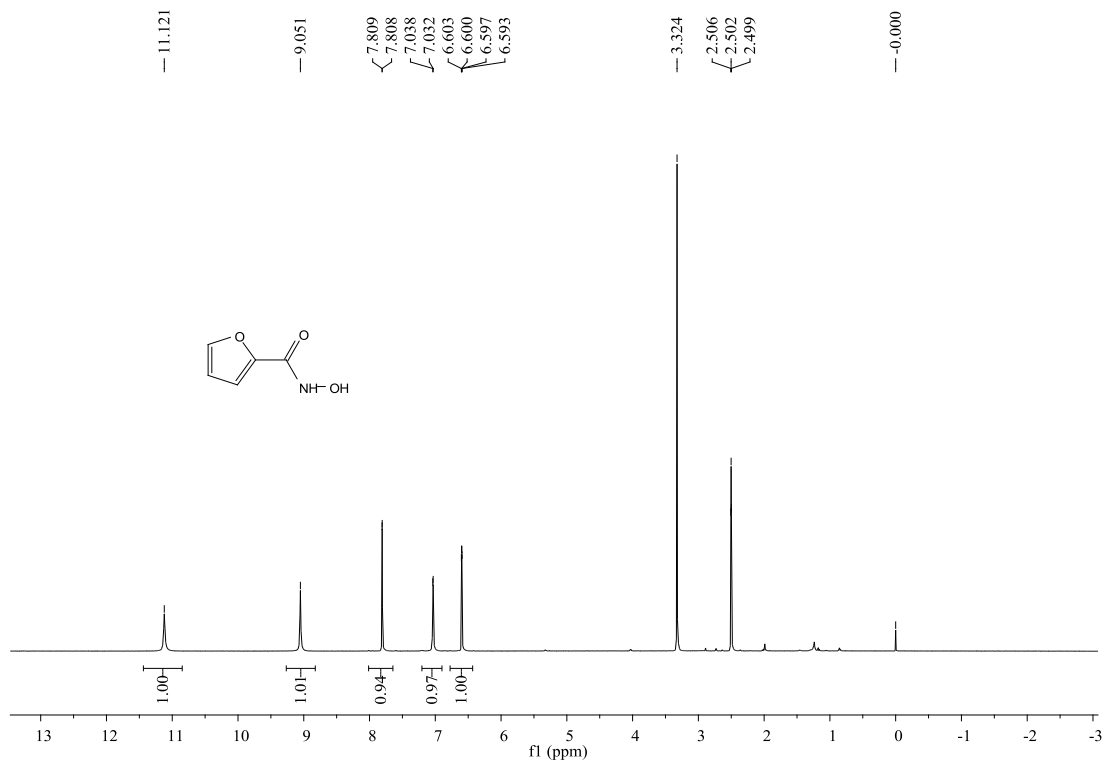
$^1\text{H NMR}$: *N*-hydroxy-2-naphthamide (**1x**):



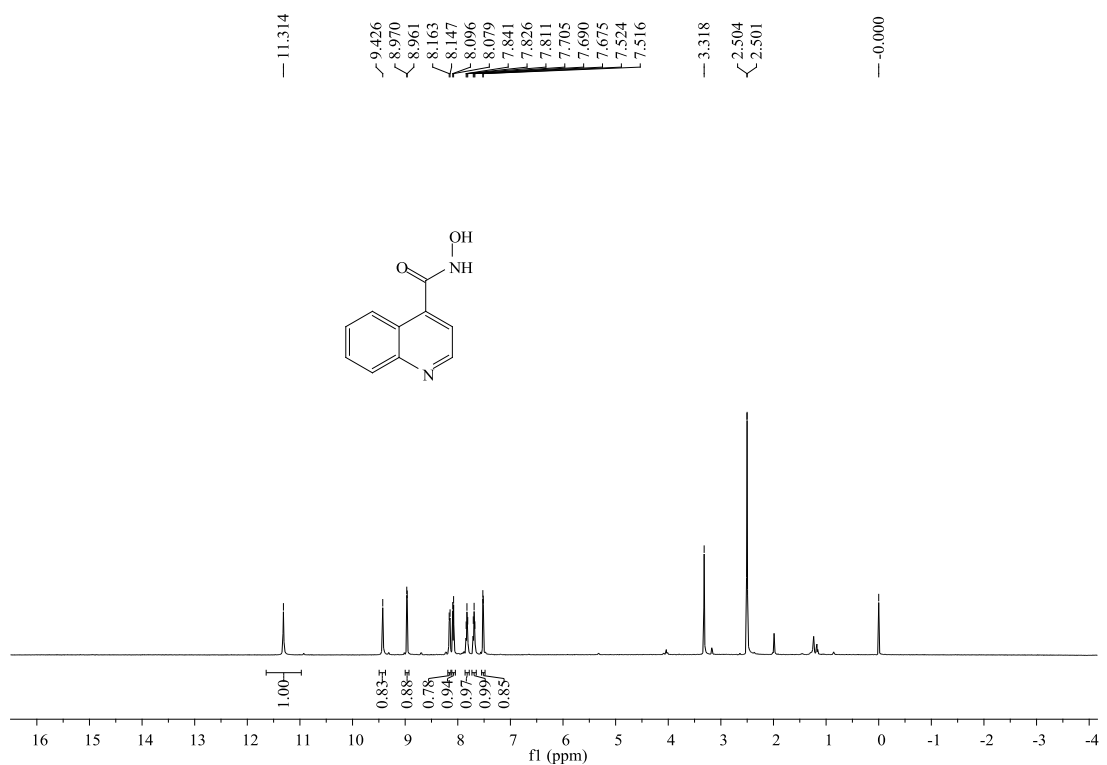
$^1\text{H NMR}$: *N*-hydroxy-1-naphthamide (**1y**)



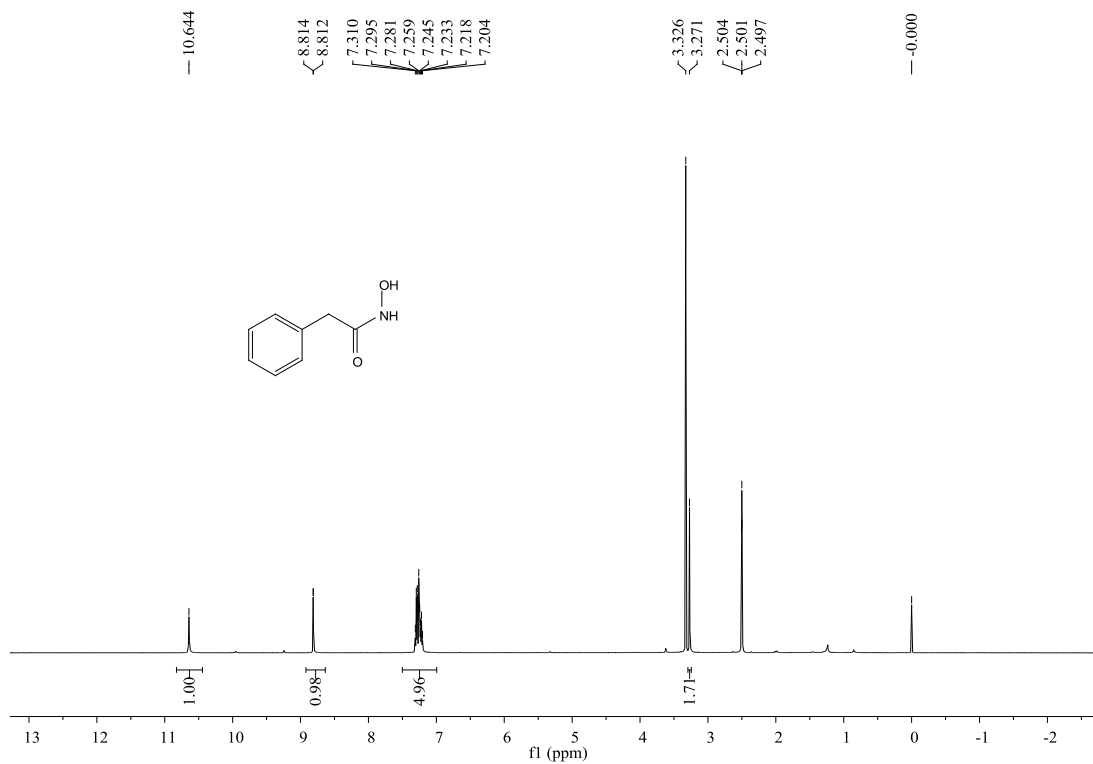
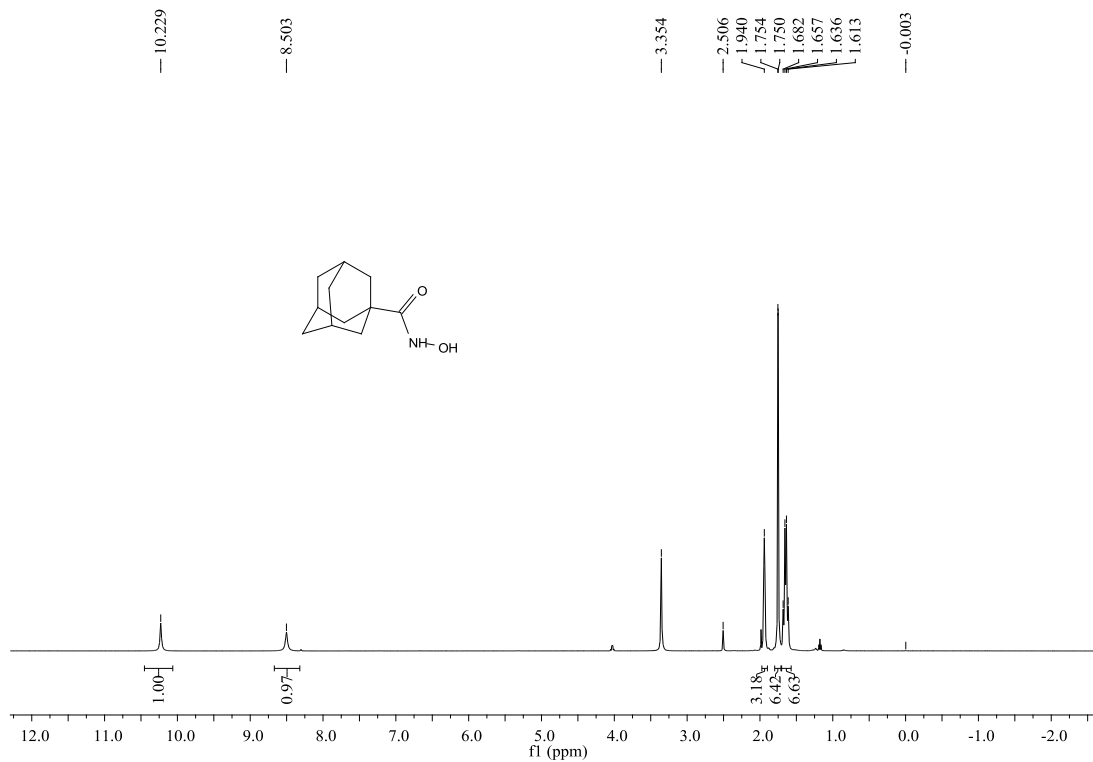
$^1\text{H NMR}$: *N*-hydroxythiophene-2-carboxamide (**1z**)

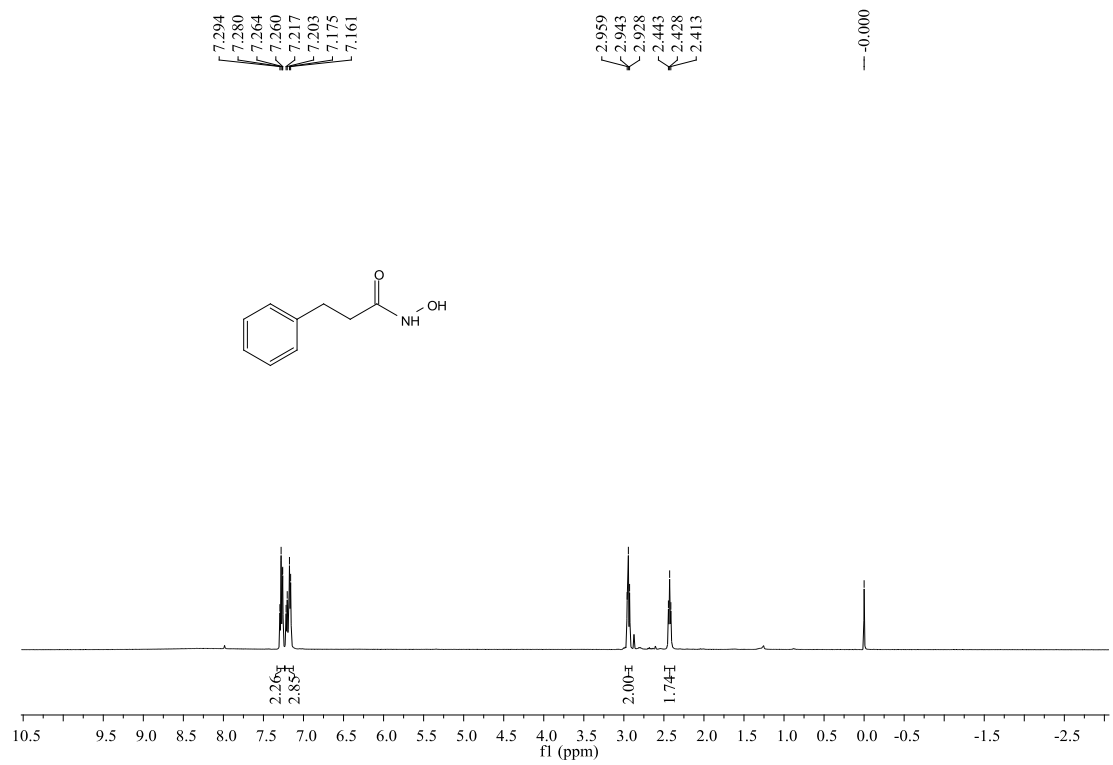


¹H NMR: *N*-hydroxyfuran-2-carboxamide (**1a'**)

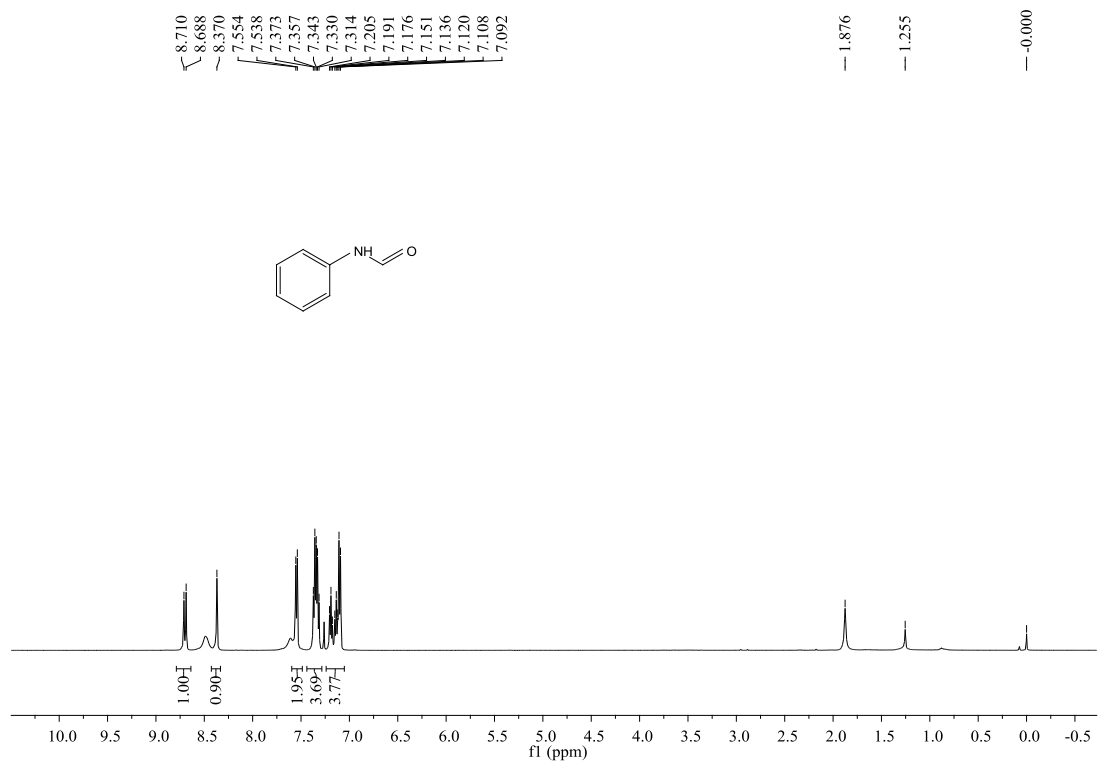


¹H NMR: *N*-hydroxyquinoline-4-carboxamide (**1b'**)

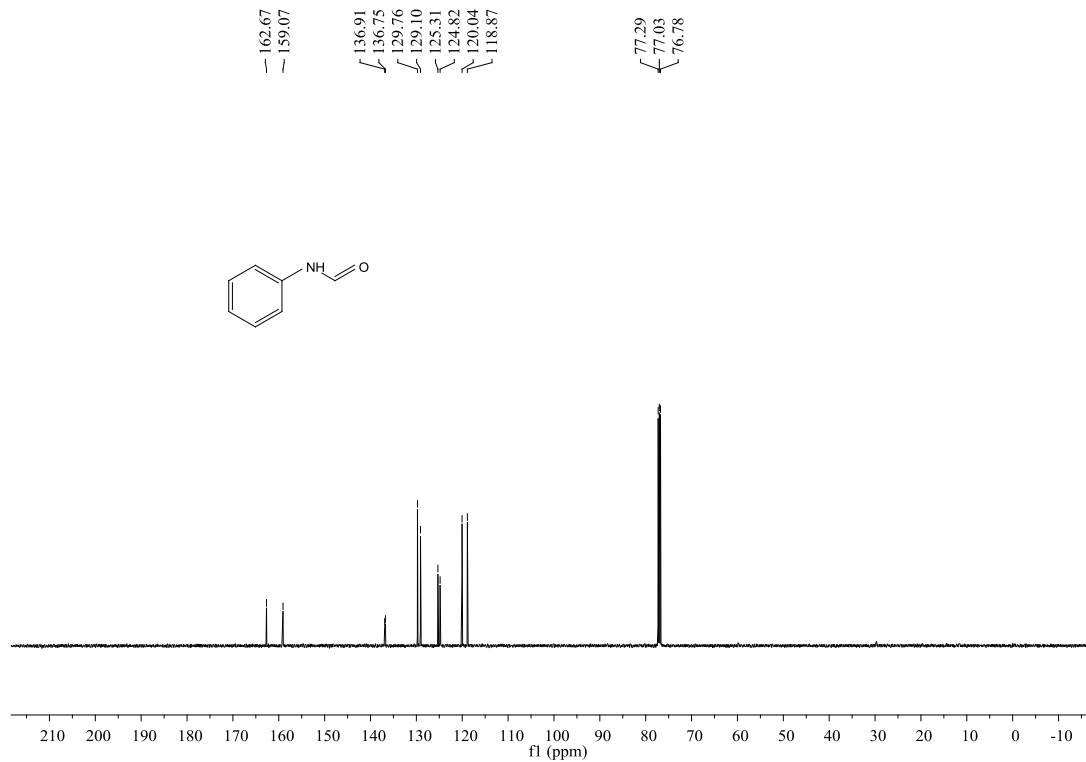




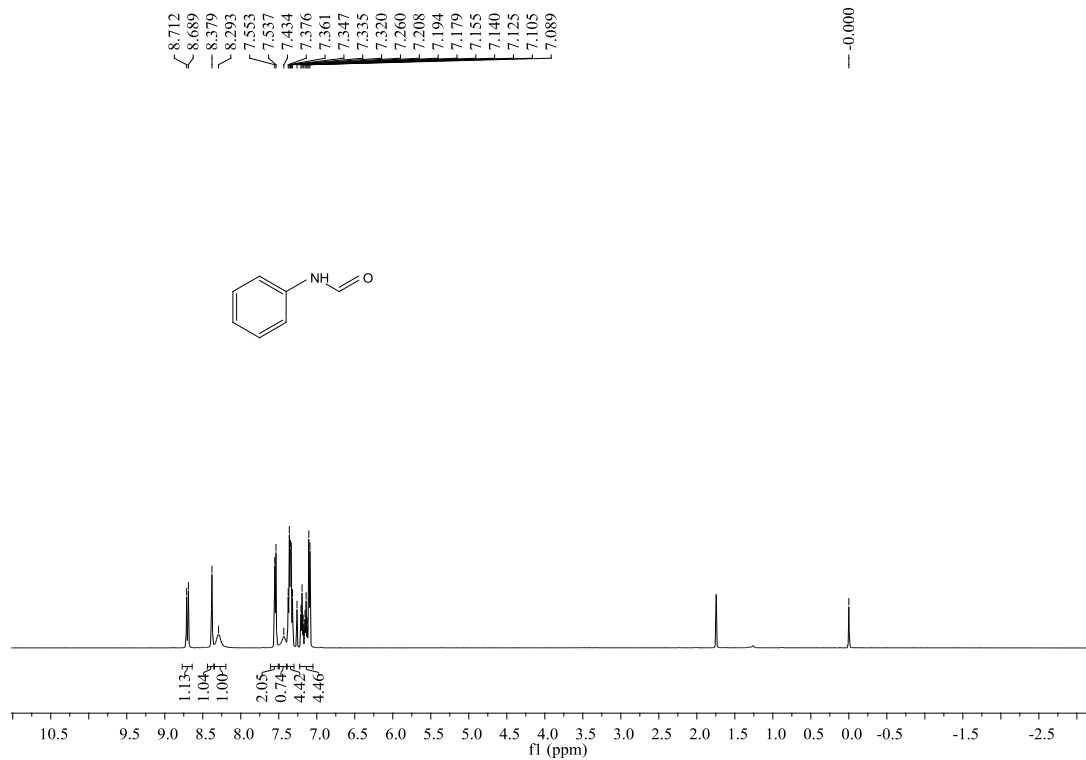
¹H NMR: *N*-hydroxy-2-phenylpropanamide (**1e'**)



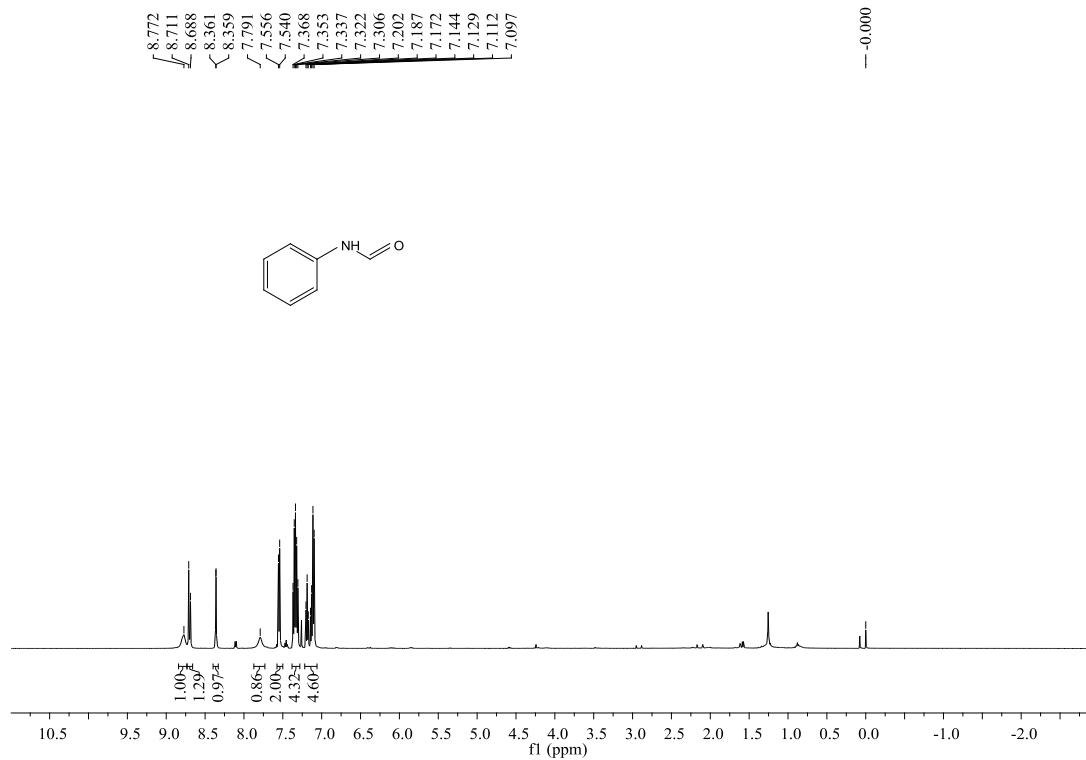
¹H NMR: *N*-phenylformamide (**2a**) (from **1a**)



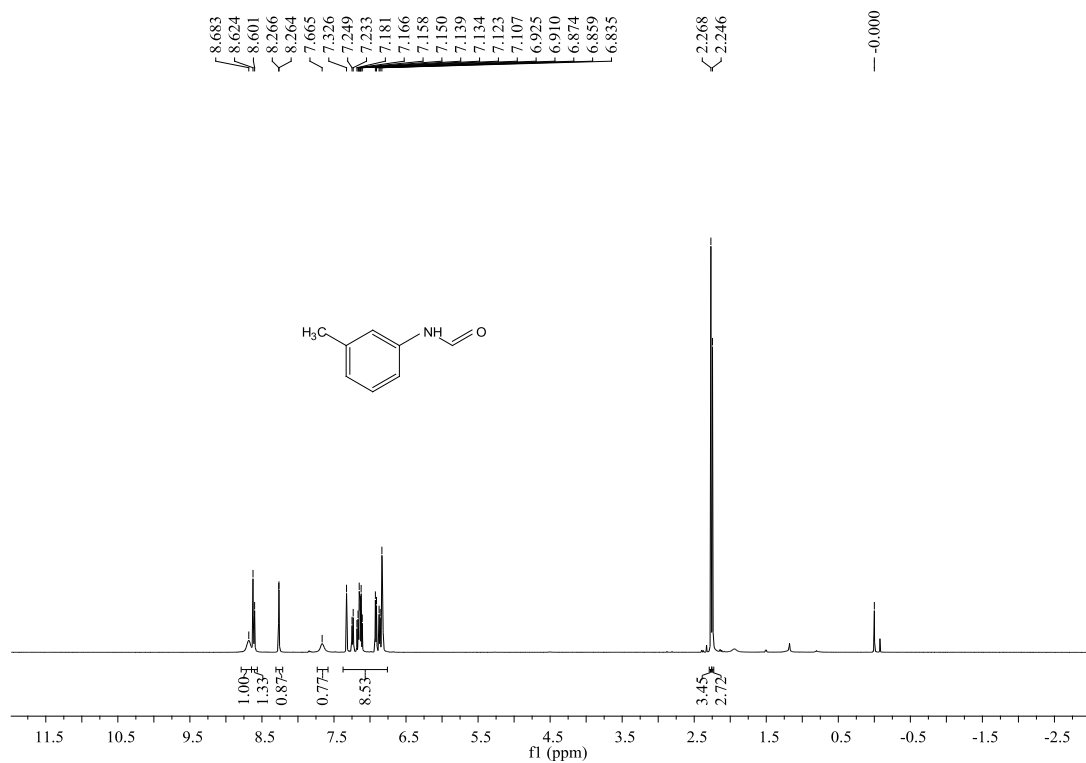
^{13}C NMR: *N*-phenylformamide (**2a**) (from **1a**)



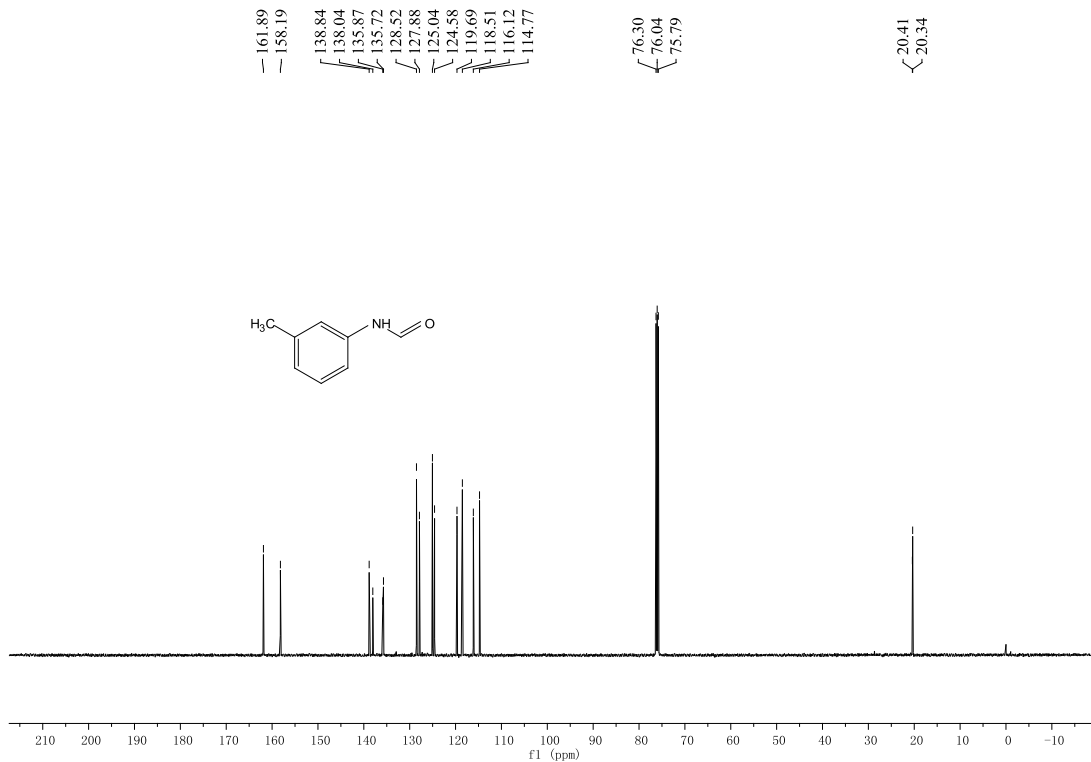
^1H NMR: *N*-phenylformamide (**2a**) (from **3a**)



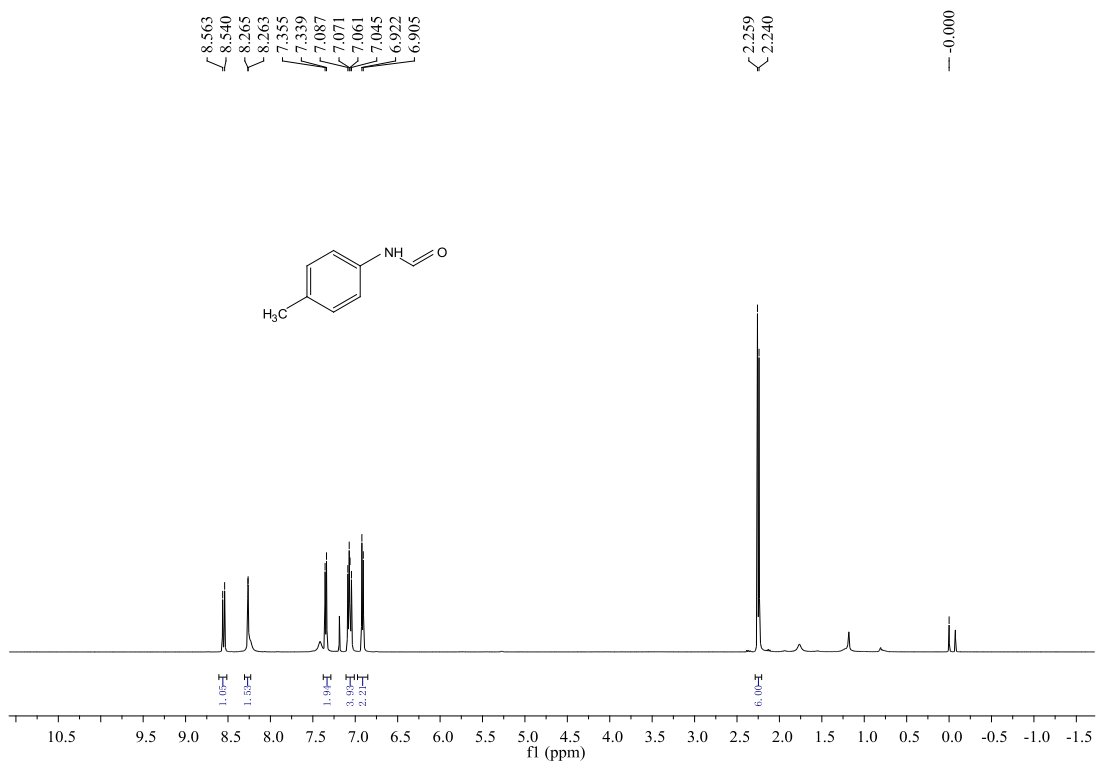
¹H NMR: *N*-phenylformamide (2a) (from 4a)



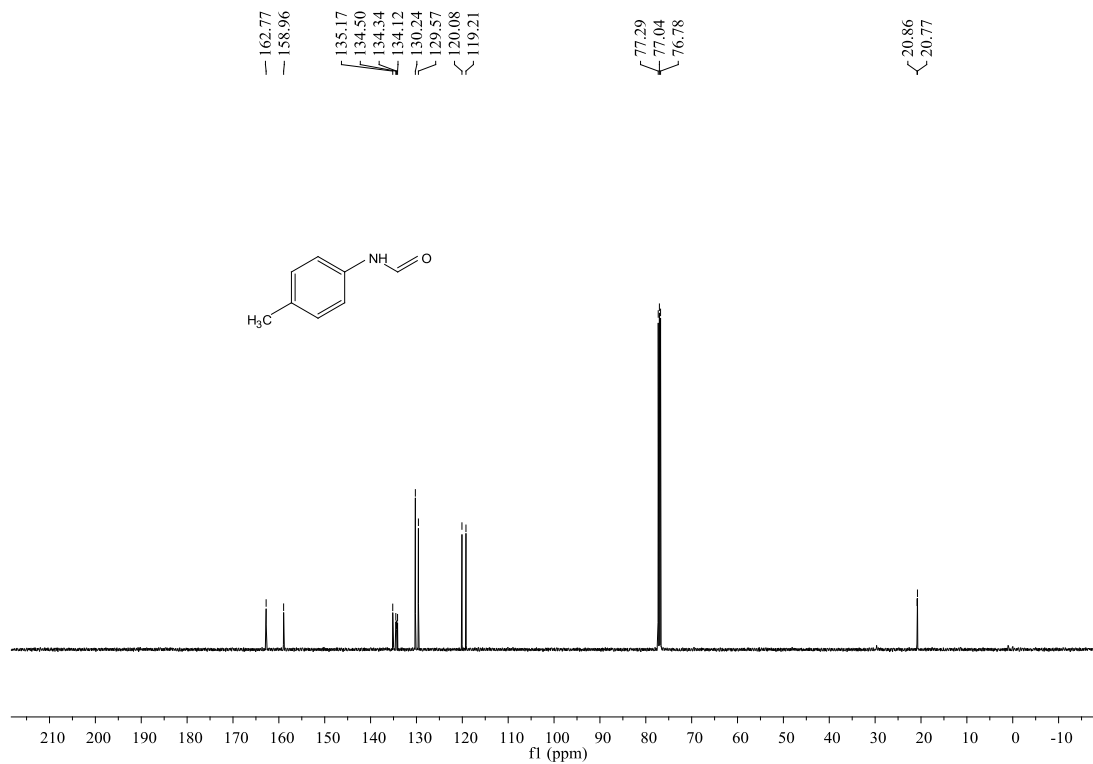
¹H NMR: *N*-*m*-tolylformamide (2b)



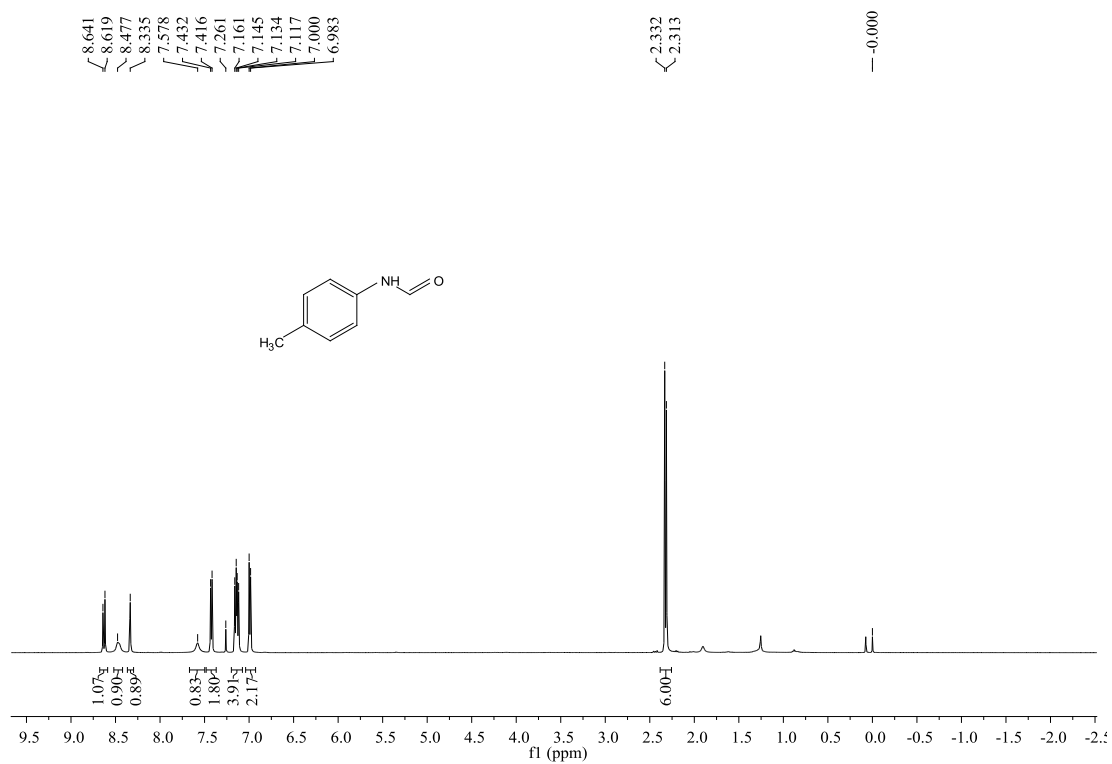
¹³C NMR: *N-m*-tolylformamide (**2b**)



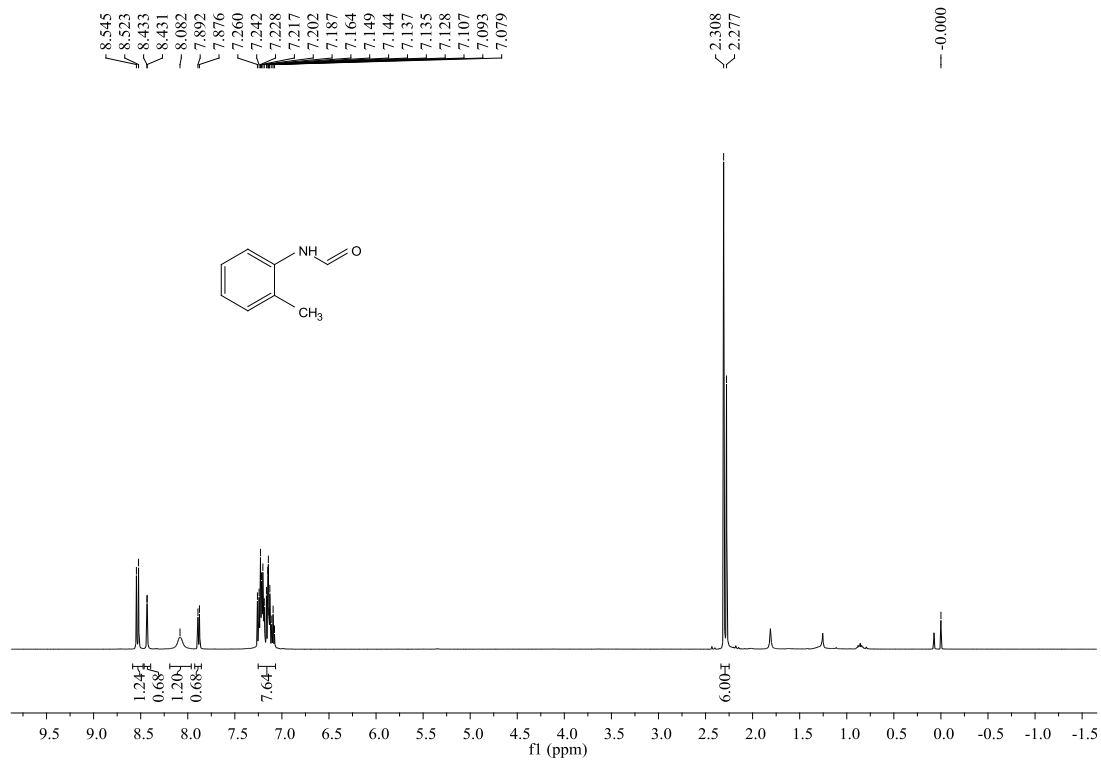
¹H NMR: *N-p*-tolylformamide (**2c**) (from **1c**)



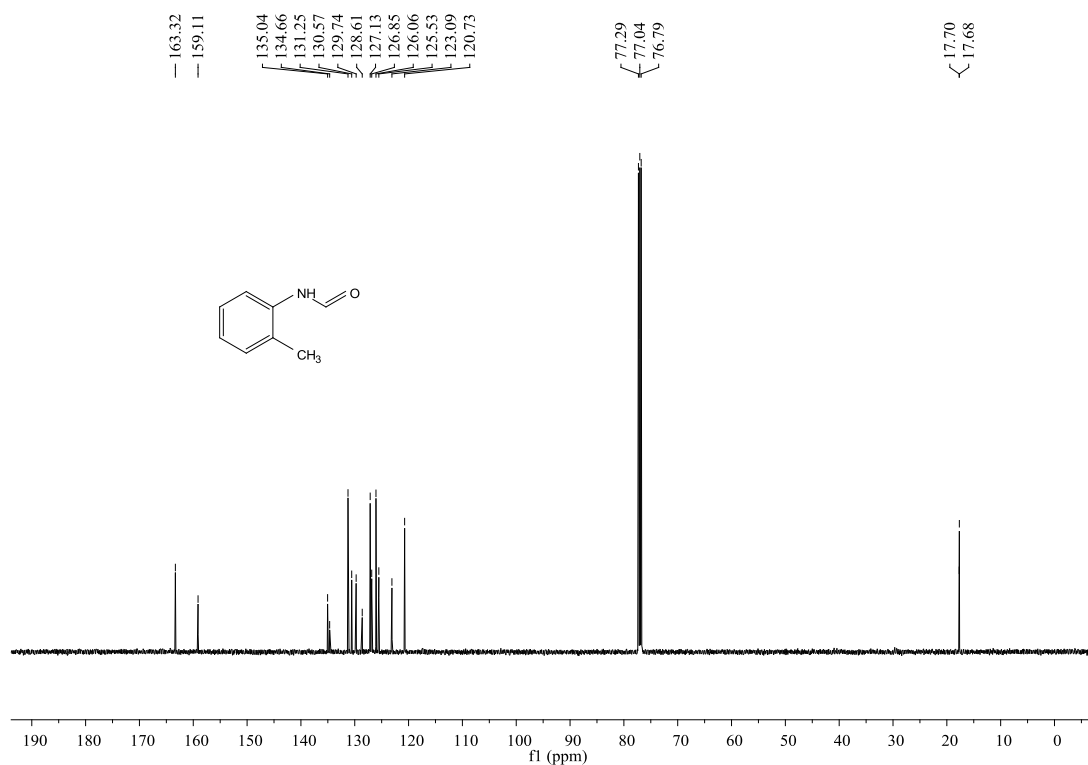
^{13}H NMR: *N-p*-tolylformamide (**2c**) (from **1c**)



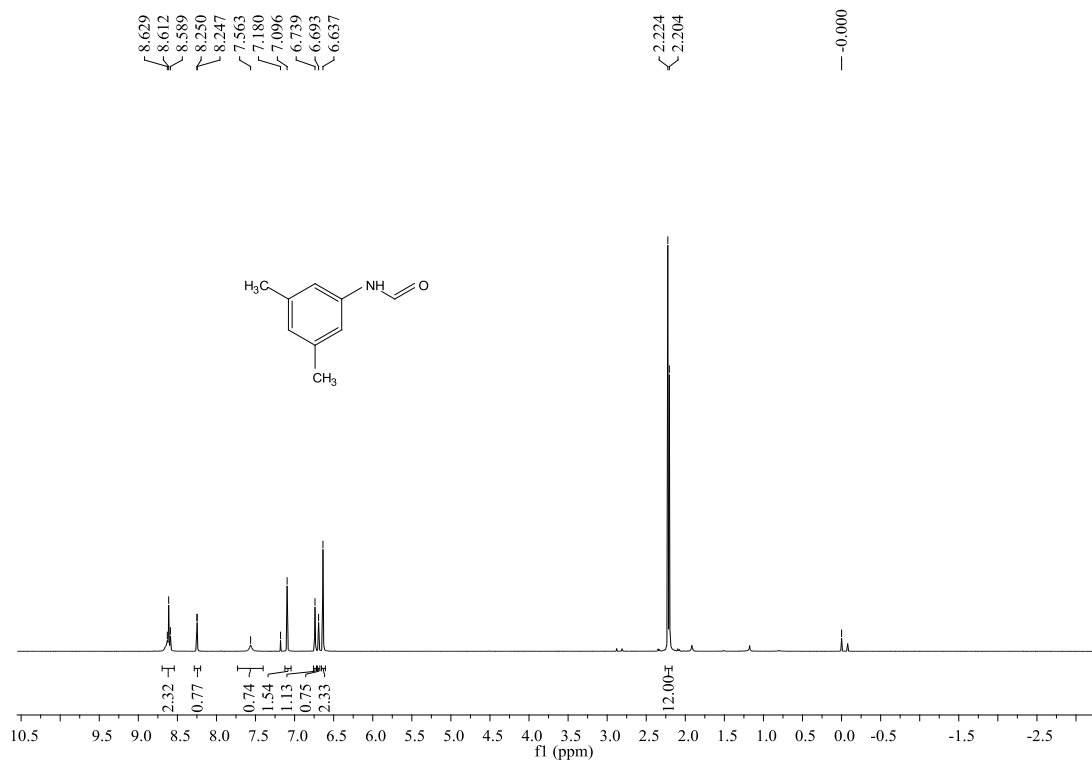
^1H NMR: *N-p*-tolylformamide (**2c**) (from **4c**)



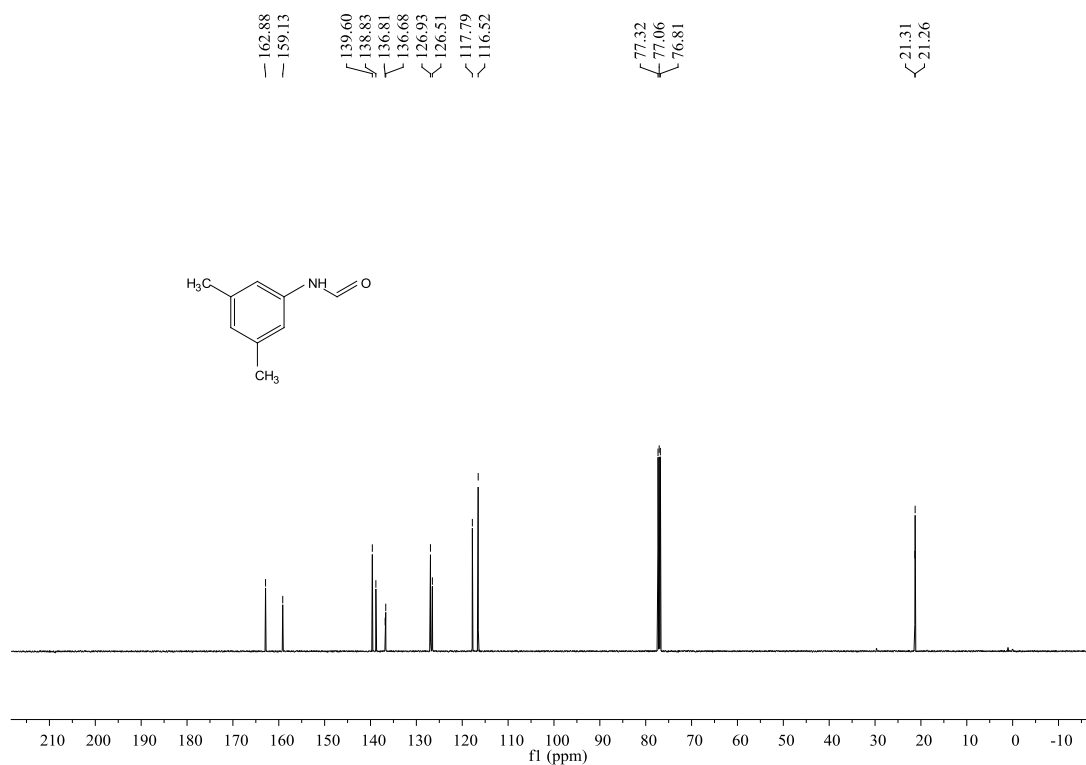
¹H NMR: *N*-*o*-tolylformamide (2d)



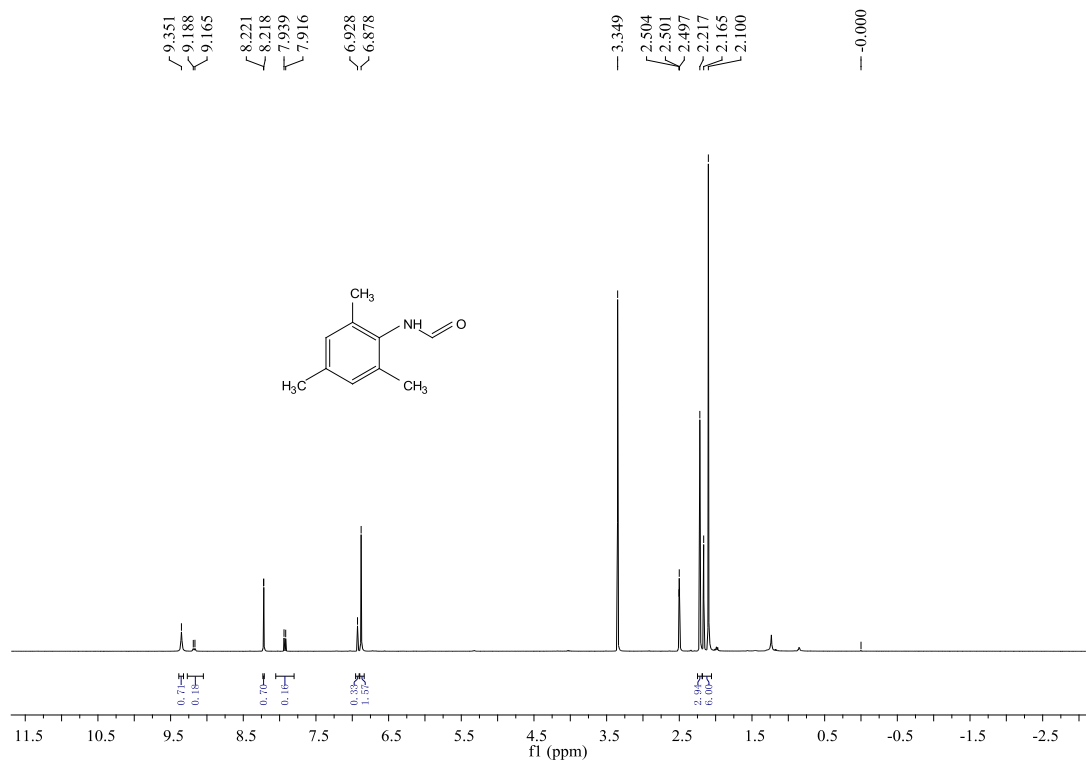
¹³C NMR: *N*-*o*-tolylformamide (2d)



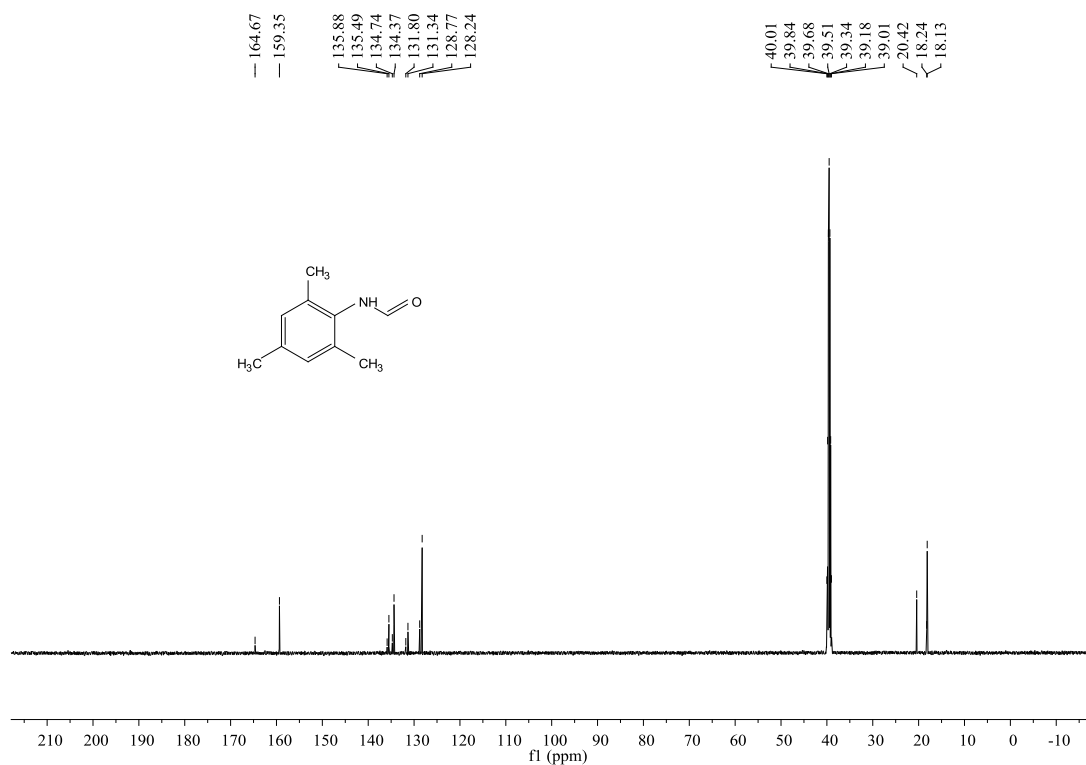
¹H NMR: *N*-(3,5-dimethylphenyl)formamide (2e)



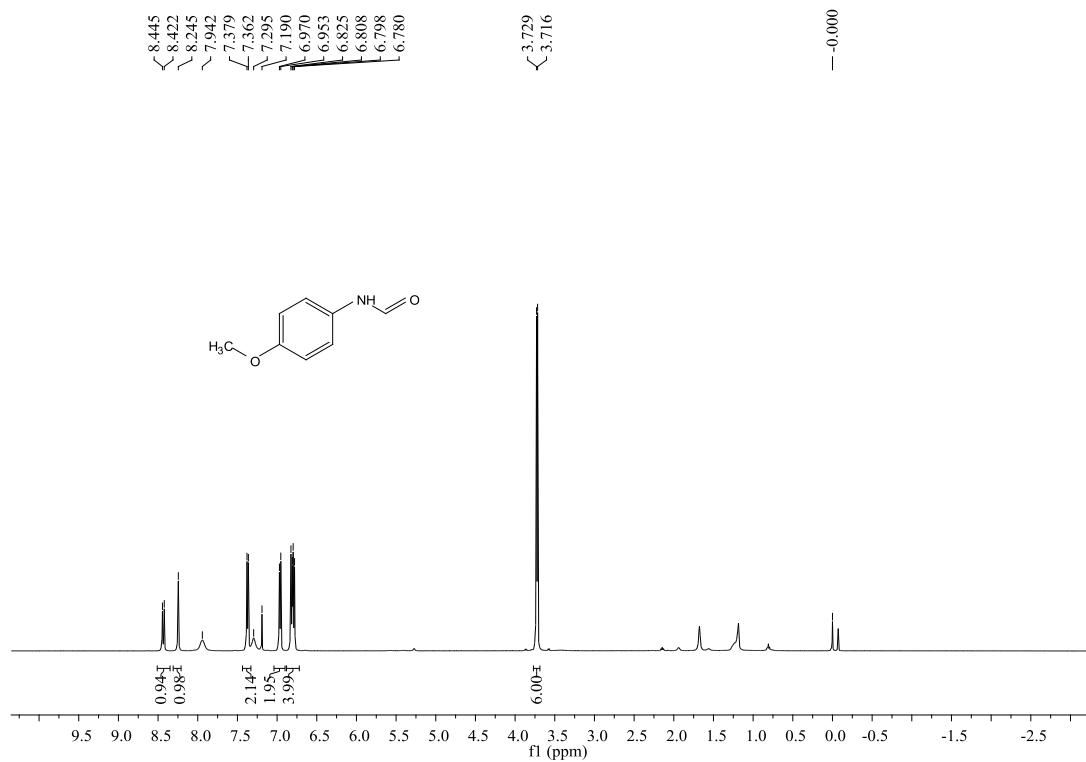
¹³C NMR: *N*-(3,5-dimethylphenyl)formamide (2e)



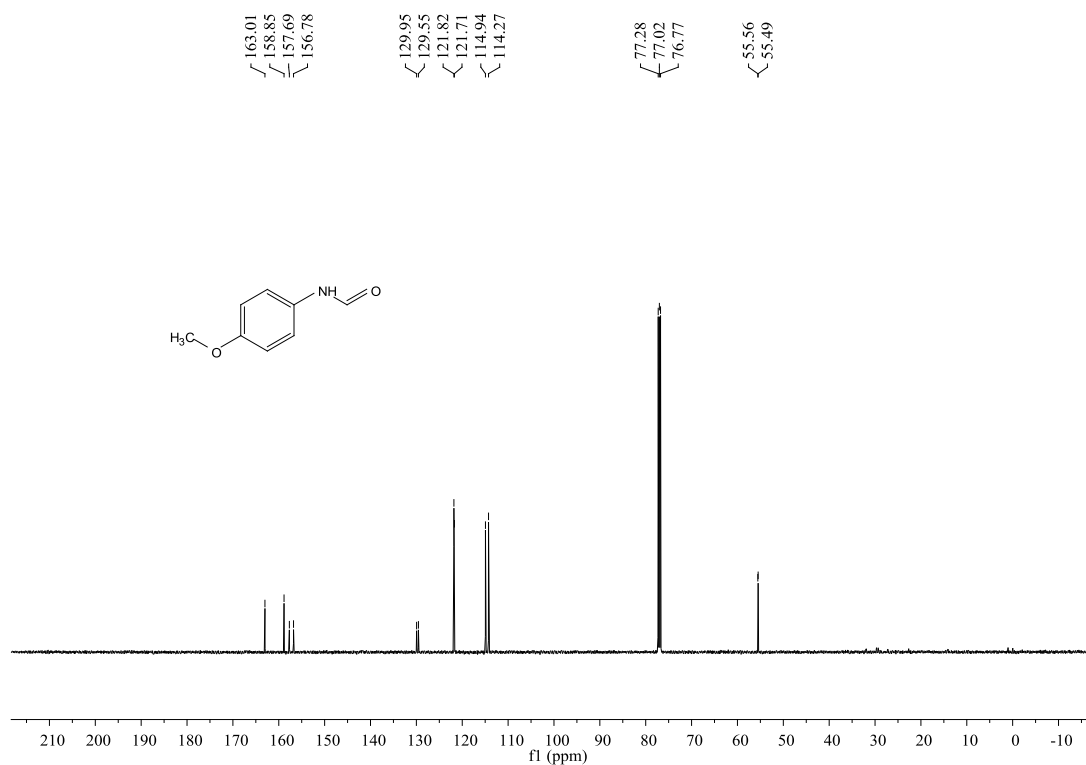
¹H NMR: *N*-mesitylformamide (**2f**)



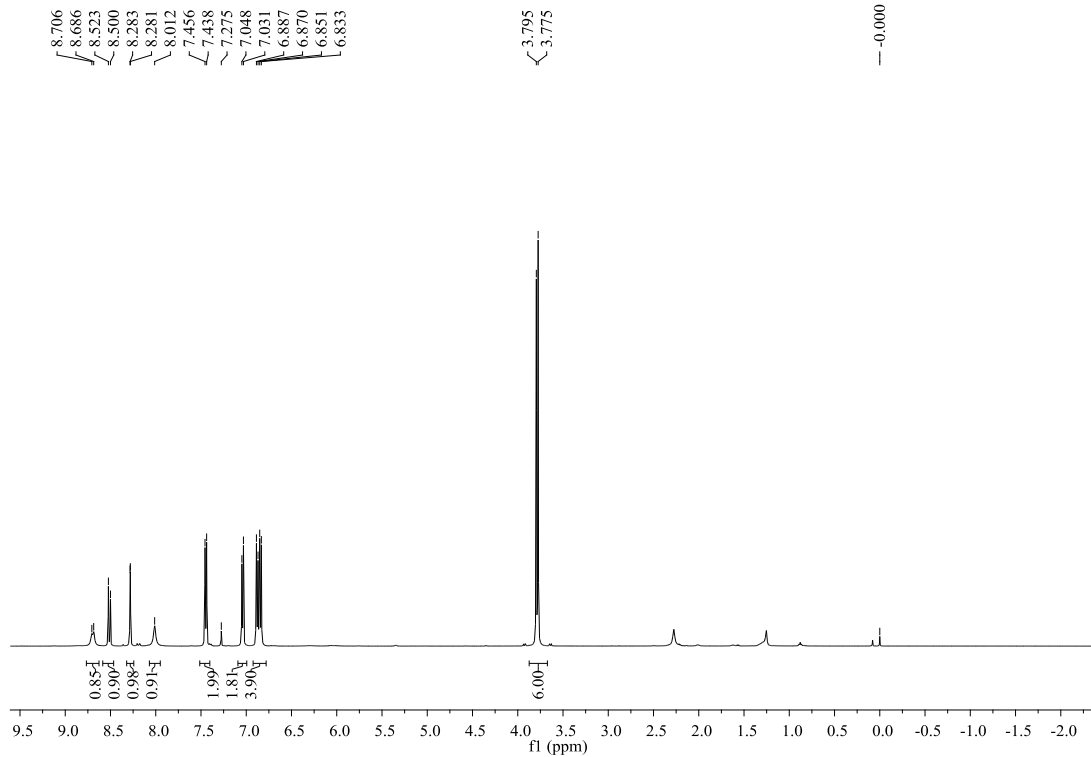
¹³C NMR: *N*-mesitylformamide (**2f**)



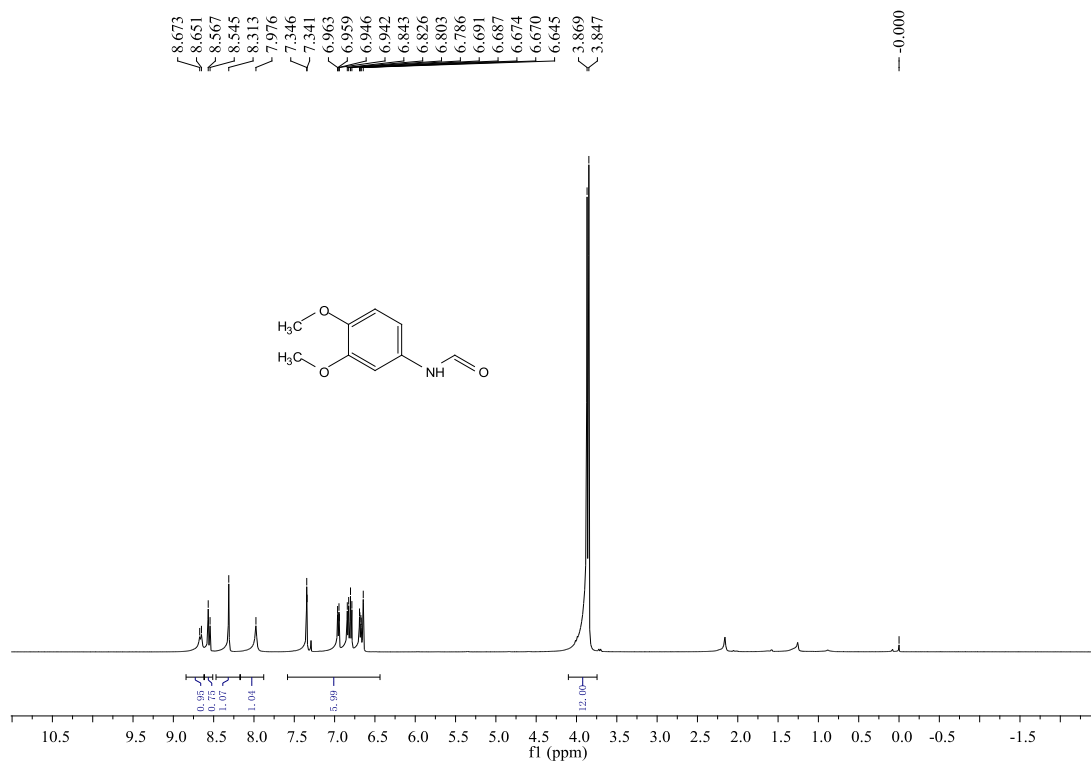
¹H NMR: *N*-(4-methoxyphenyl)formamide (**2g**) (from **1g**)



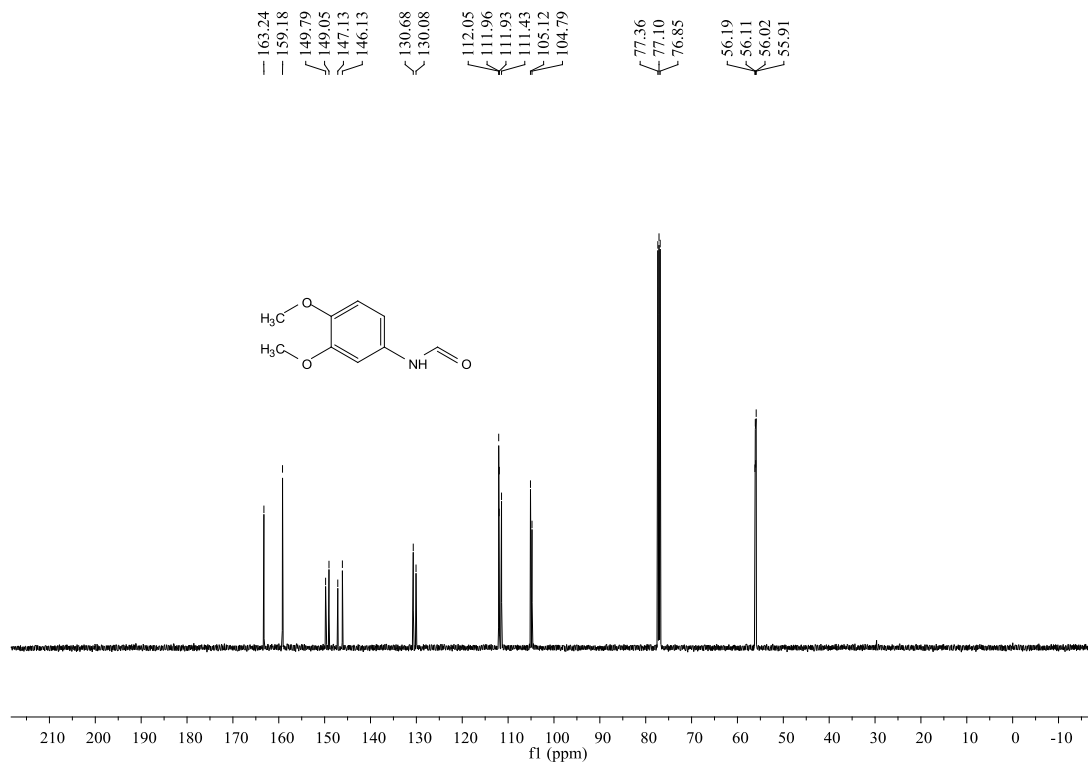
¹³C NMR: *N*-(4-methoxyphenyl)formamide (**2g**) (from **1g**)



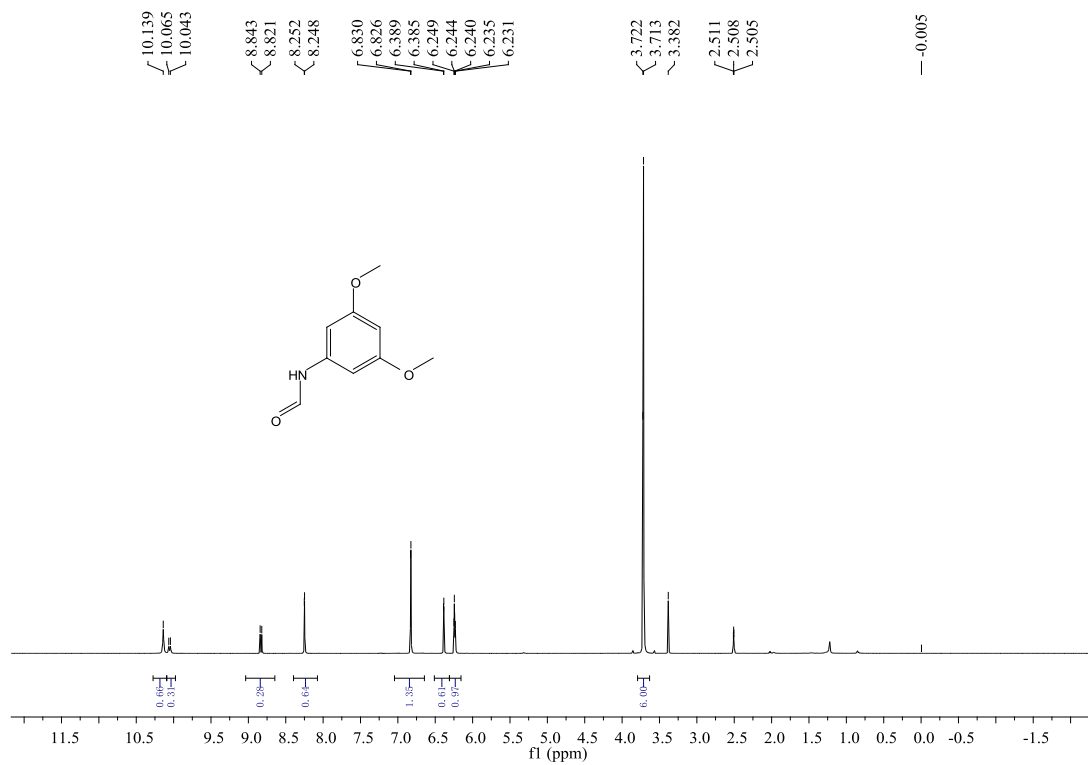
¹H NMR: *N*-(4-methoxyphenyl)formamide (**2g**) (from **3c**)



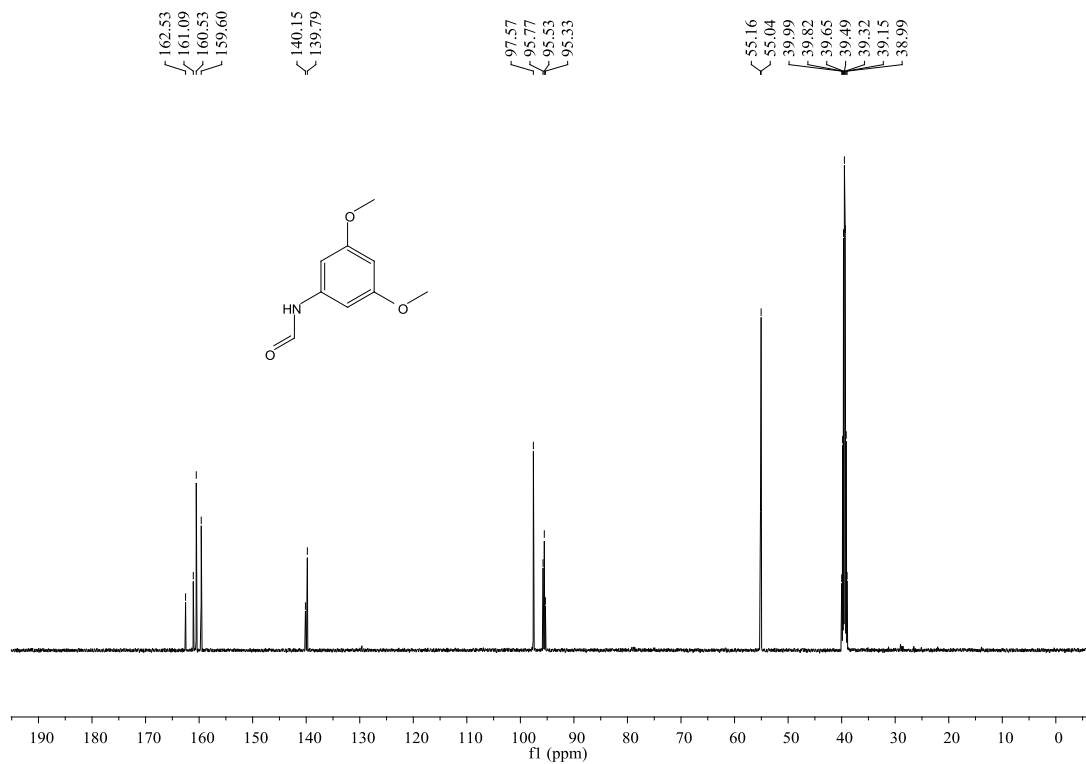
¹H NMR: *N*-(3,4-dimethoxyphenyl)formamide (**2h**)



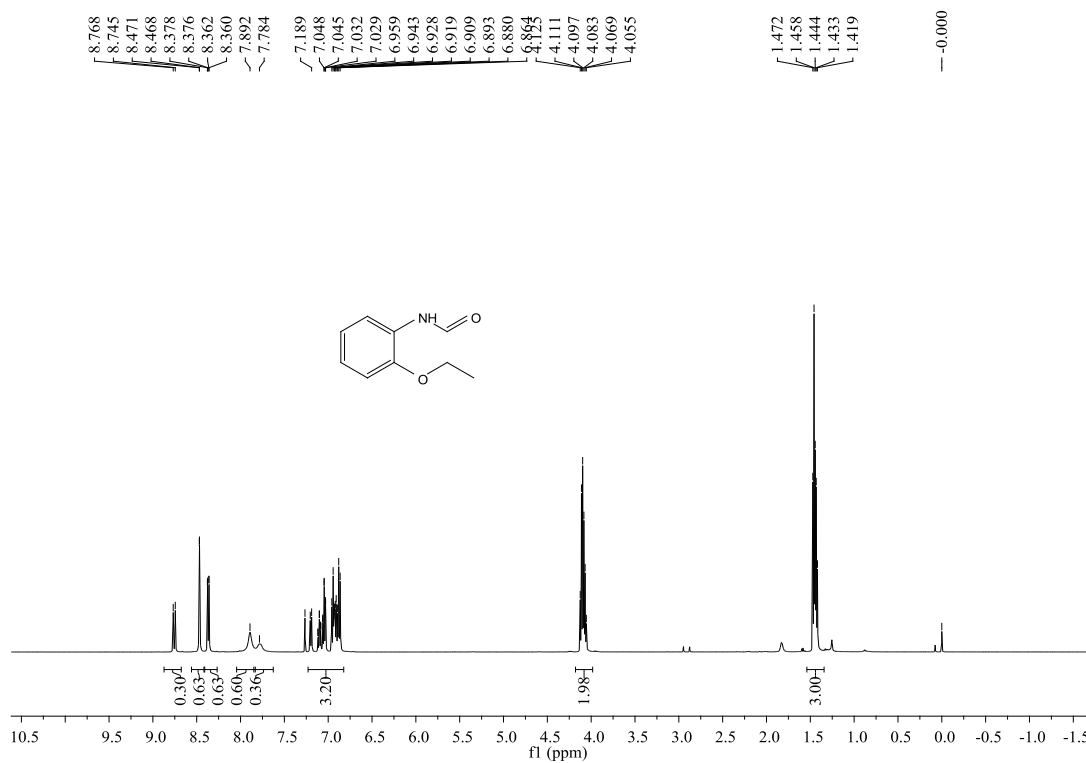
^{13}C NMR: *N*-(3,4-dimethoxyphenyl)formamide (**2h**)



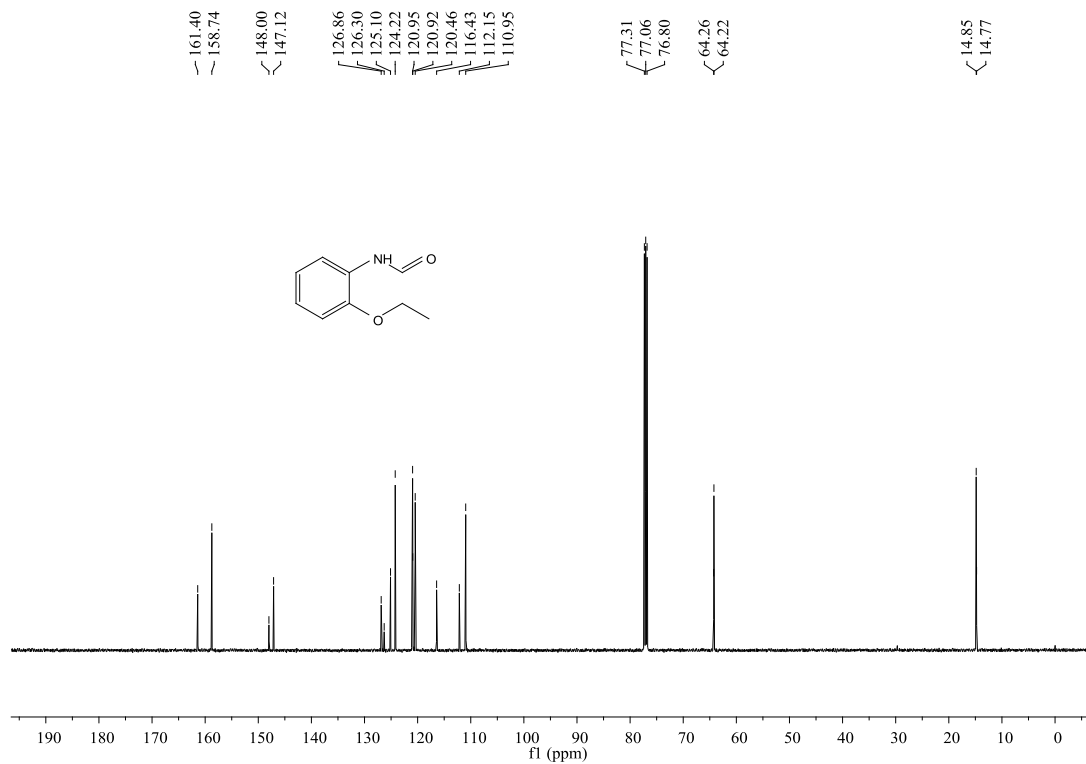
^1H NMR: *N*-(3,5-dimethoxyphenyl)formamide (**2i**)



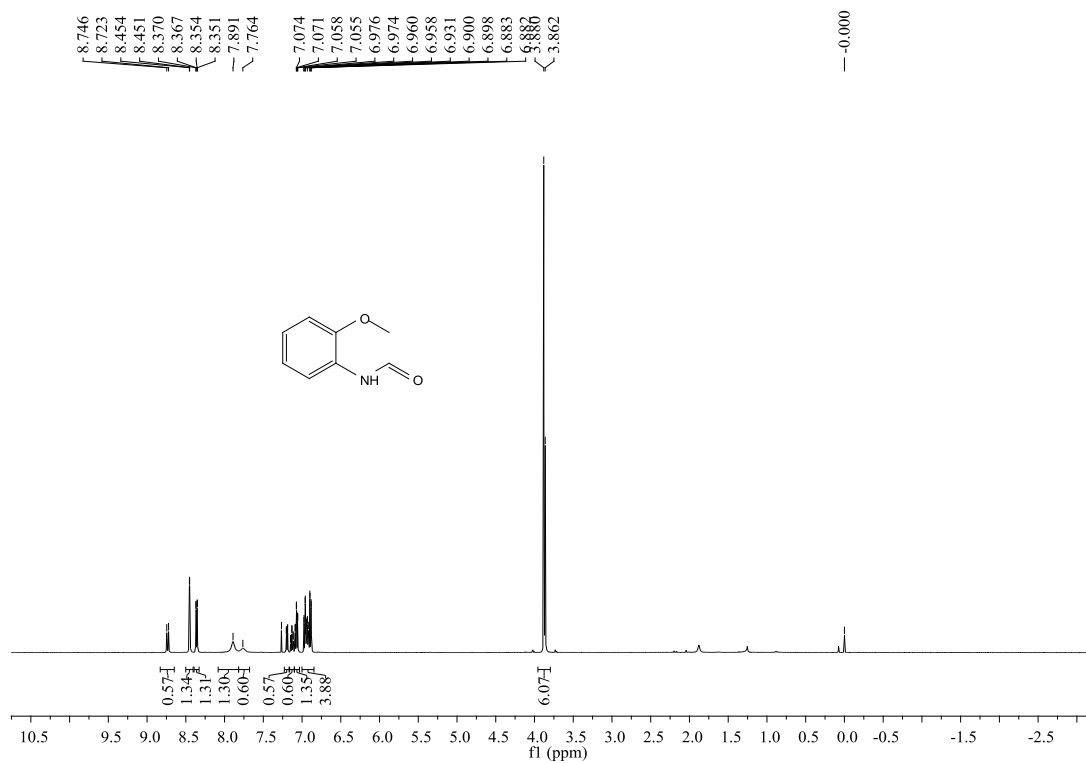
¹³C NMR: *N*-(3,5-dimethoxyphenyl)formamide (**2i**)



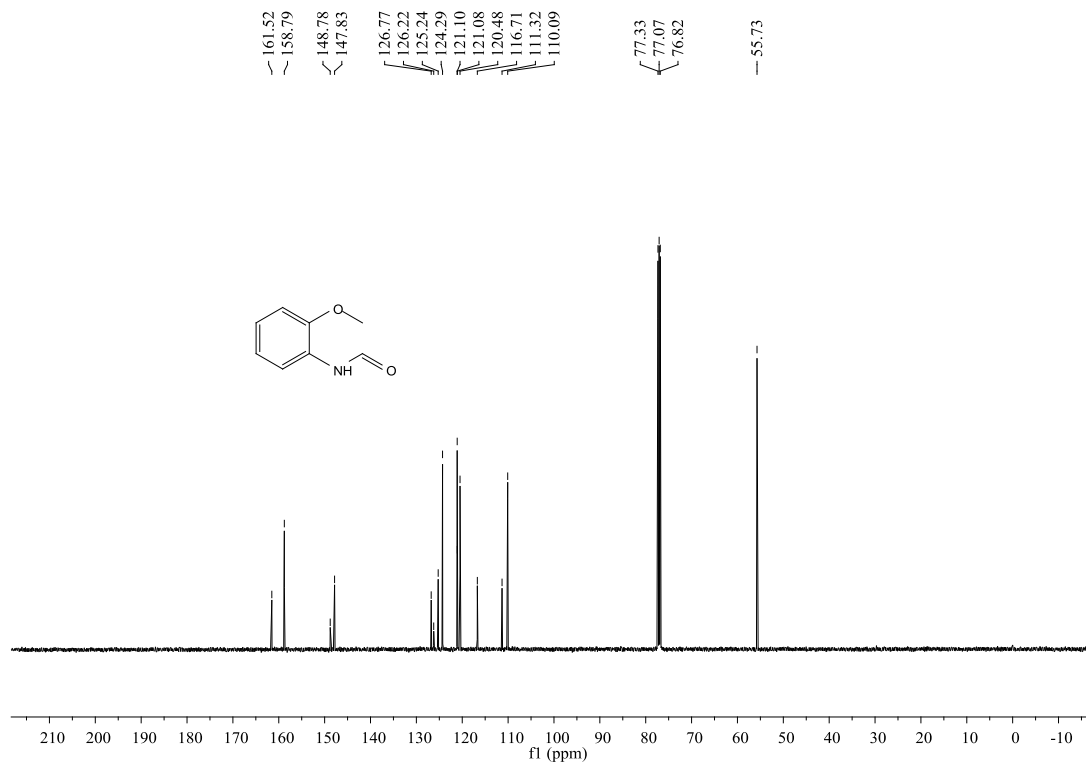
¹H NMR: *N*-(2-ethoxyphenyl)formamide (**2j**)



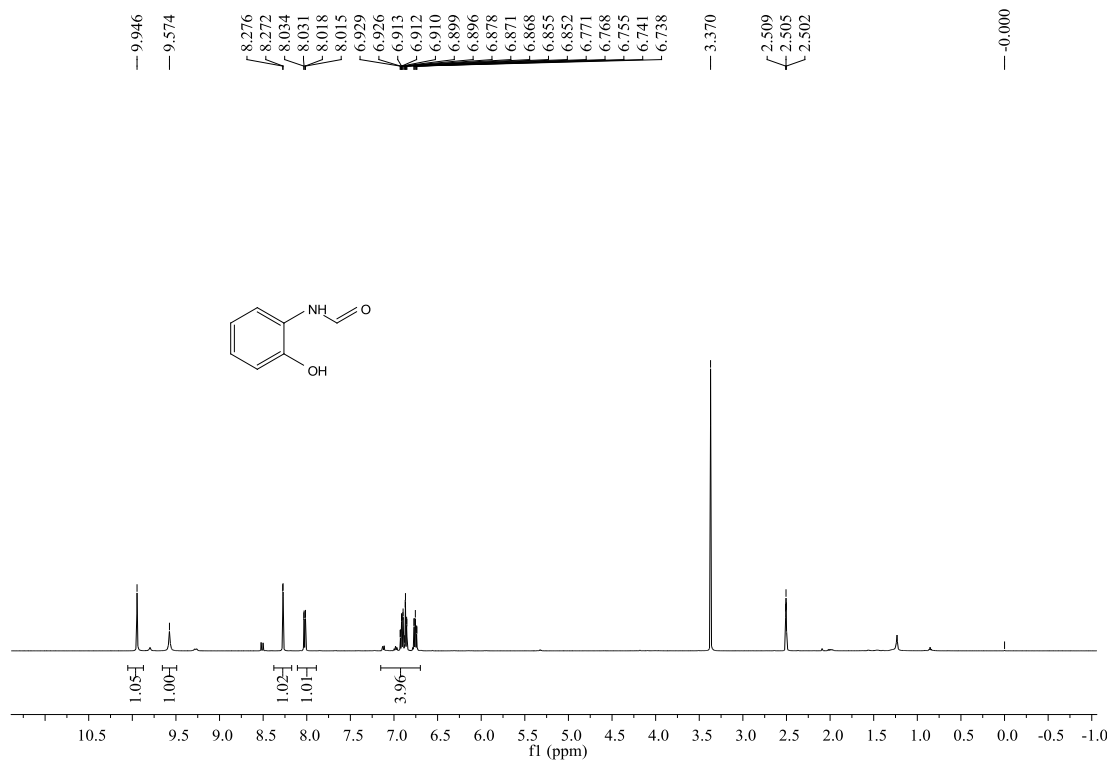
¹³C NMR: *N*-(2-ethoxyphenyl)formamide (**2j**)



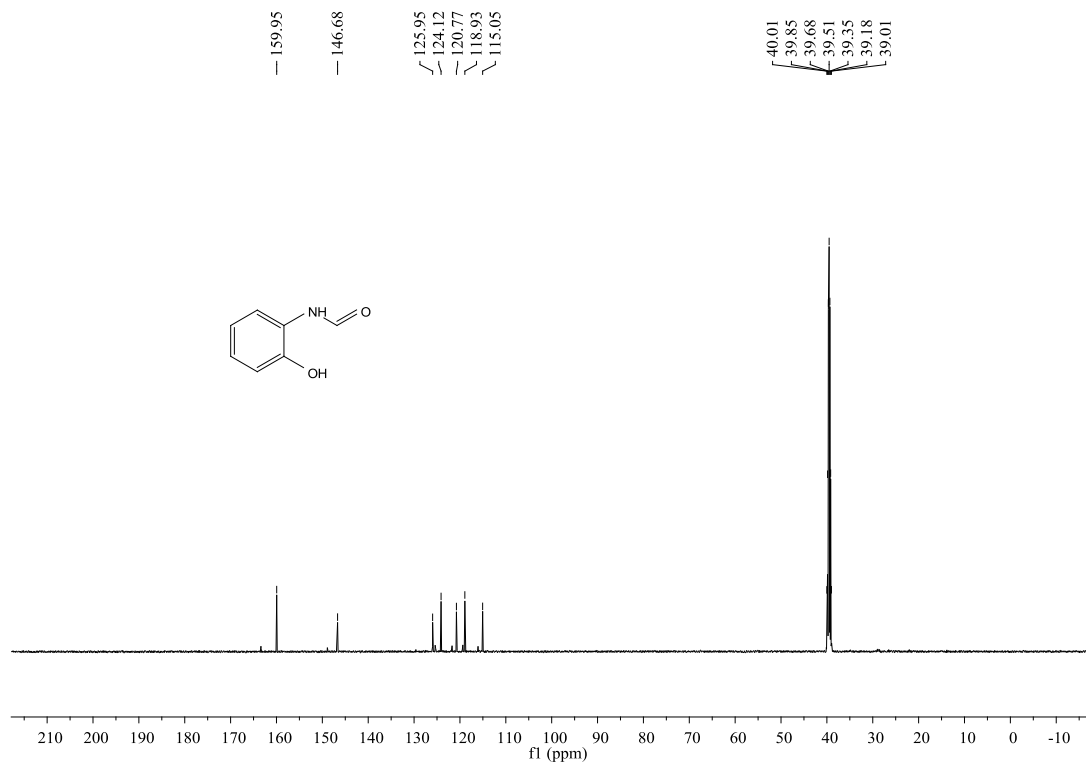
¹H NMR: *N*-(2-methoxyphenyl)formamide (**2k**)



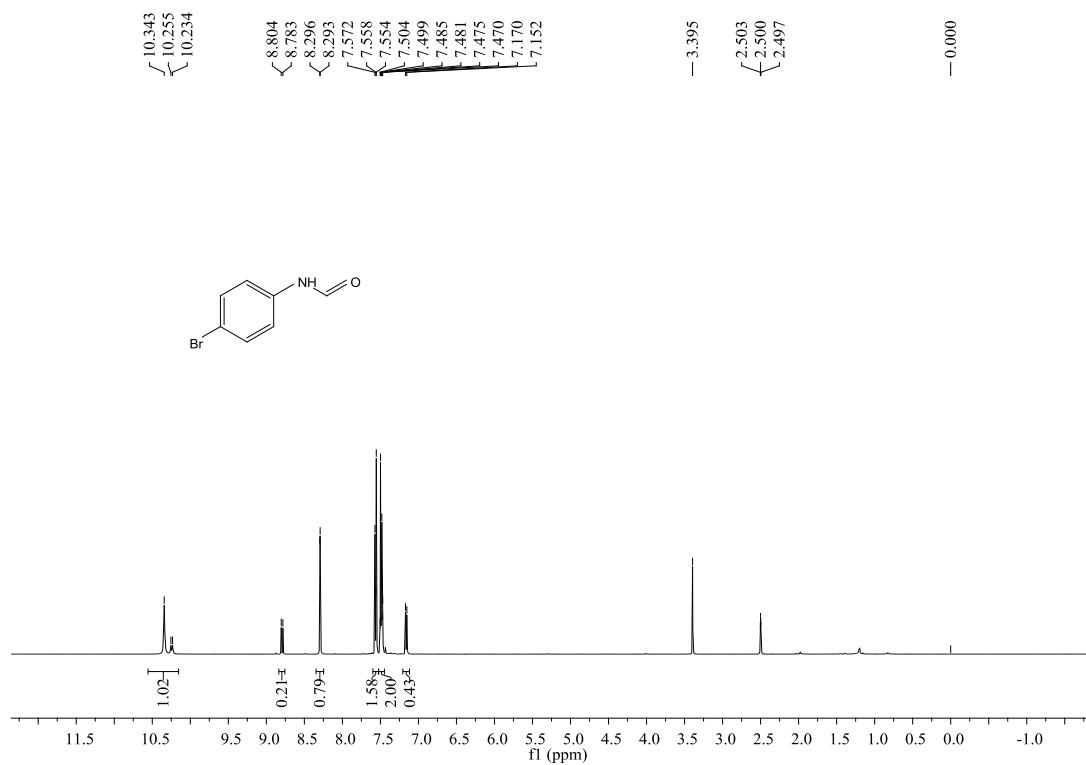
¹³C NMR: *N*-(2-methoxyphenyl)formamide (**2k**)



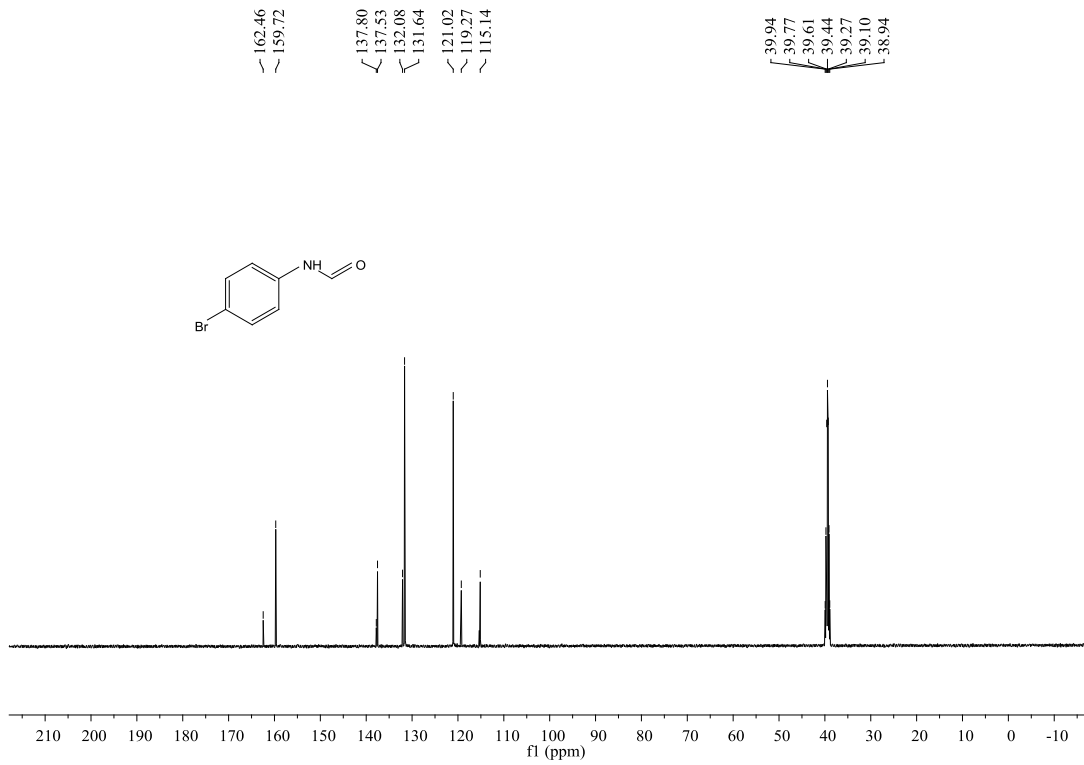
¹H NMR: *N*-(2-hydroxyphenyl)formamide (**2l**)



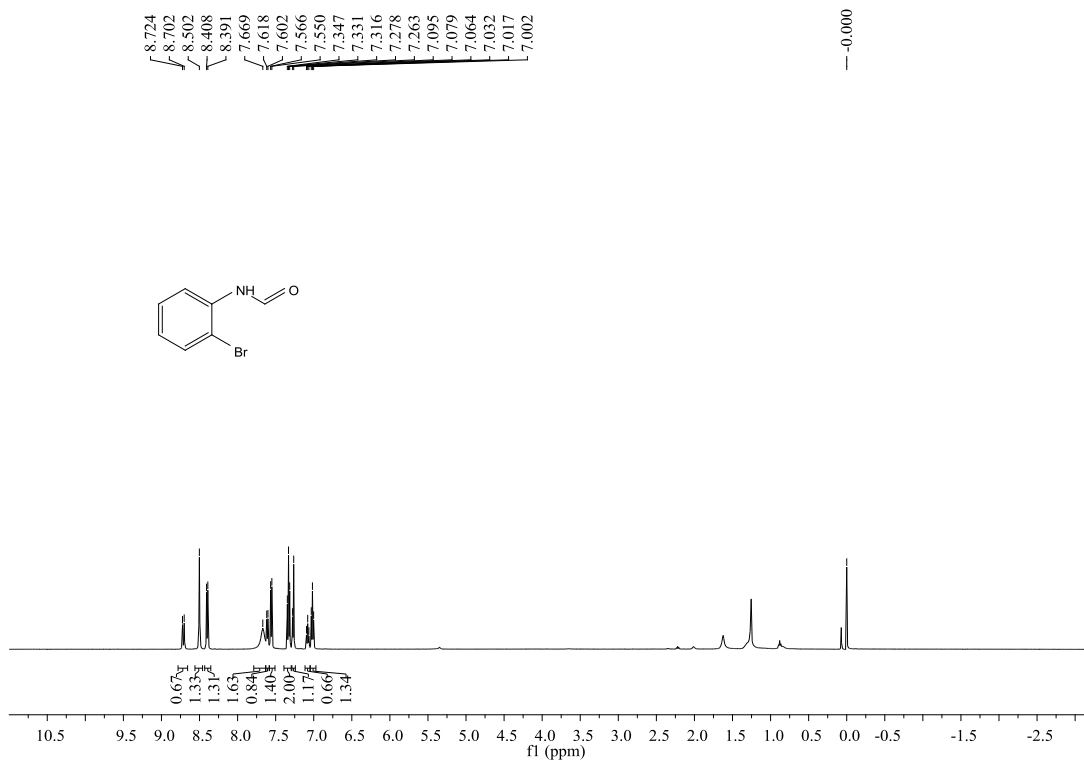
^{13}C NMR: *N*-(2-hydroxyphenyl)formamide (**21**)



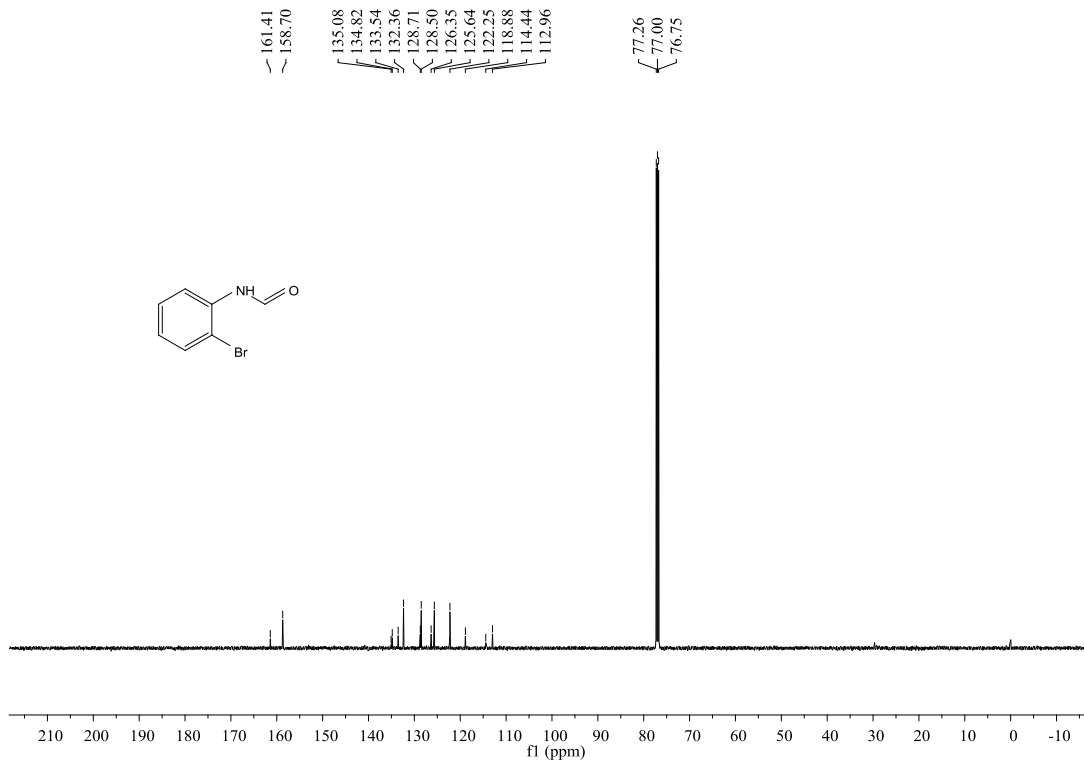
^1H NMR: *N*-(4-bromophenyl)formamide (**2m**)



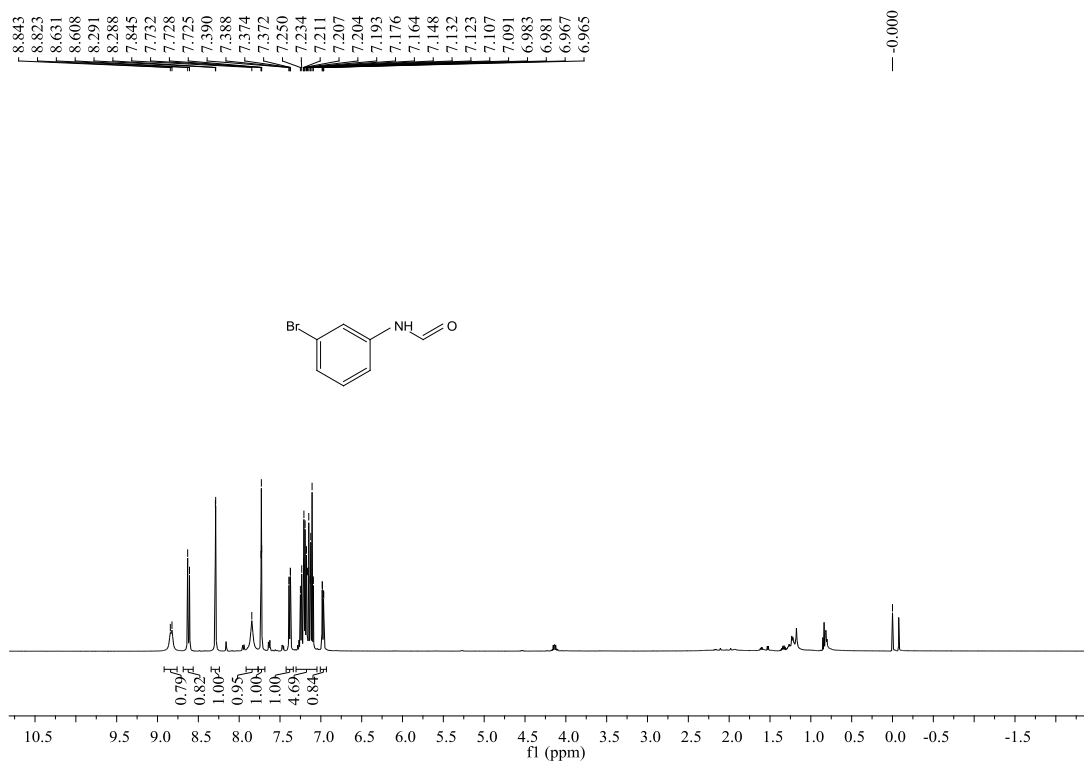
^{13}C NMR: *N*-(4-bromophenyl)formamide (**2m**)



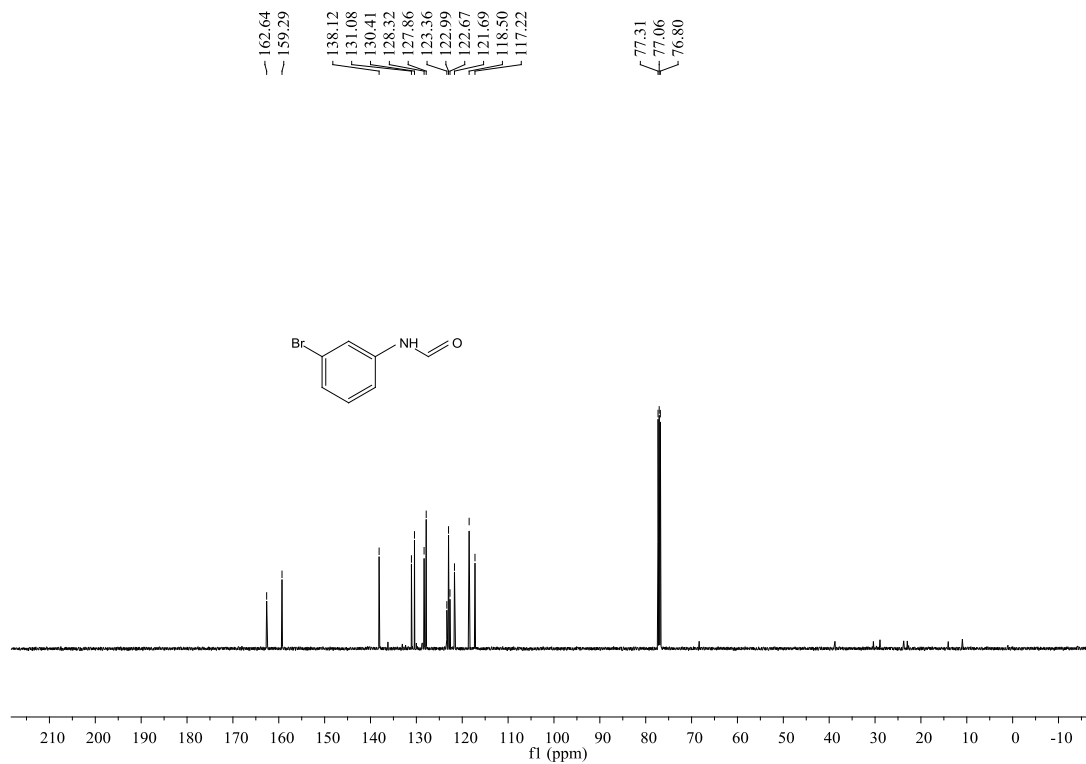
^1H NMR: *N*-(2-bromophenyl)formamide (**2n**)



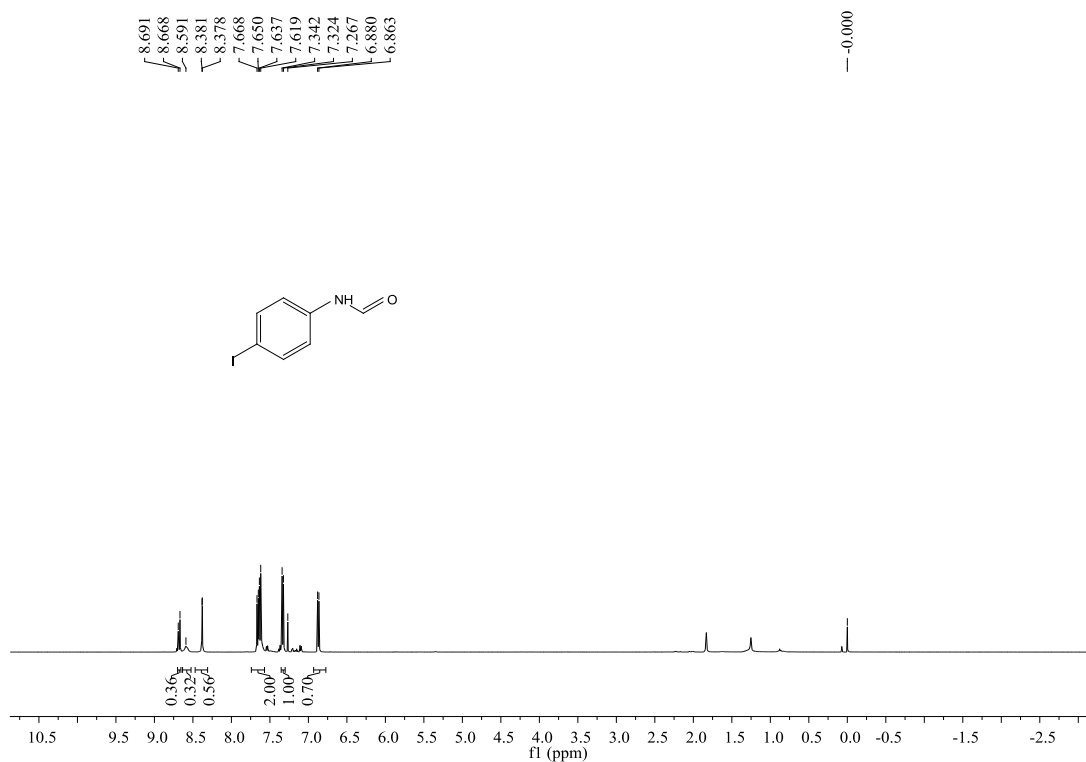
¹³C NMR: *N*-(2-bromophenyl)formamide (**2n**)



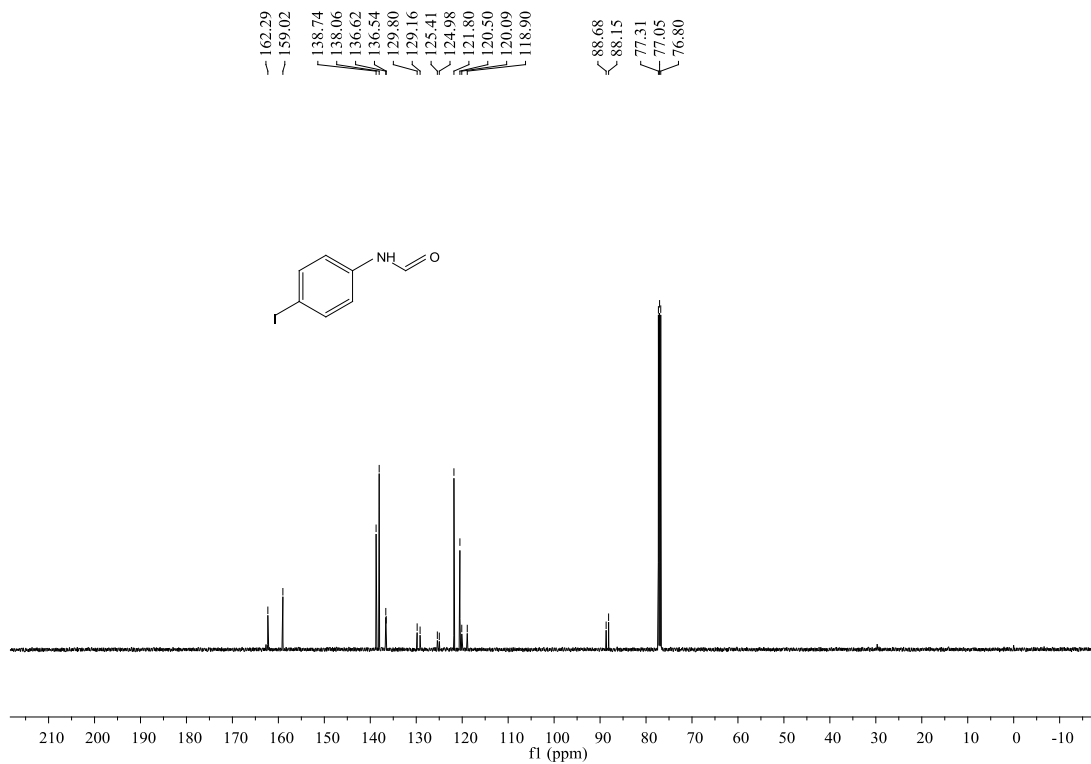
¹H NMR: *N*-(3-bromophenyl)formamide (**2o**)



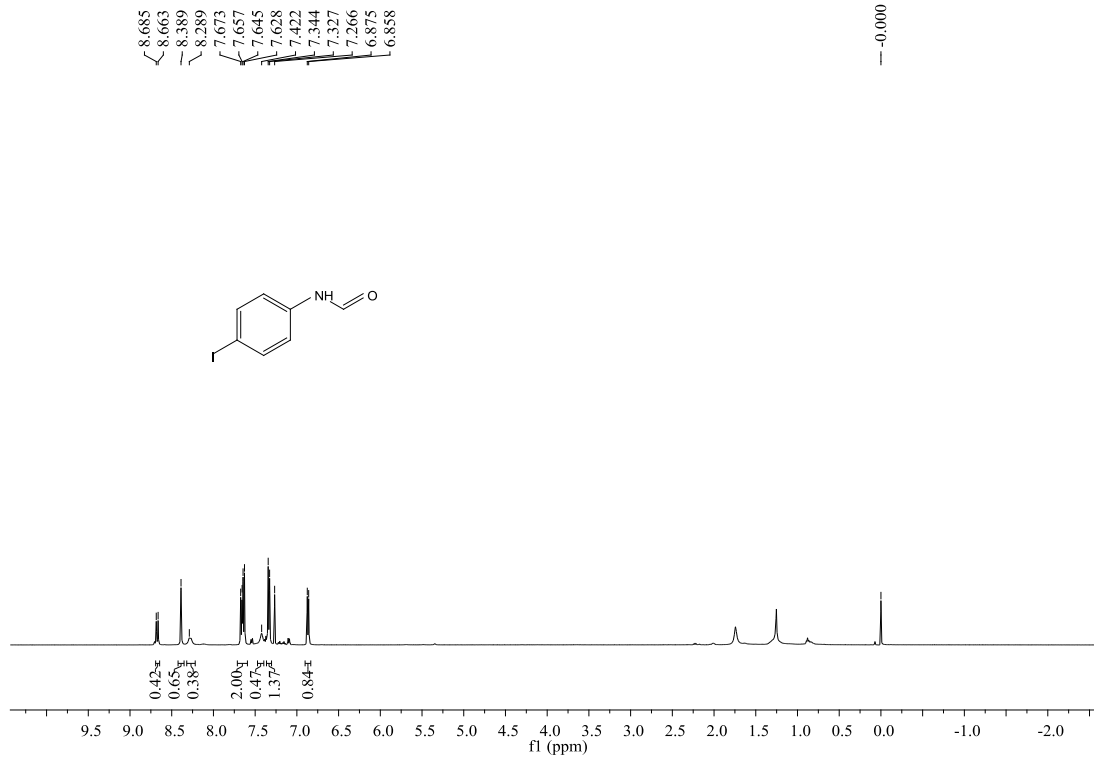
¹³C NMR: *N*-(3-bromophenyl)formamide (**2o**)



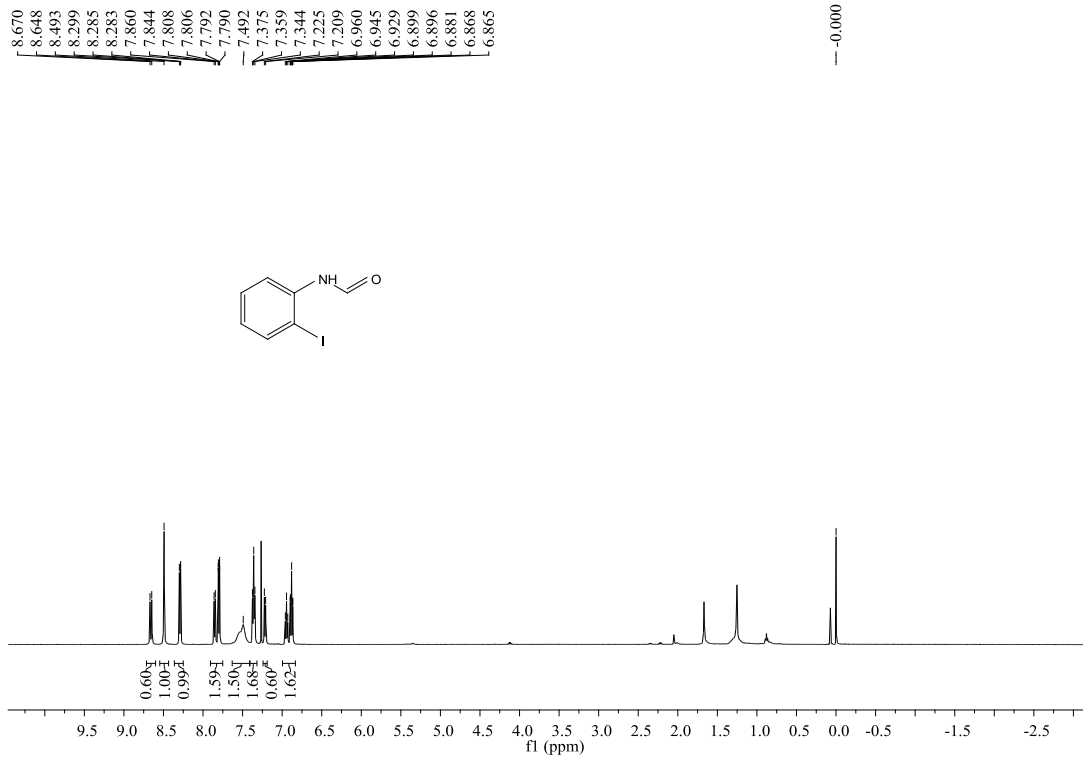
¹H NMR: *N*-(4-iodophenyl)formamide (**2p**) (from **1p**)



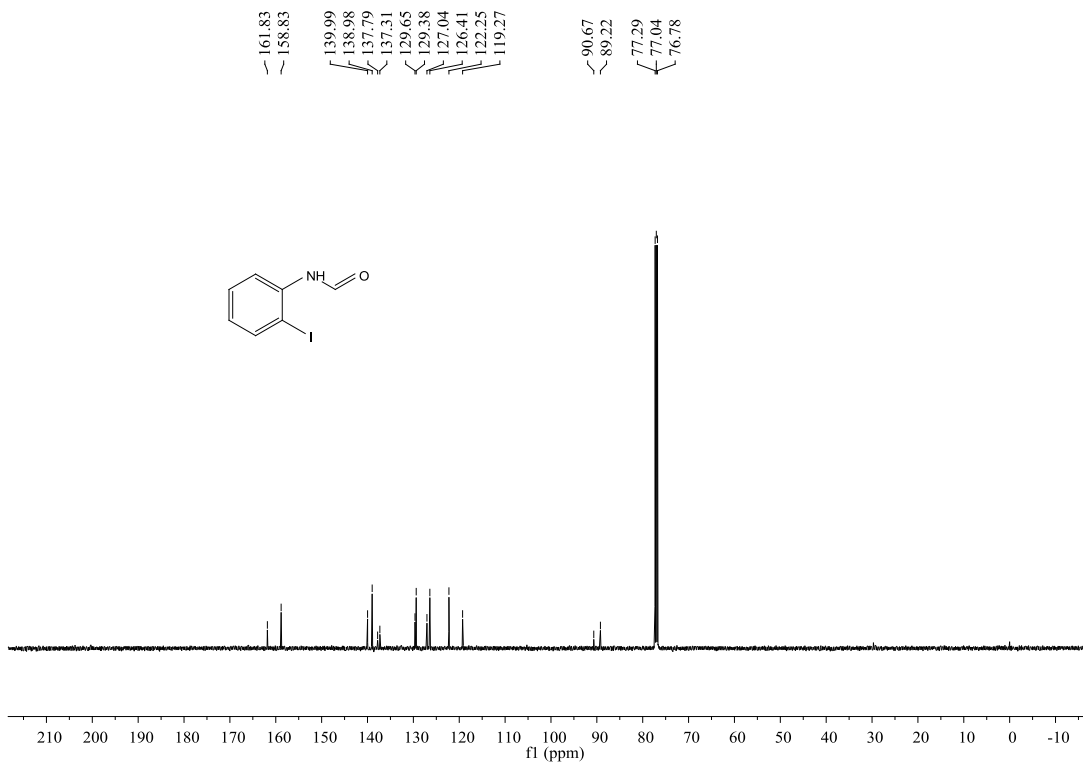
¹³C NMR: *N*-(4-iodophenyl)formamide (**2p**) (from **1p**)



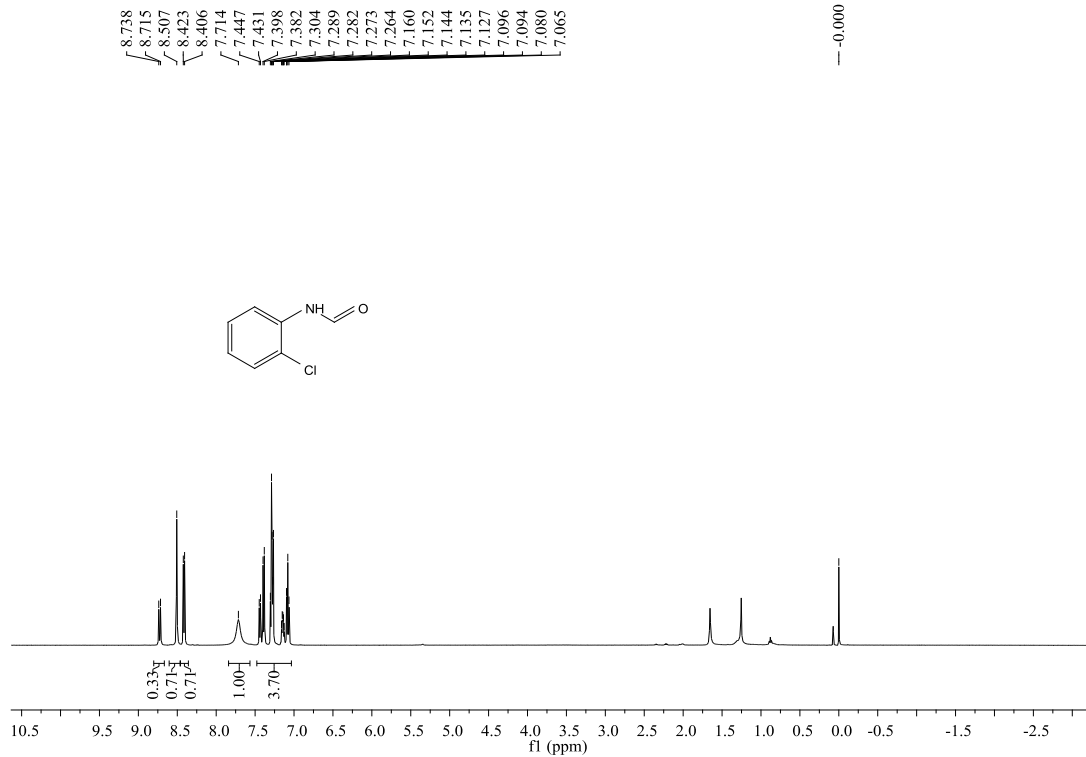
¹H NMR: *N*-(4-iodophenyl)formamide (**2p**) (from **4p**)



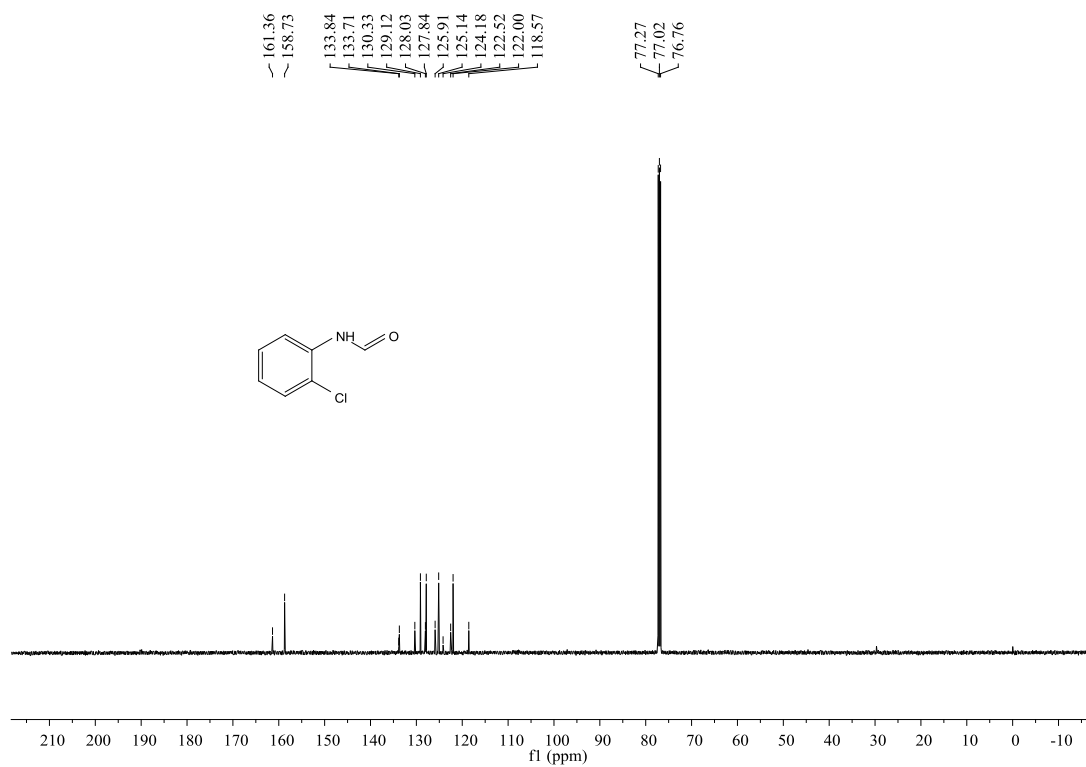
$^1\text{H NMR}$: *N*-(2-iodophenyl)formamide (2q)



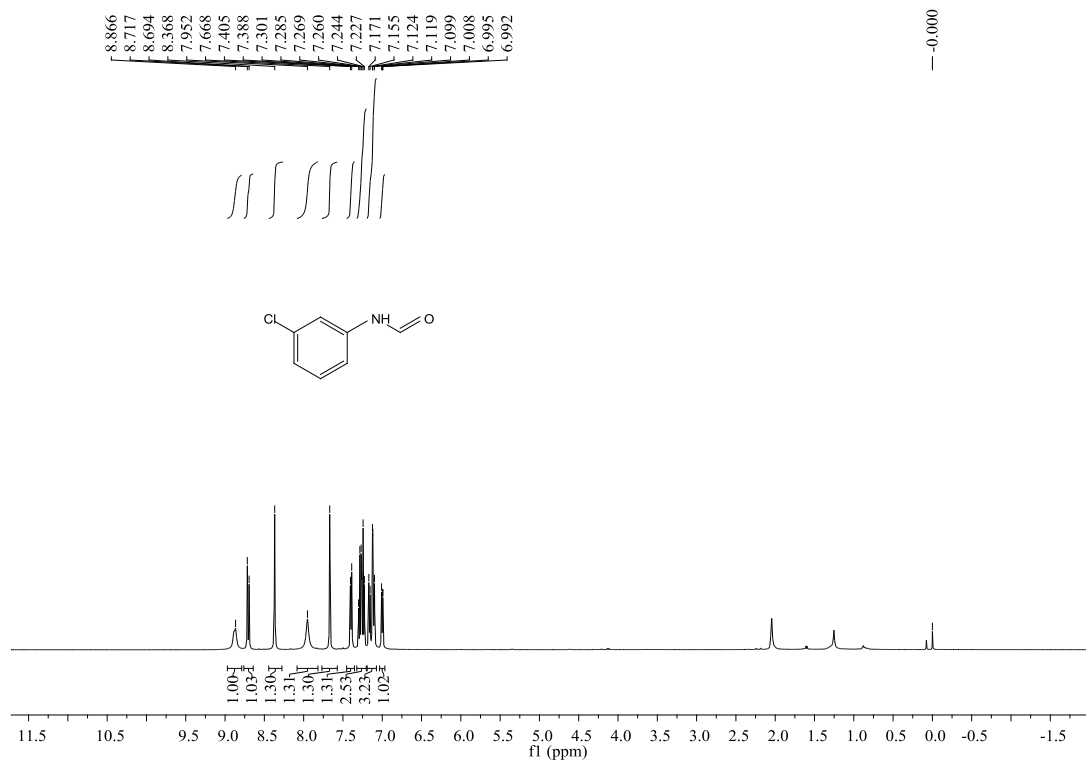
$^{13}\text{C NMR}$: *N*-(2-iodophenyl)formamide (2q)



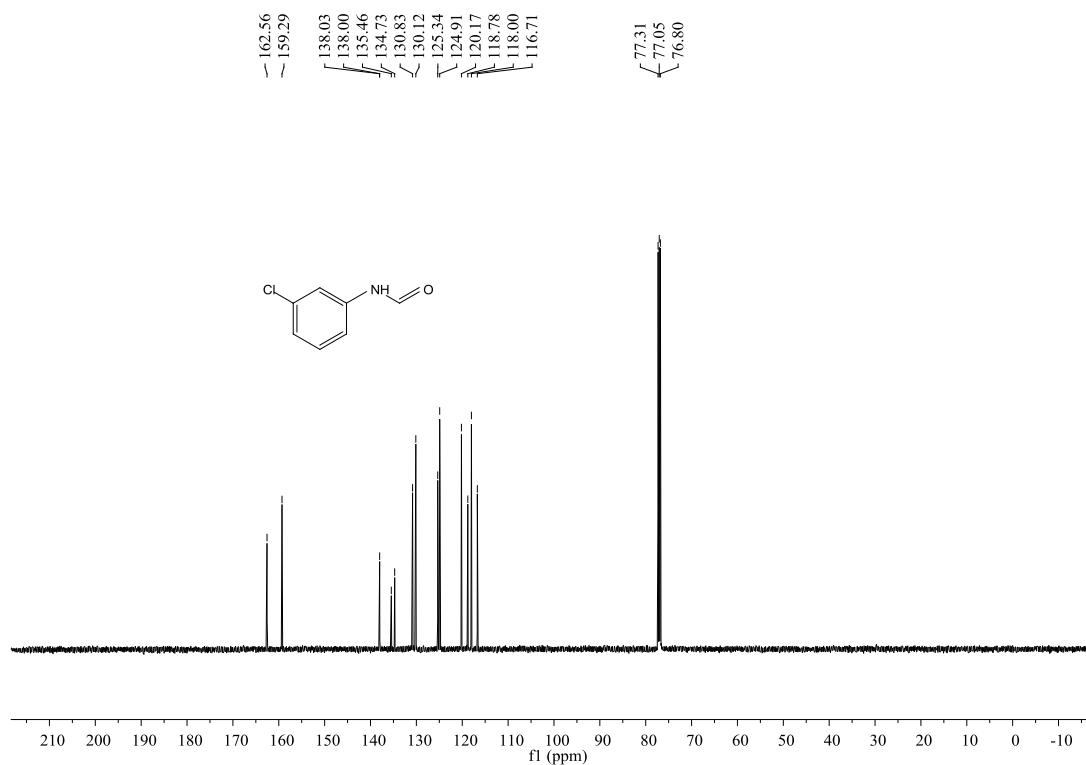
^1H NMR: *N*-(2-chlorophenyl)formamide (2r)



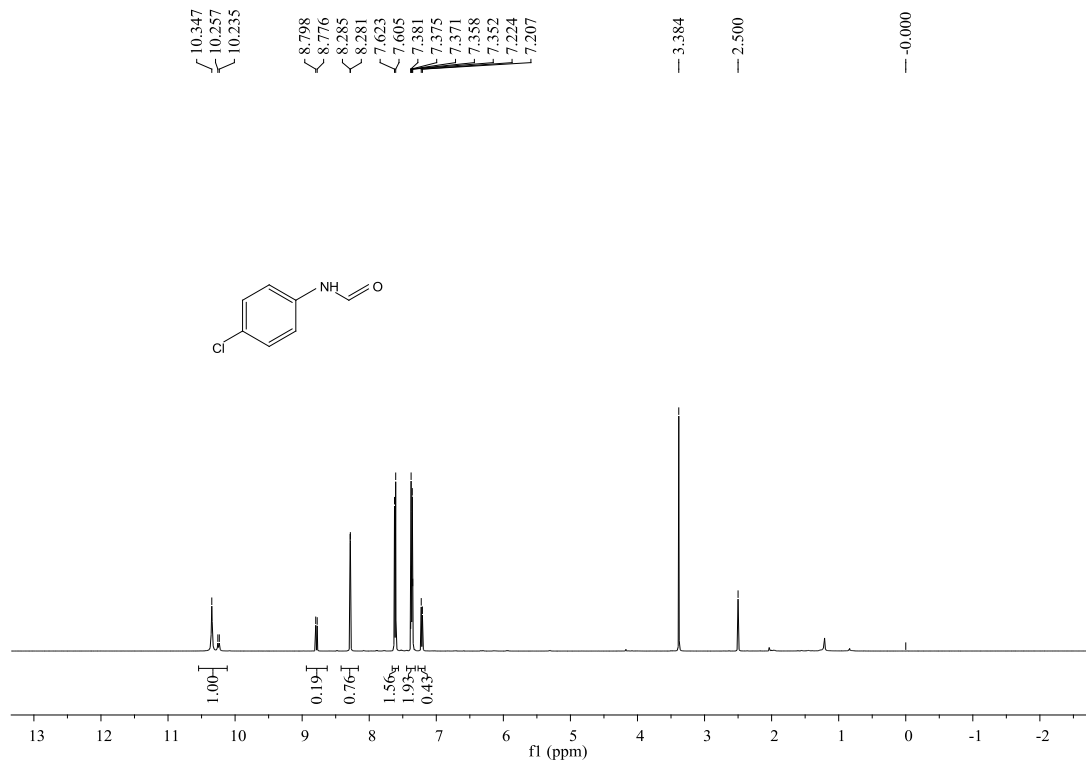
^{13}C NMR: *N*-(2-chlorophenyl)formamide (2r)



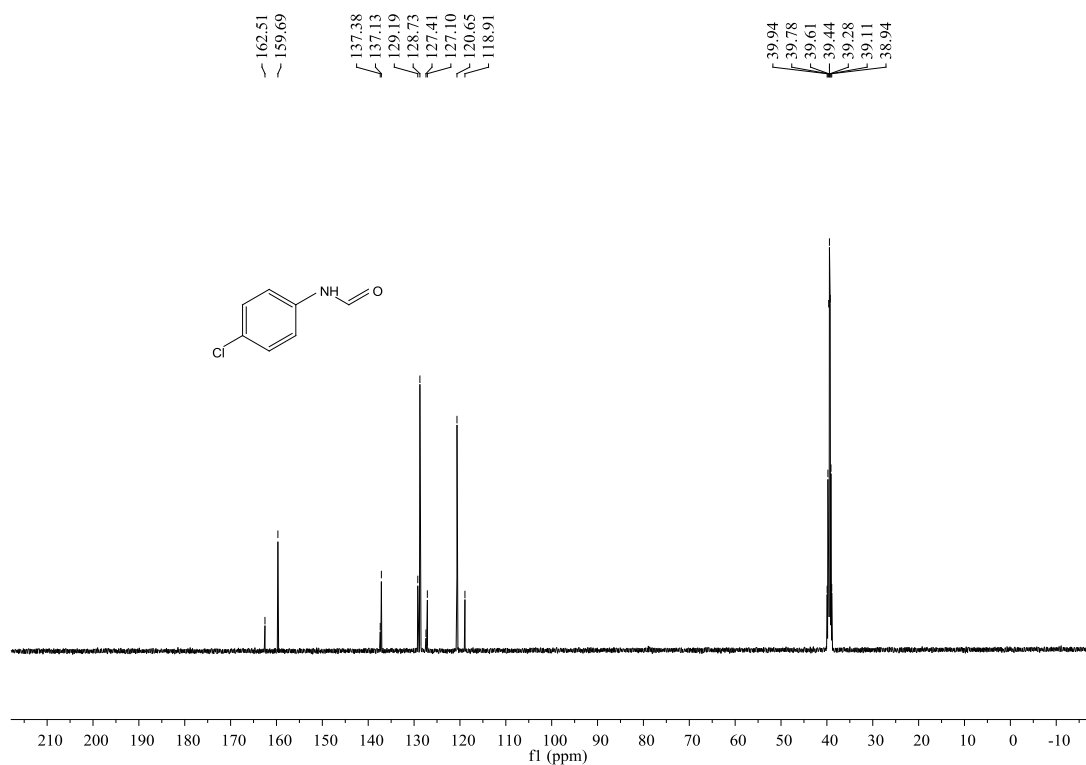
¹H NMR: *N*-(3-chlorophenyl)formamide (**2s**)



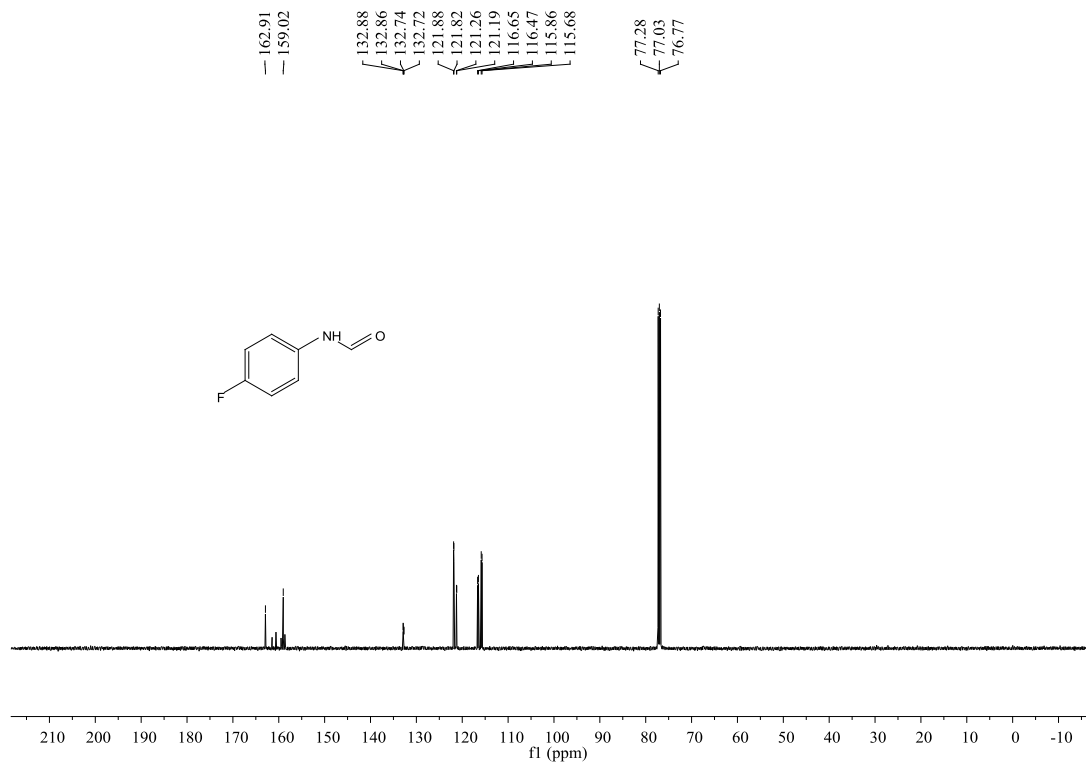
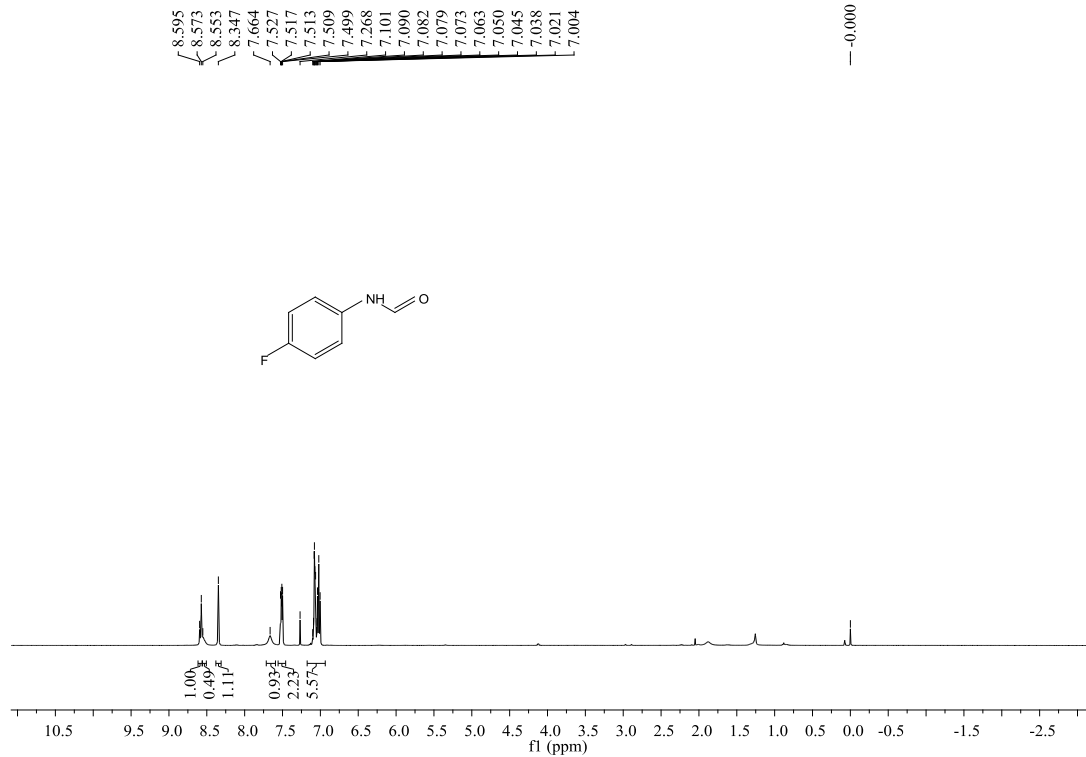
¹³C NMR: *N*-(3-chlorophenyl)formamide (**2s**)

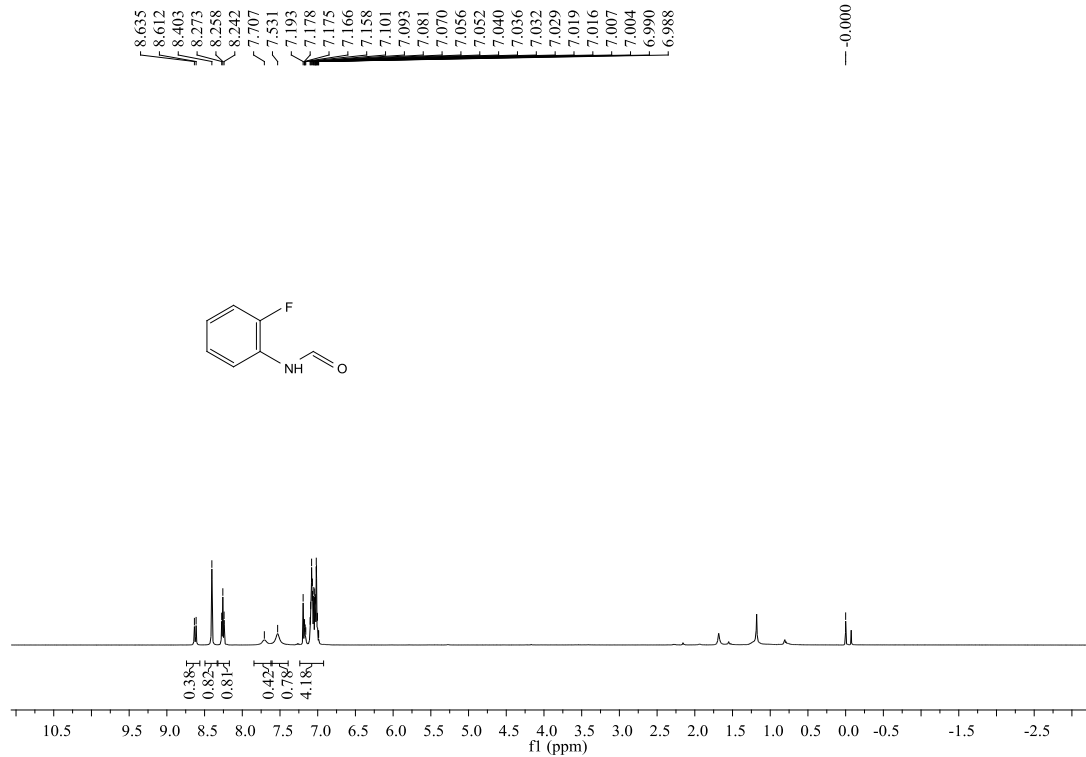


¹H NMR: *N*-(4-chlorophenyl)formamide (2t)

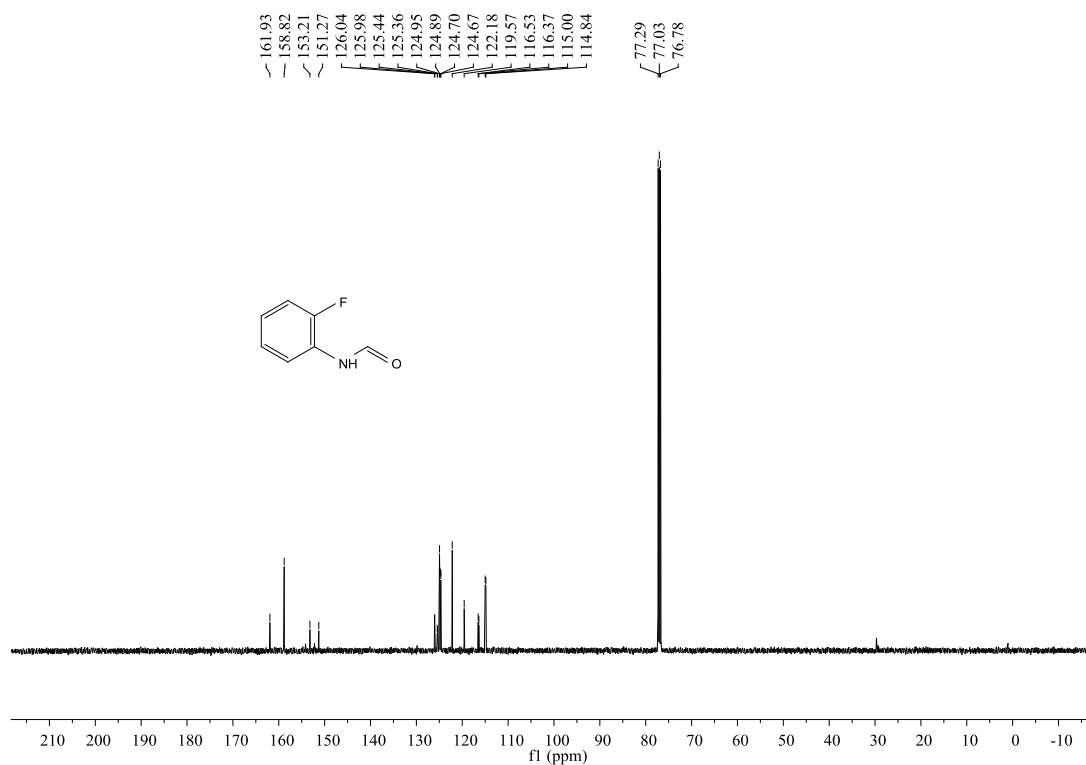


¹³C NMR: *N*-(4-chlorophenyl)formamide (2t)

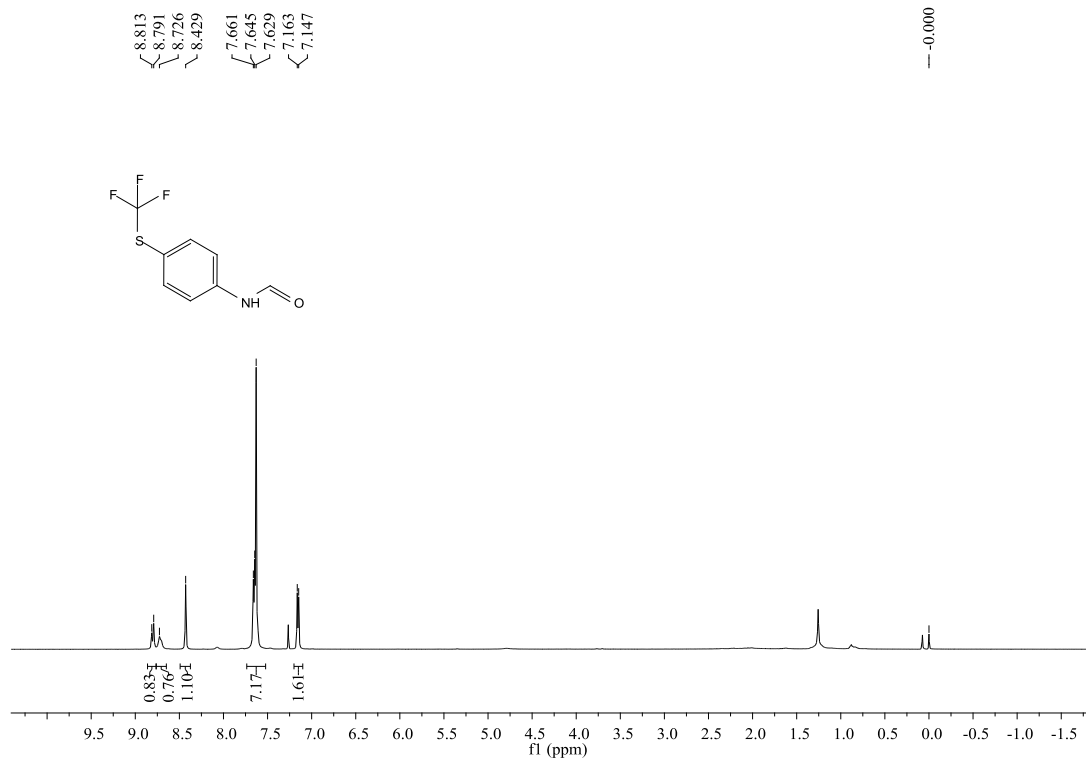




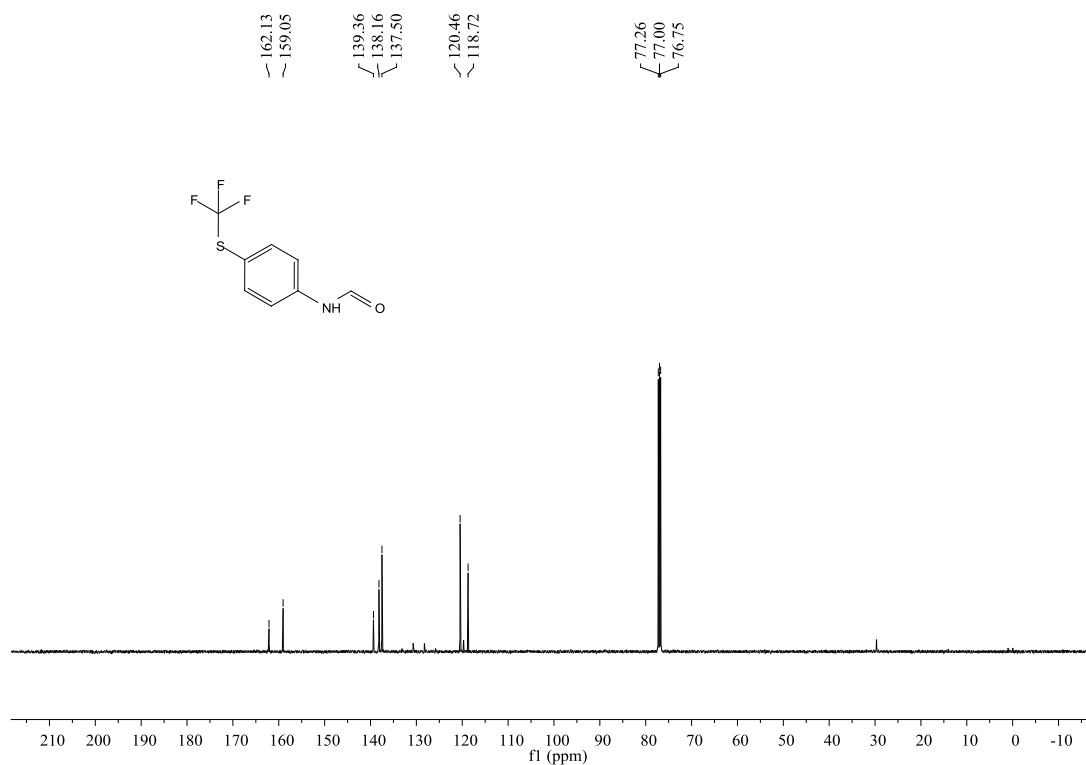
¹H NMR: *N*-(2-fluorophenyl)formamide (**2v**)



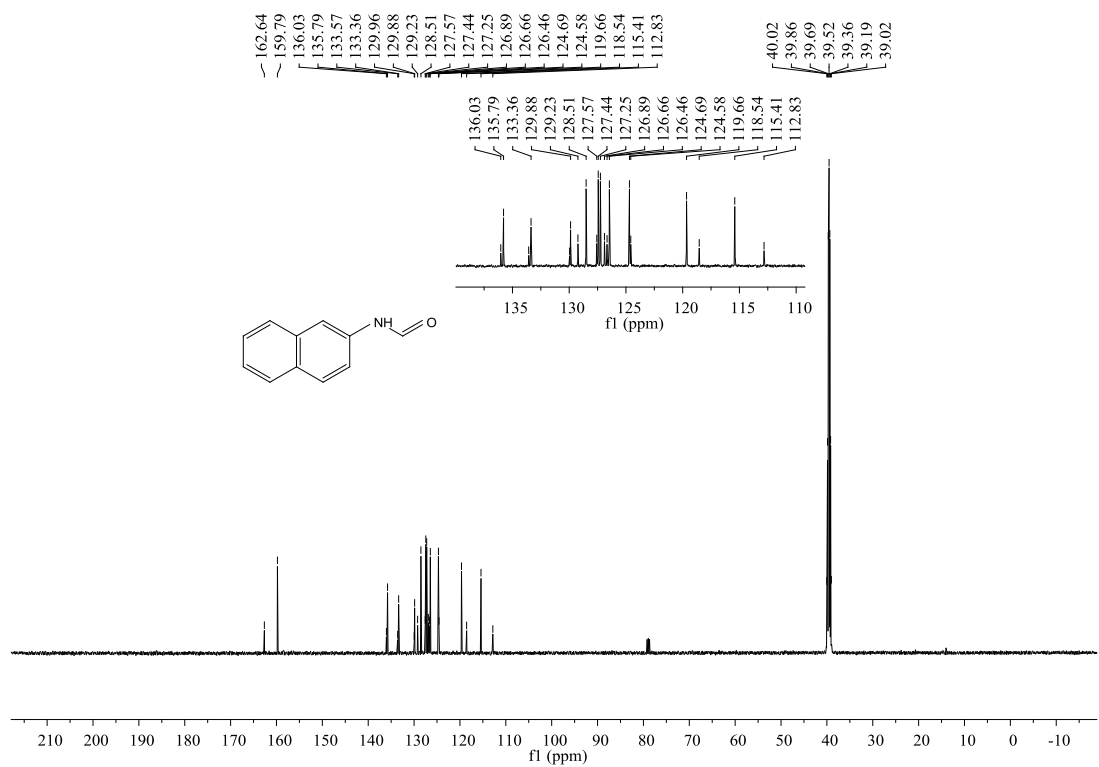
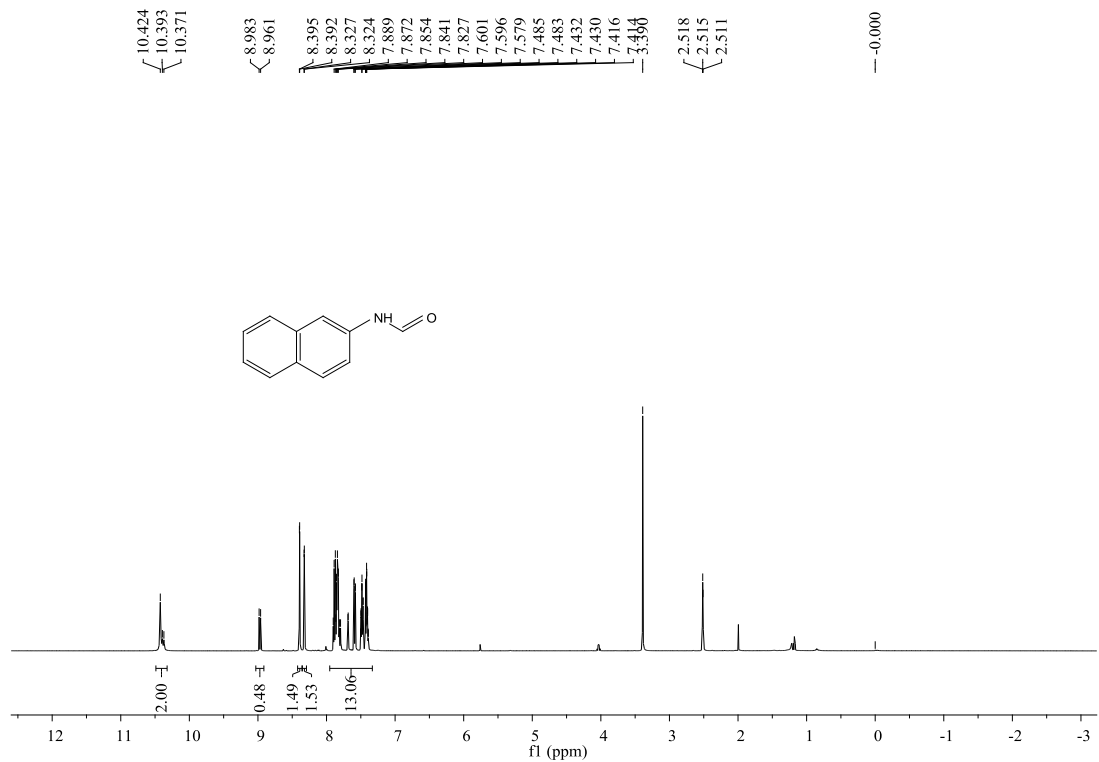
¹³C NMR: *N*-(2-fluorophenyl)formamide (**2v**)

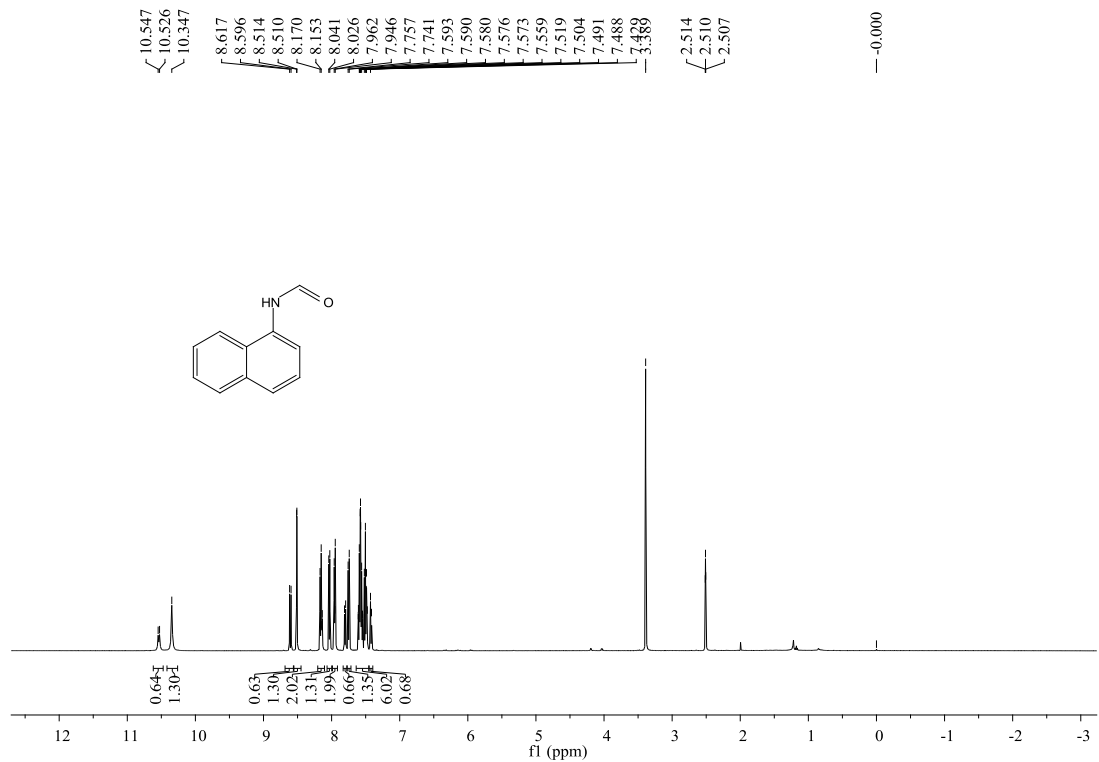


¹H NMR: *N*-(4-((trifluoromethyl)thio)phenyl)formamide (**2w**)

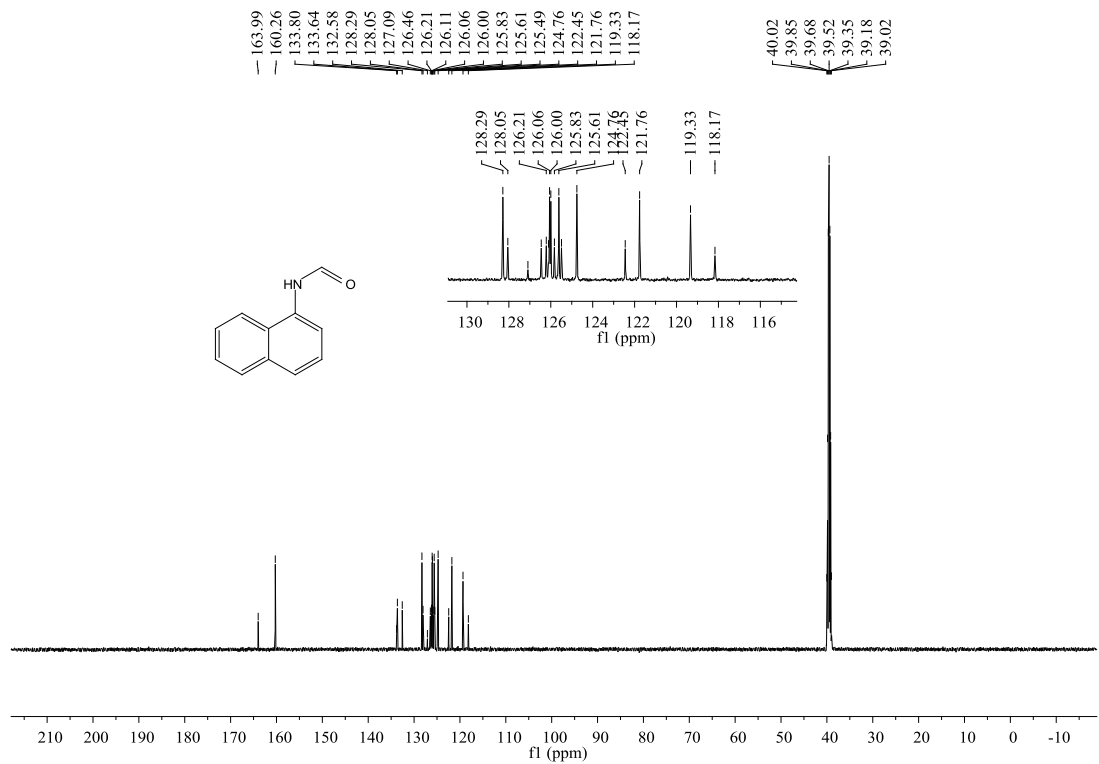


¹³C NMR: *N*-(4-((trifluoromethyl)thio)phenyl)formamide (**2w**)

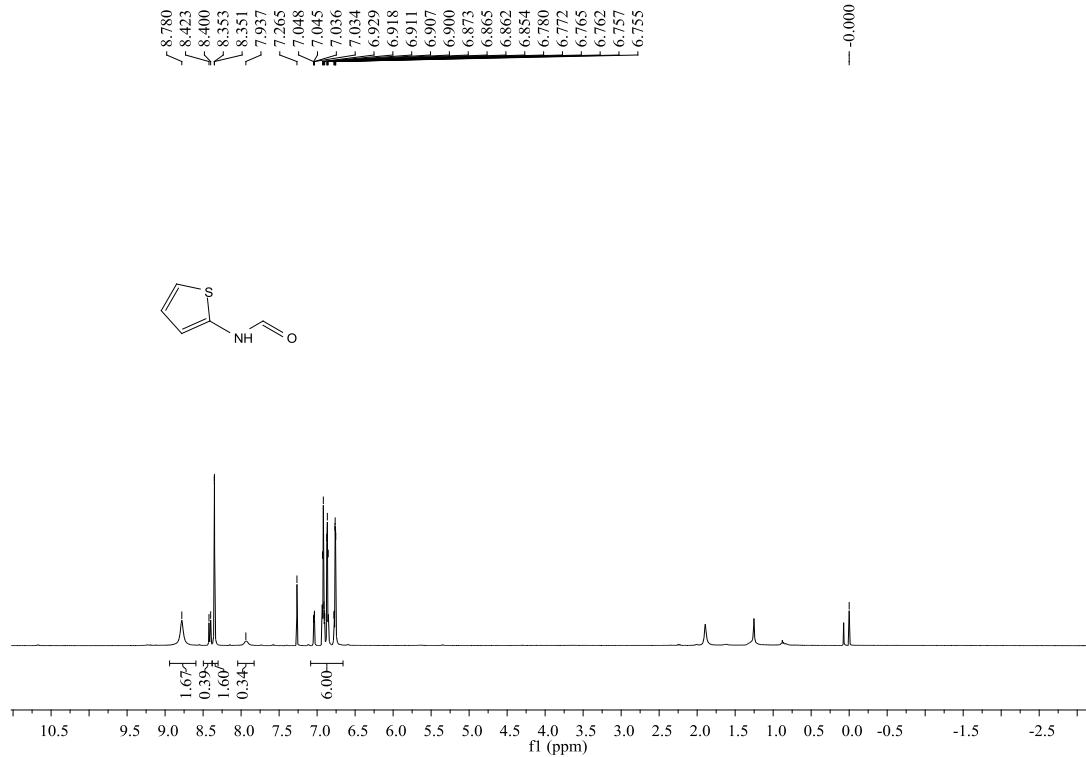




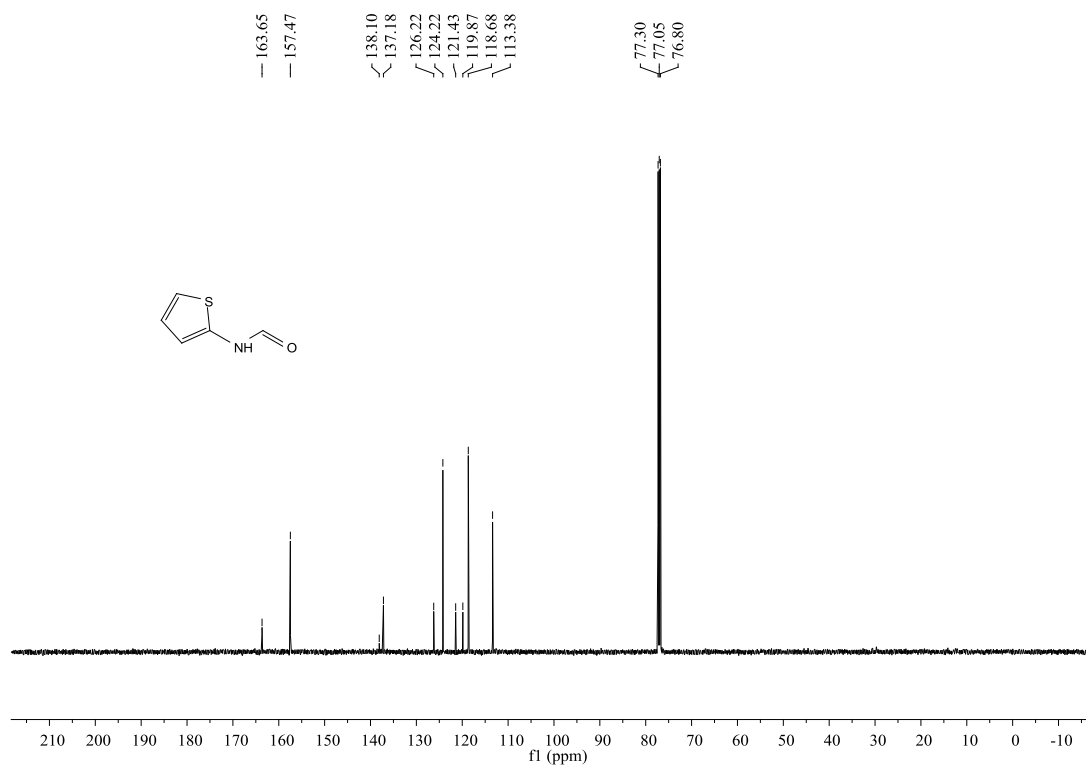
¹H NMR: *N*-(naphthalene-1-yl)formamide (2y)



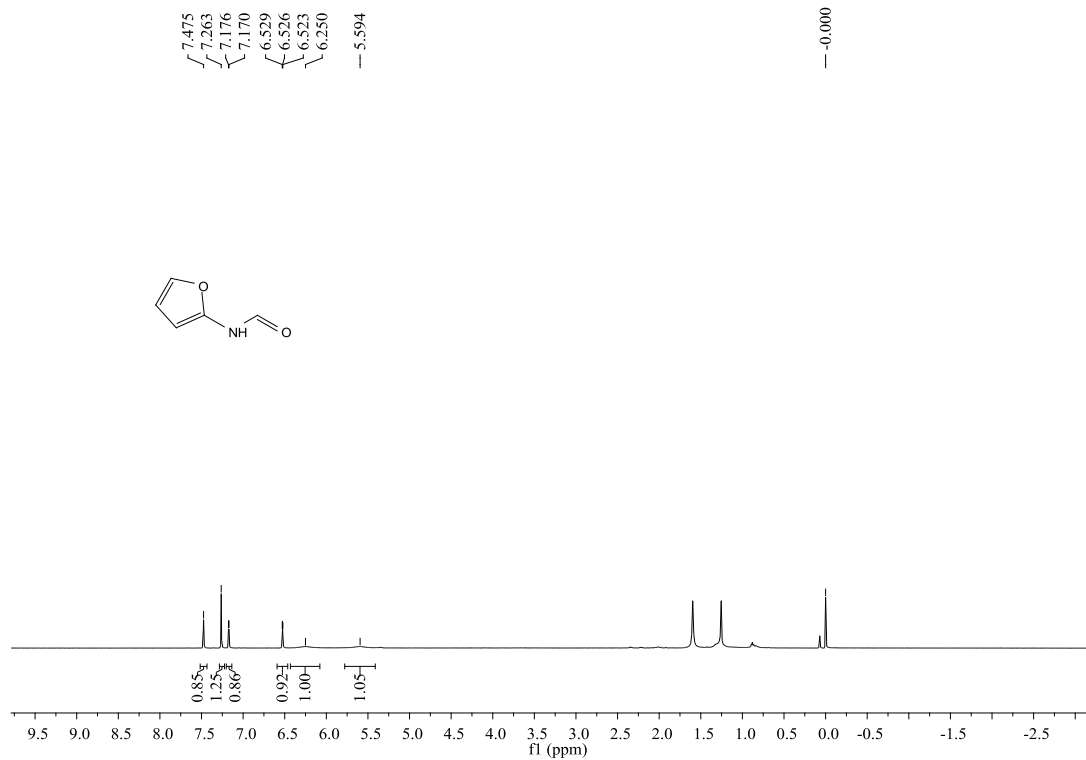
¹³C NMR: *N*-(naphthalene-1-yl)formamide (2y)



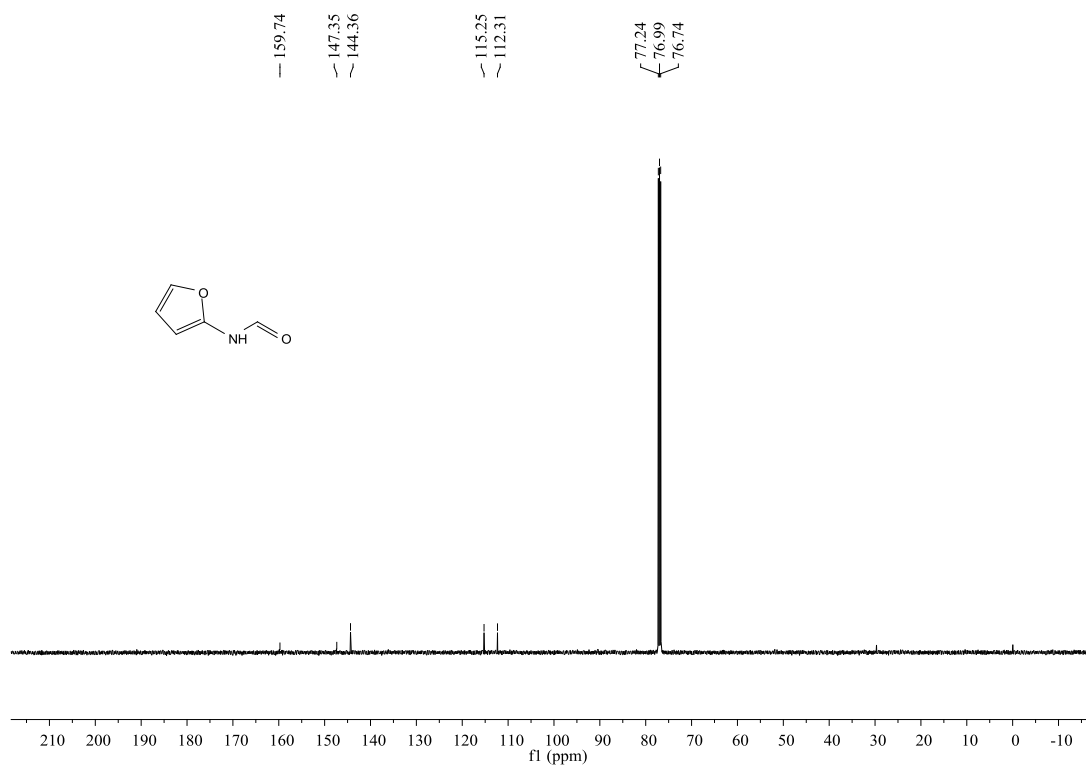
¹H NMR: *N*-(thiophen-2-yl)formamide (**2z**)



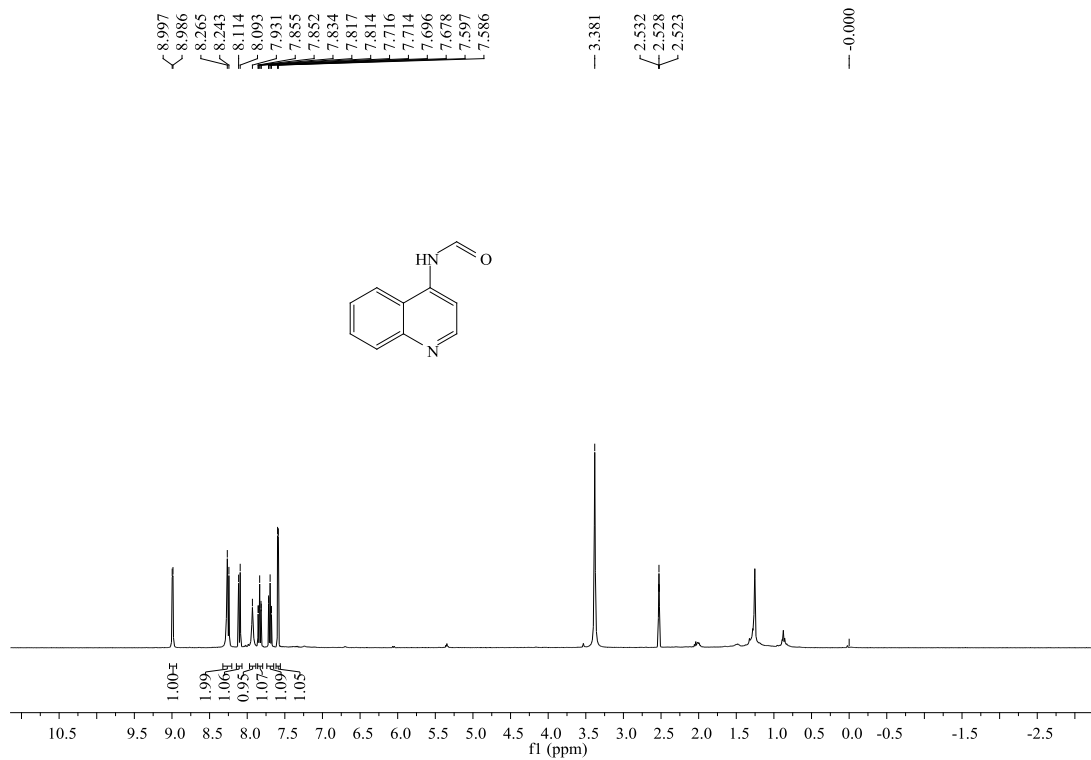
¹³C NMR: *N*-(thiophen-2-yl)formamide (**2z**)



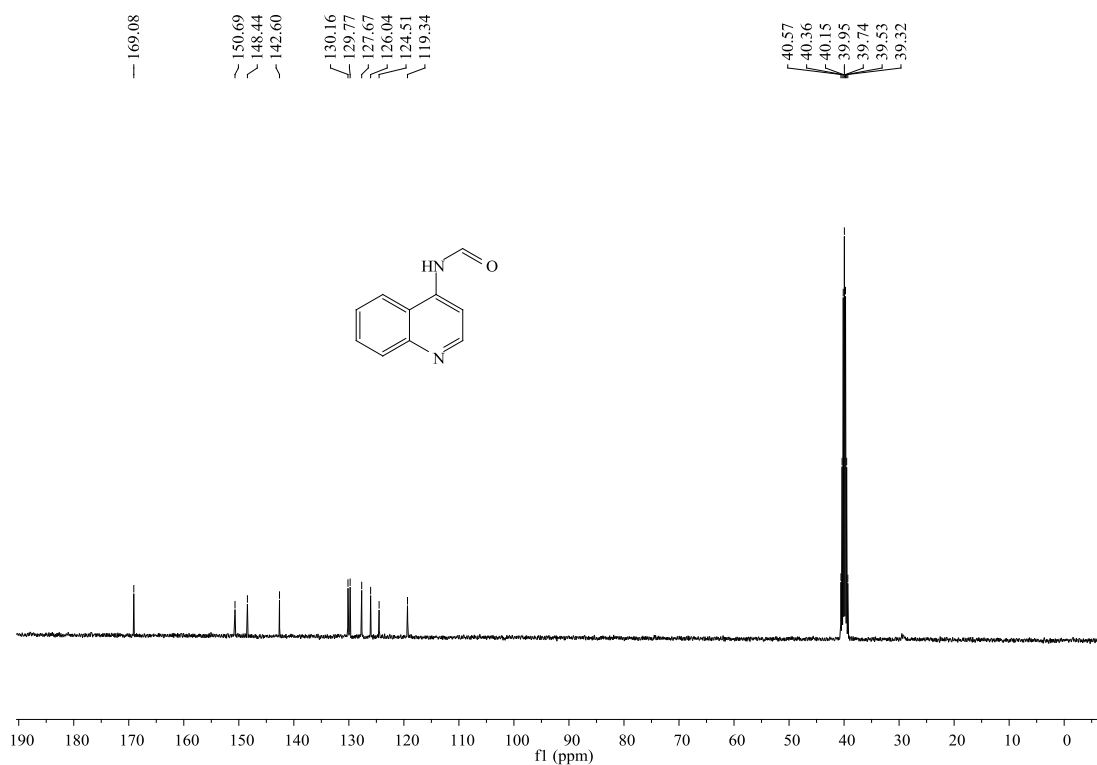
¹H NMR: *N*-(furan-2-yl)formamide (**2a'**)



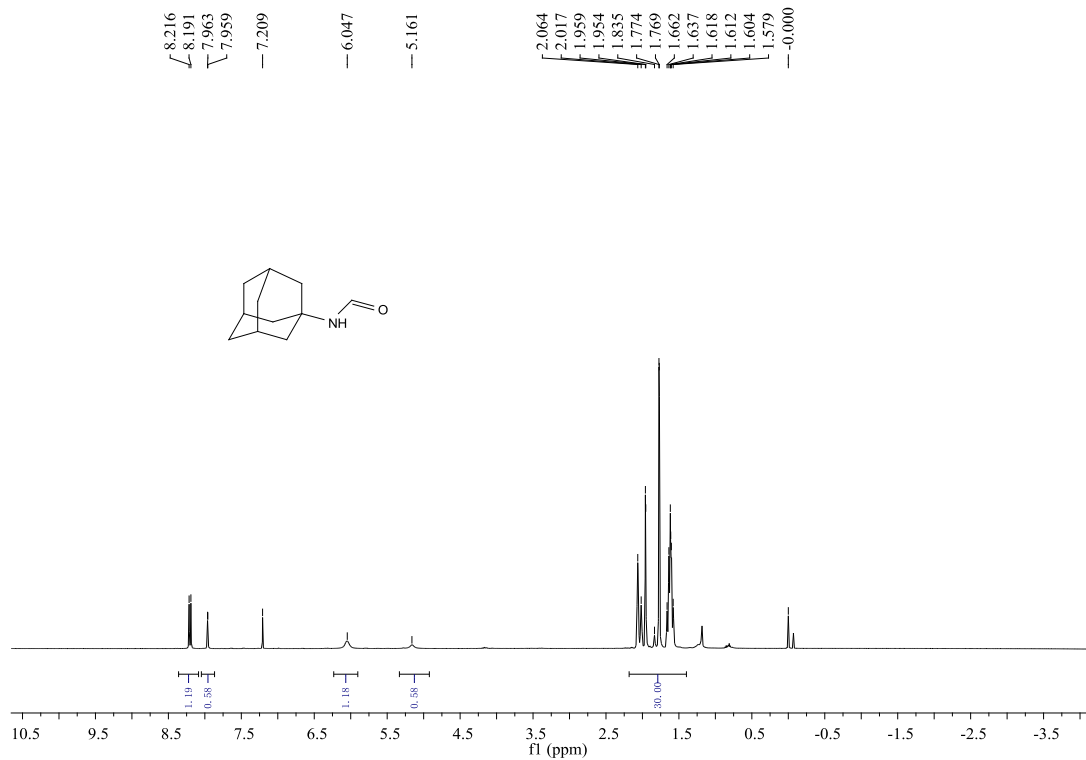
¹³C NMR: *N*-(furan-2-yl)formamide (**2a'**)



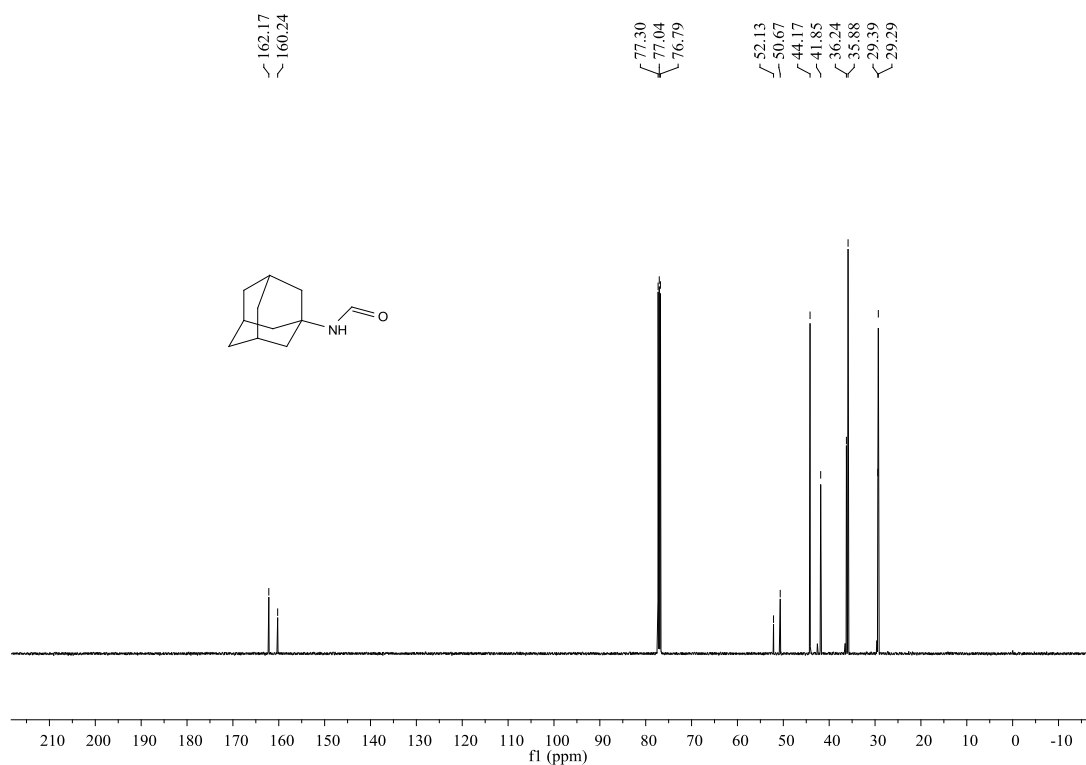
¹H NMR: *N*-(quinolin-4-yl)formamide (2b')



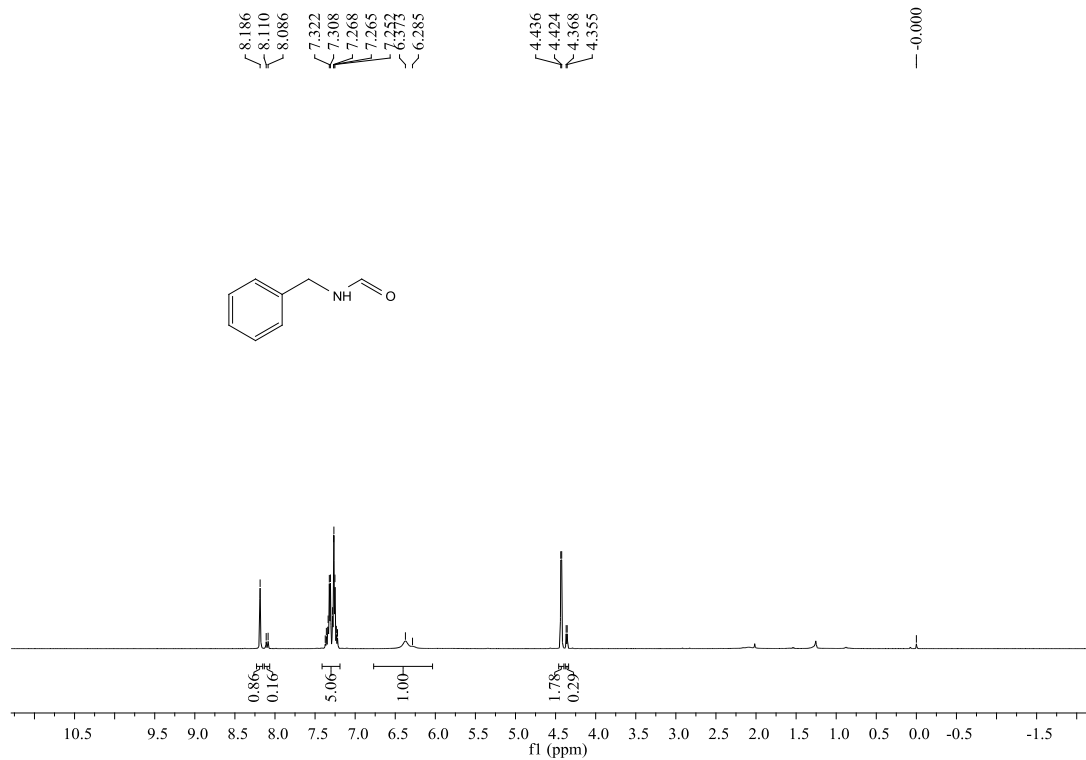
¹³C NMR: *N*-(quinolin-4-yl)formamide (2b')



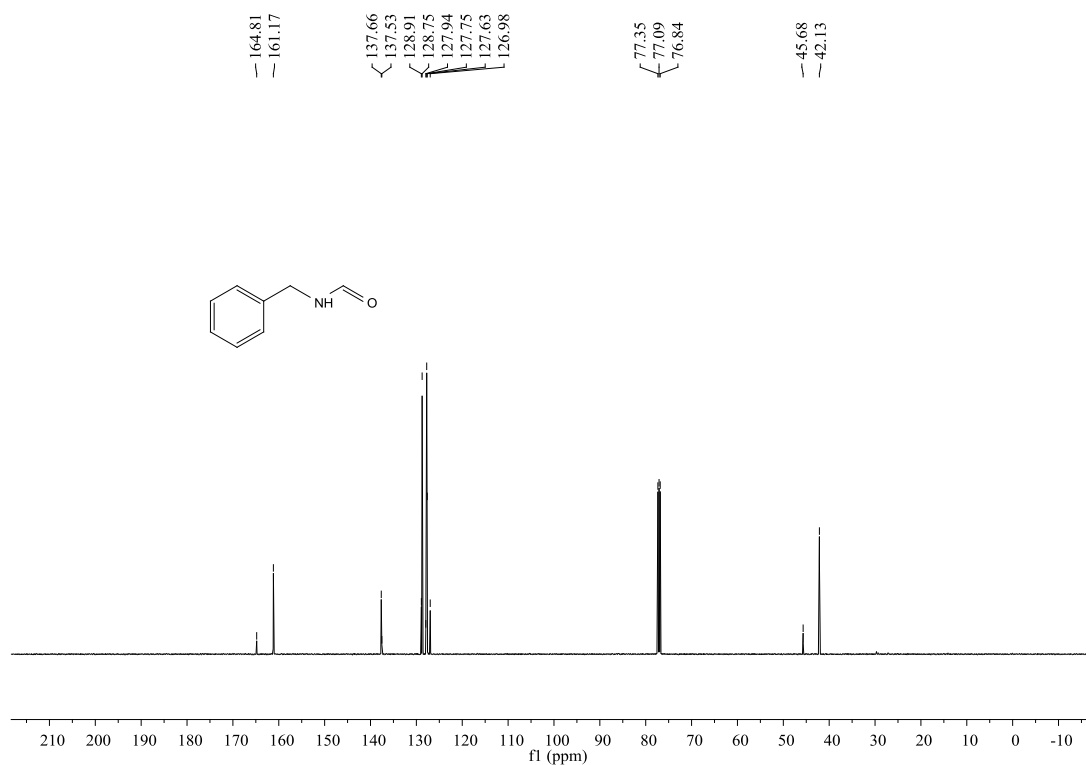
¹H NMR: *N*-adamantylformamide (**2c'**)



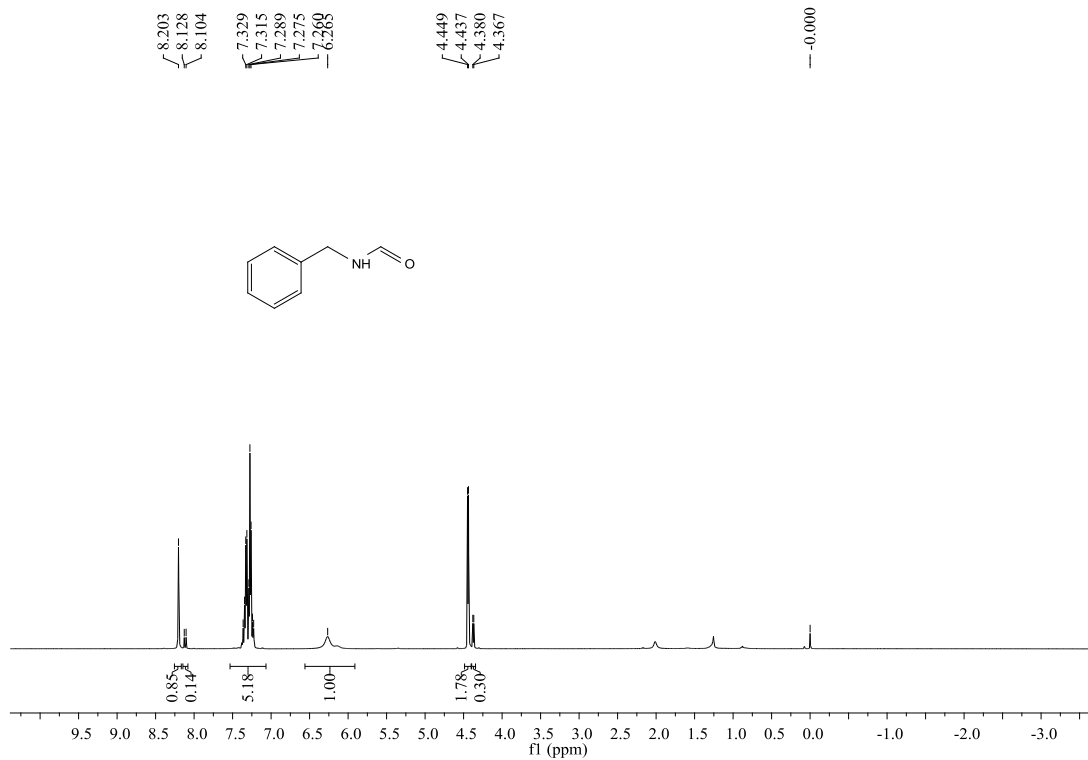
¹³C NMR: *N*-adamantylformamide (**2c'**)



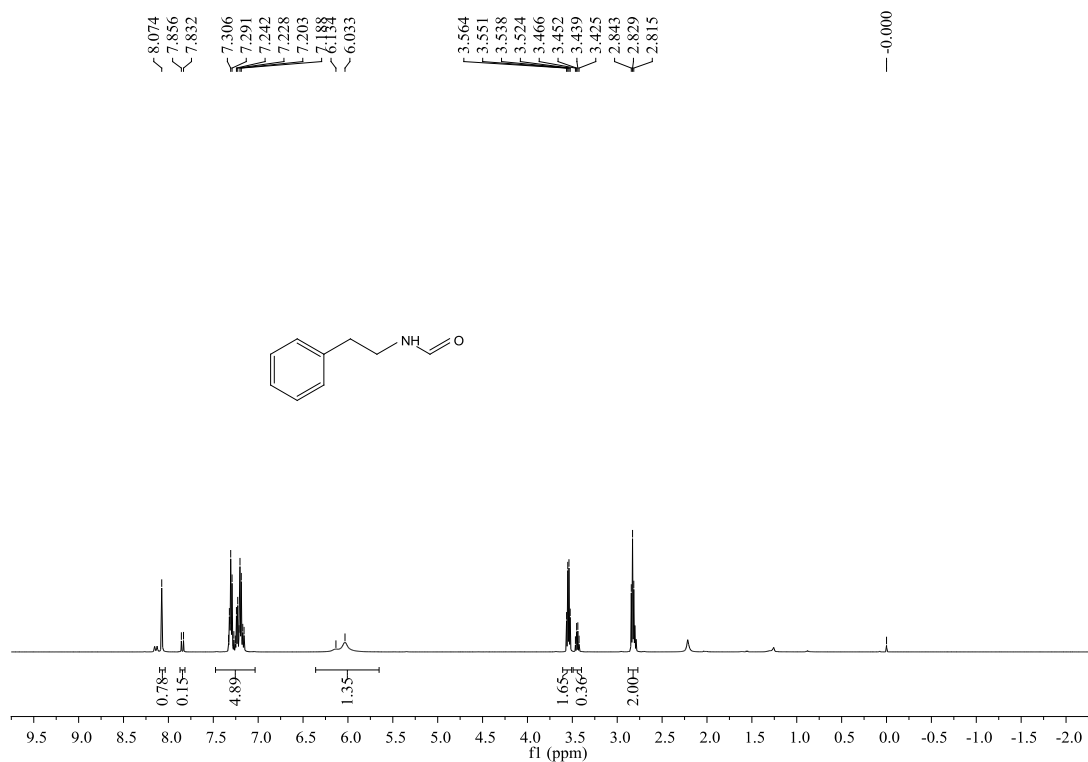
¹H NMR: *N*-benzylformamide (2d') (from 1d')



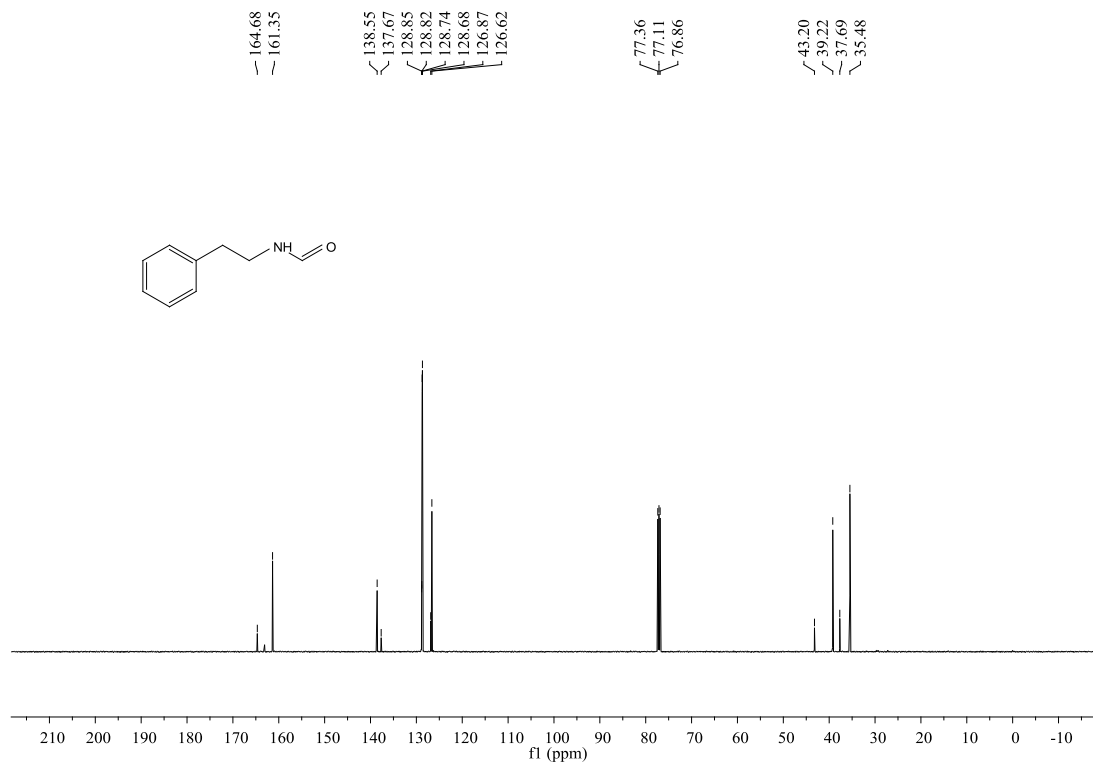
¹³C NMR: *N*-benzylformamide (2d') (from 1d')



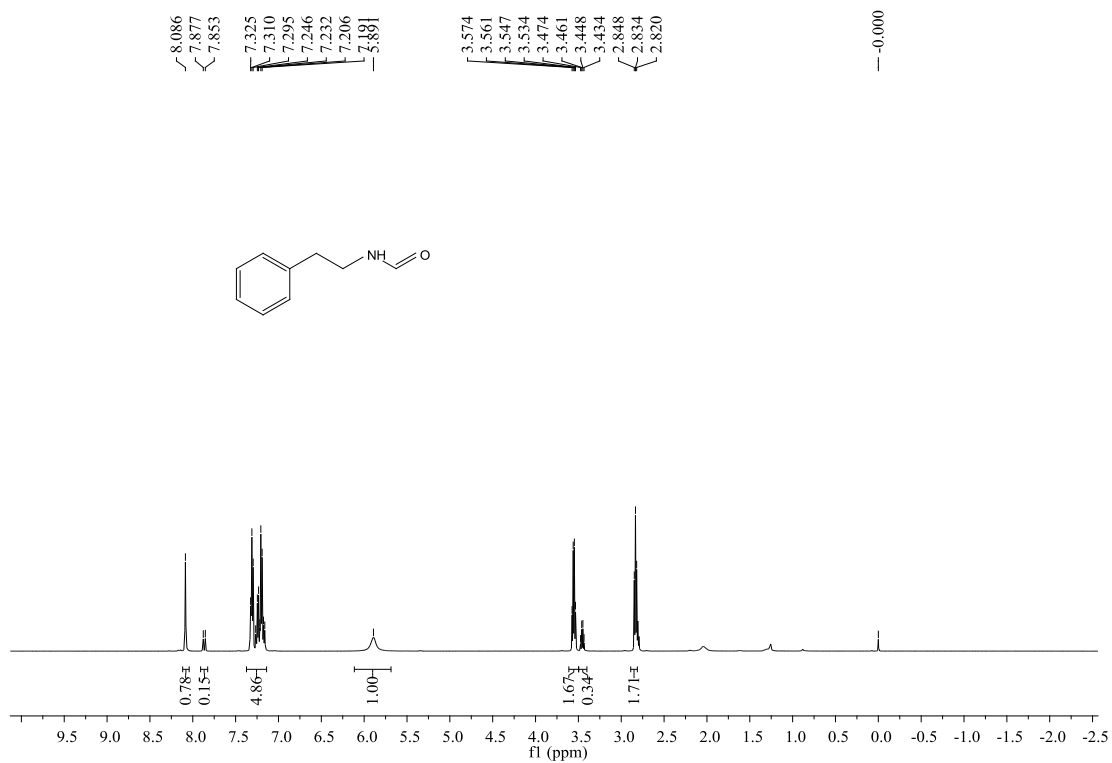
¹H NMR: *N*-benzylformamide (2d') (from 4d')



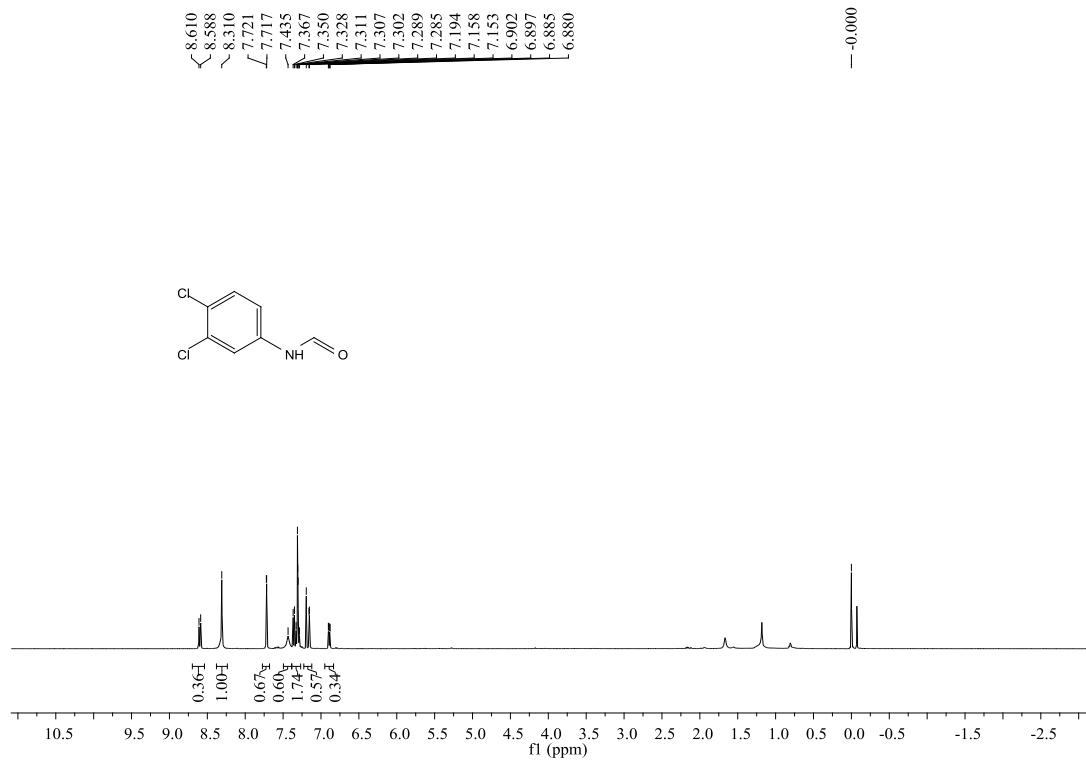
¹H NMR: *N*-phenethylformamide (2e') (from 1e')



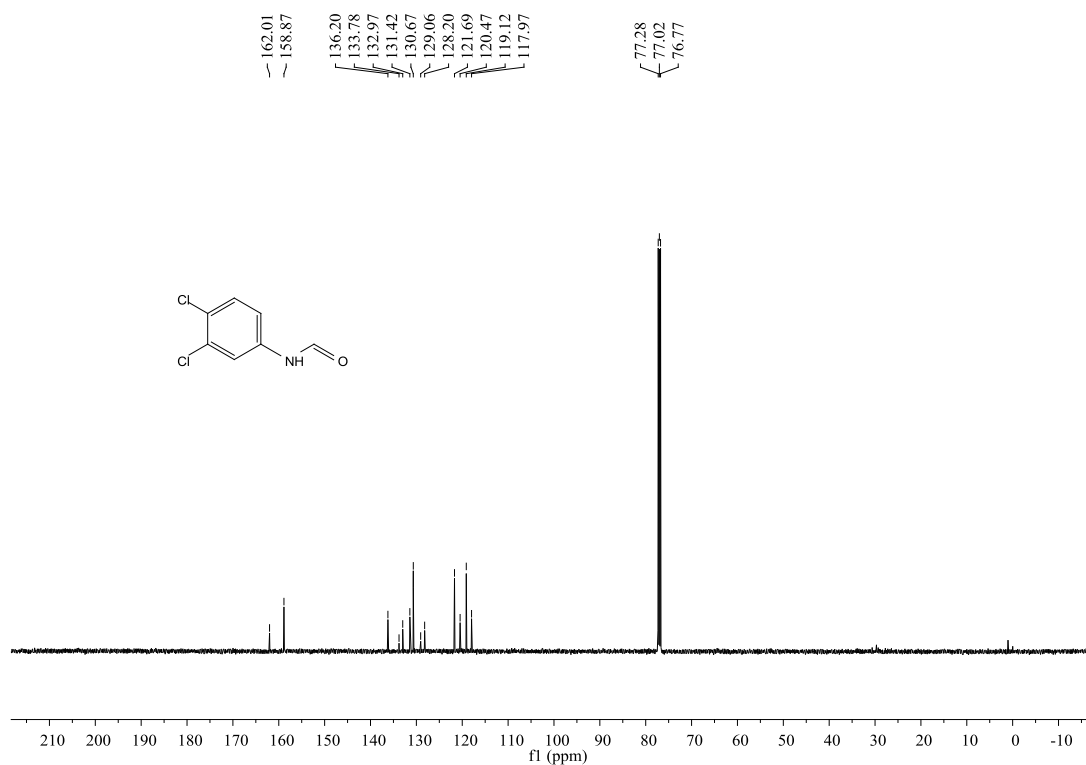
¹³C NMR: *N*-phenethylformamide (**2e'**) (from **1e'**)



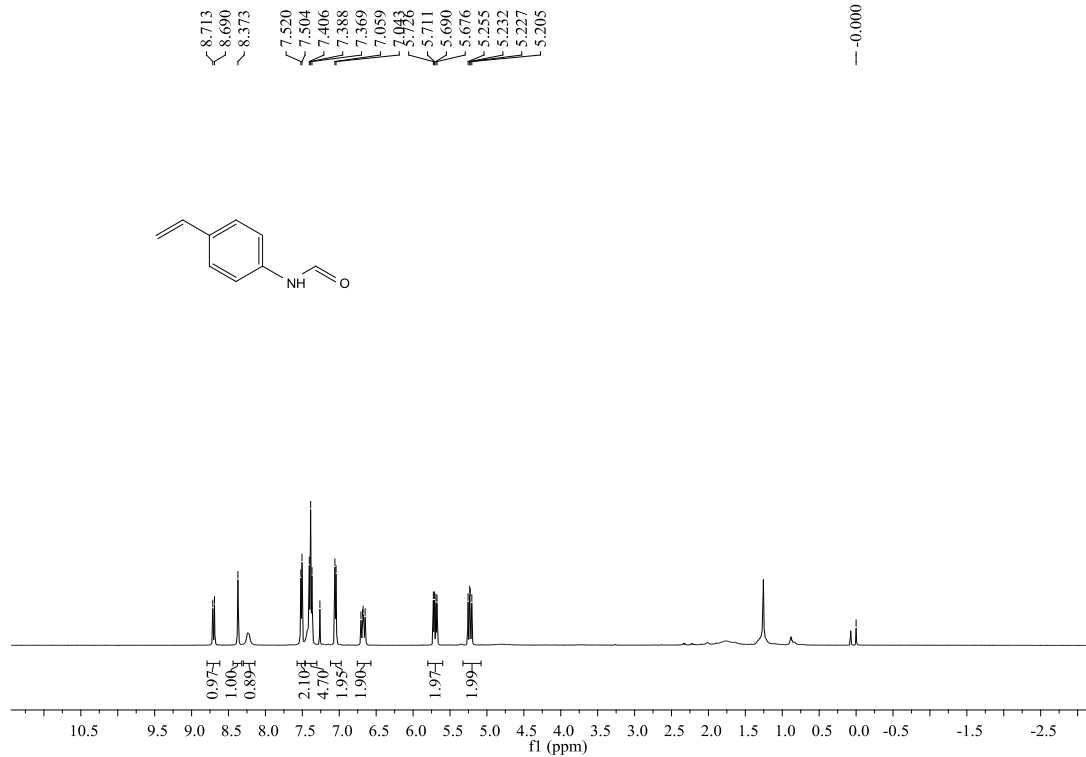
¹H NMR: *N*-phenethylformamide (**2e'**) (from **4e'**)



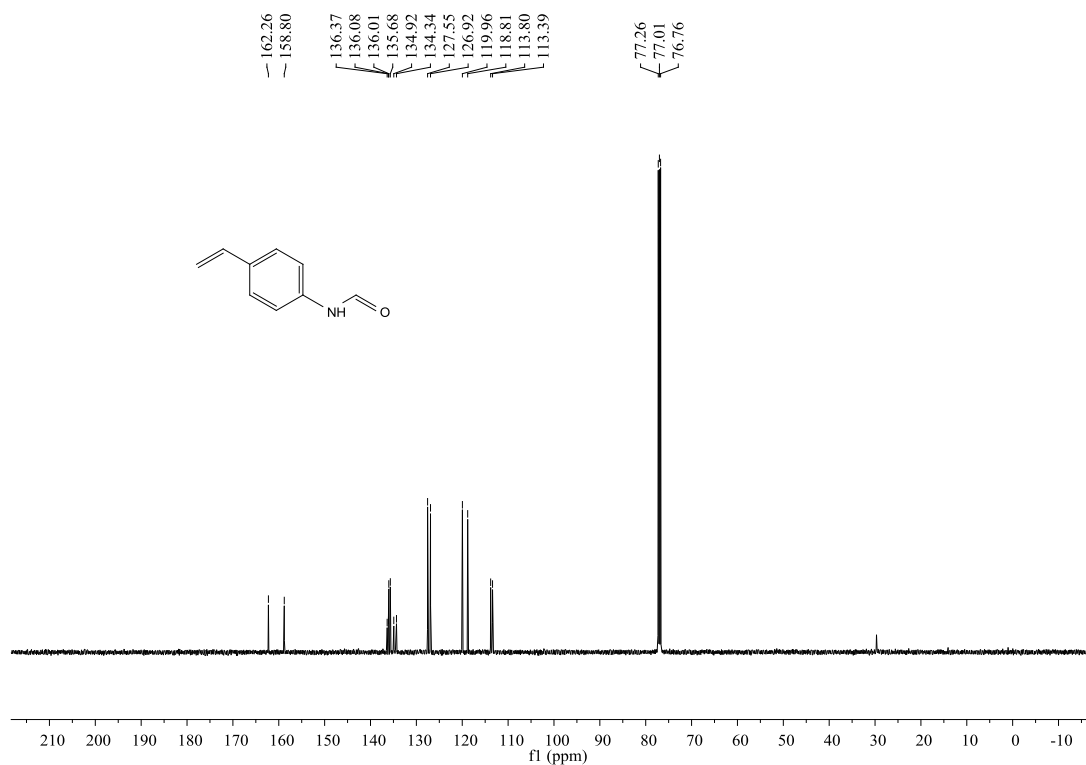
¹H NMR: *N*-(3,4-dichlorophenyl)formamide (**2g'**)



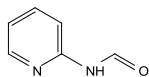
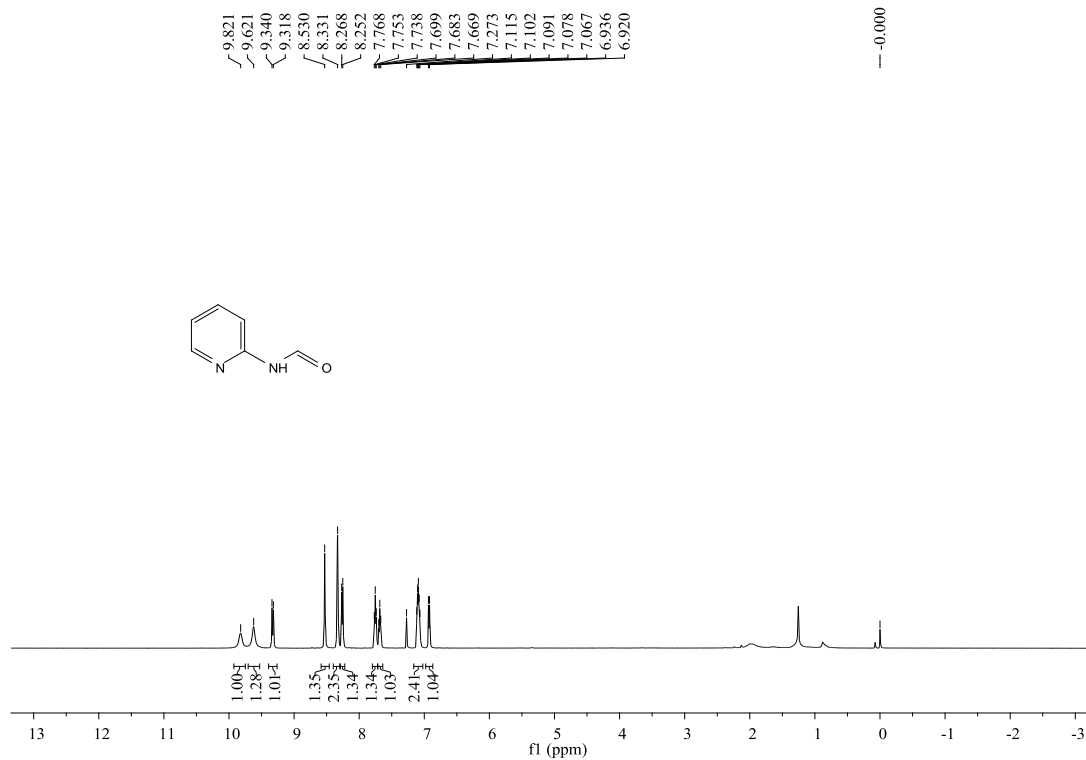
¹³C NMR: *N*-(3,4-dichlorophenyl)formamide (**2g'**)



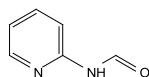
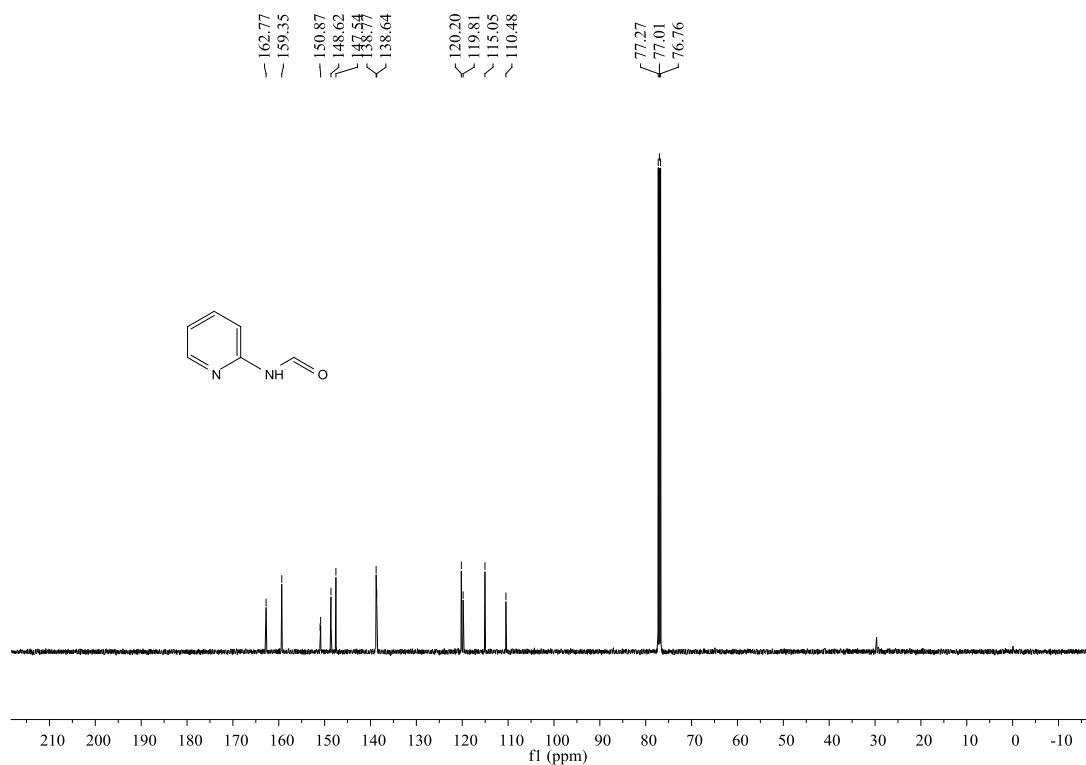
¹H NMR: *N*-(4-vinylphenyl)formamide (2h')



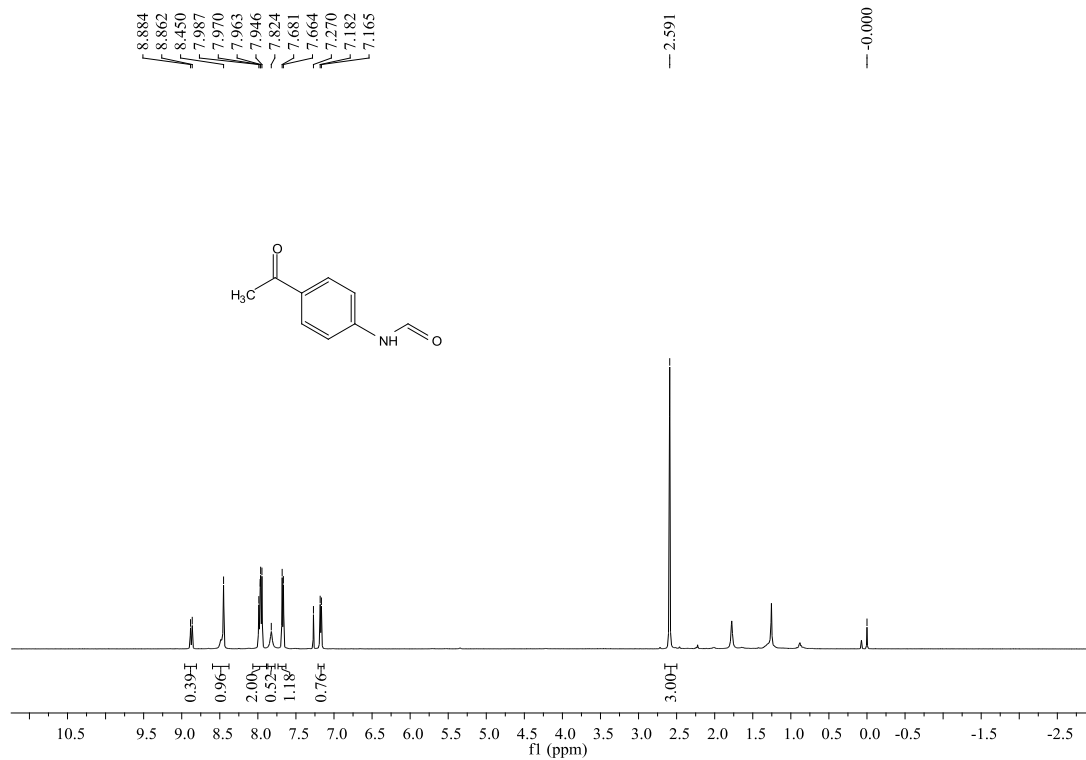
¹³C NMR: *N*-(4-vinylphenyl)formamide (2h')



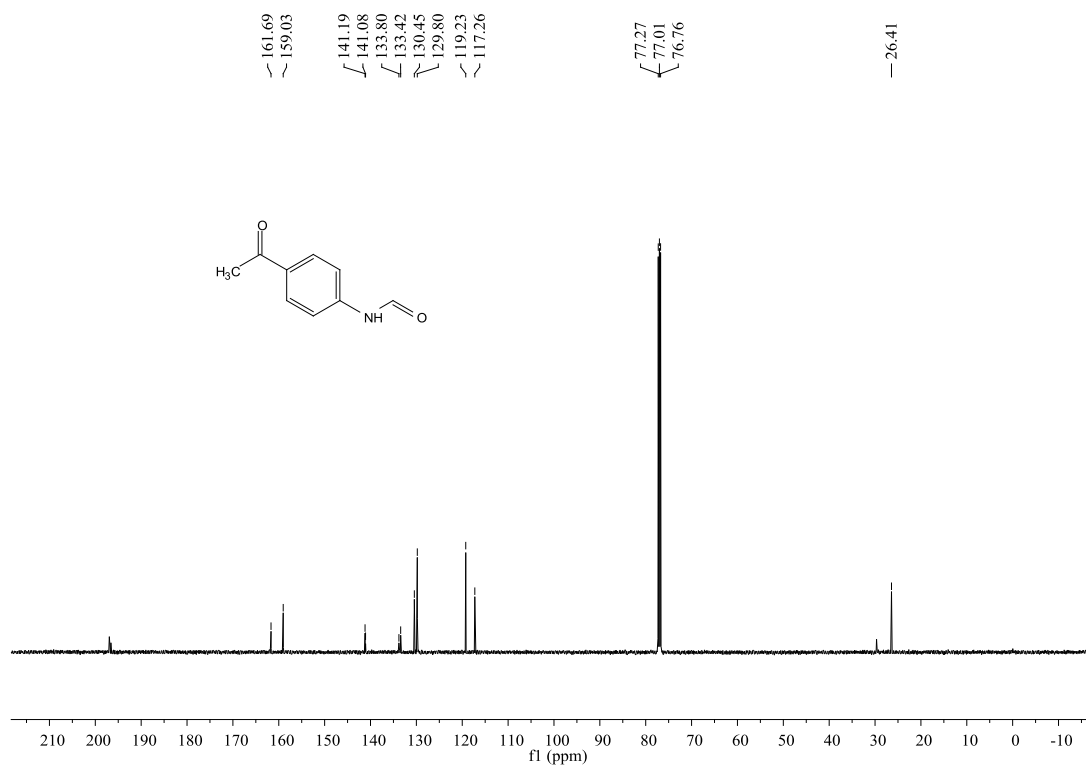
¹H NMR: *N*-(pyridin-2-yl)formamide (**2i'**)



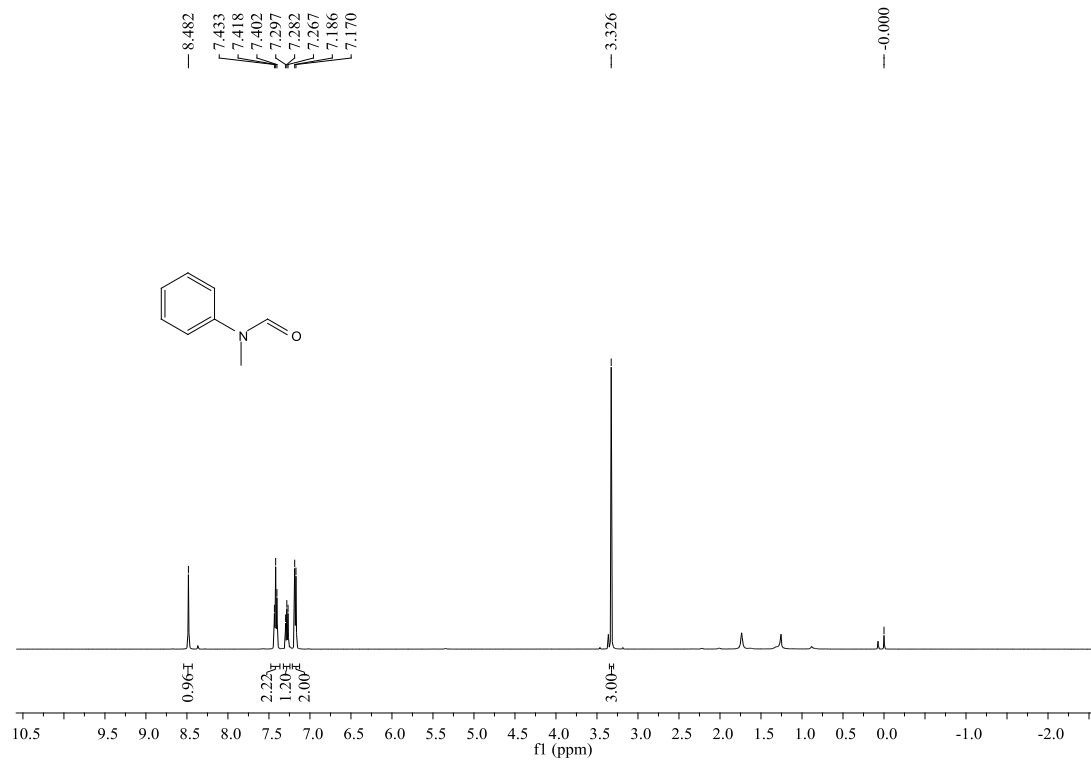
¹³C NMR: *N*-(pyridin-2-yl)formamide (**2i'**)



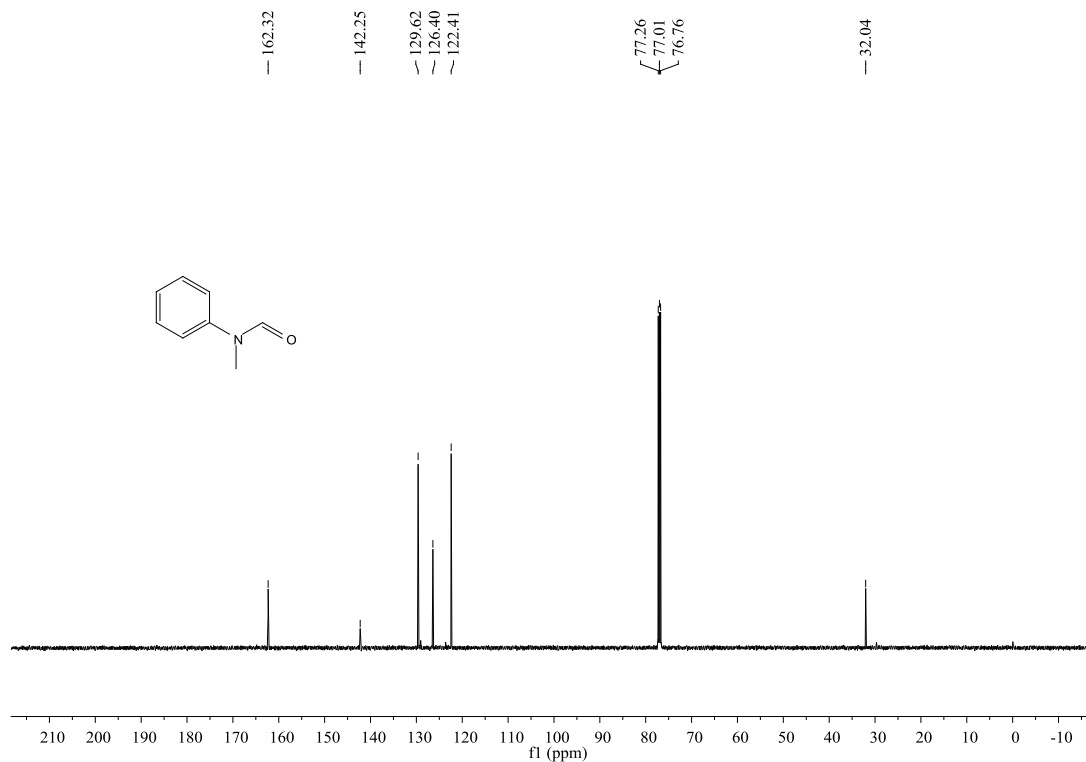
¹H NMR: *N*-(4-acetylphenyl)formamide (**2j'**)



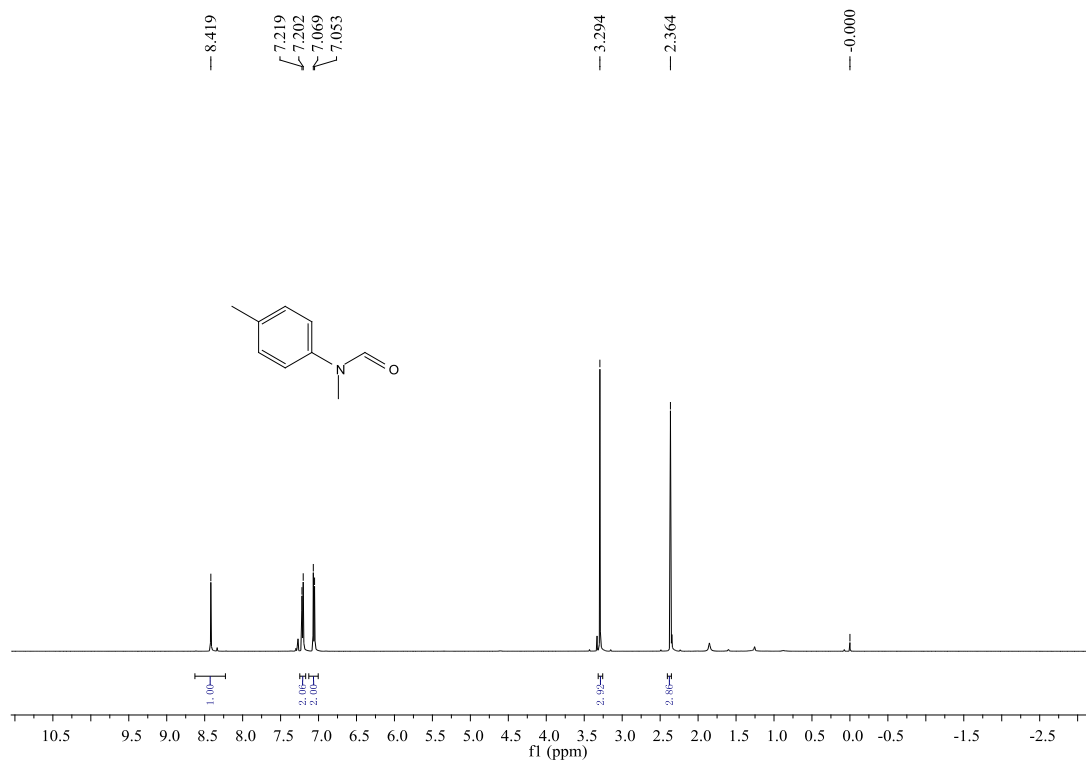
¹³C NMR: *N*-(4-acetylphenyl)formamide (**2j'**)



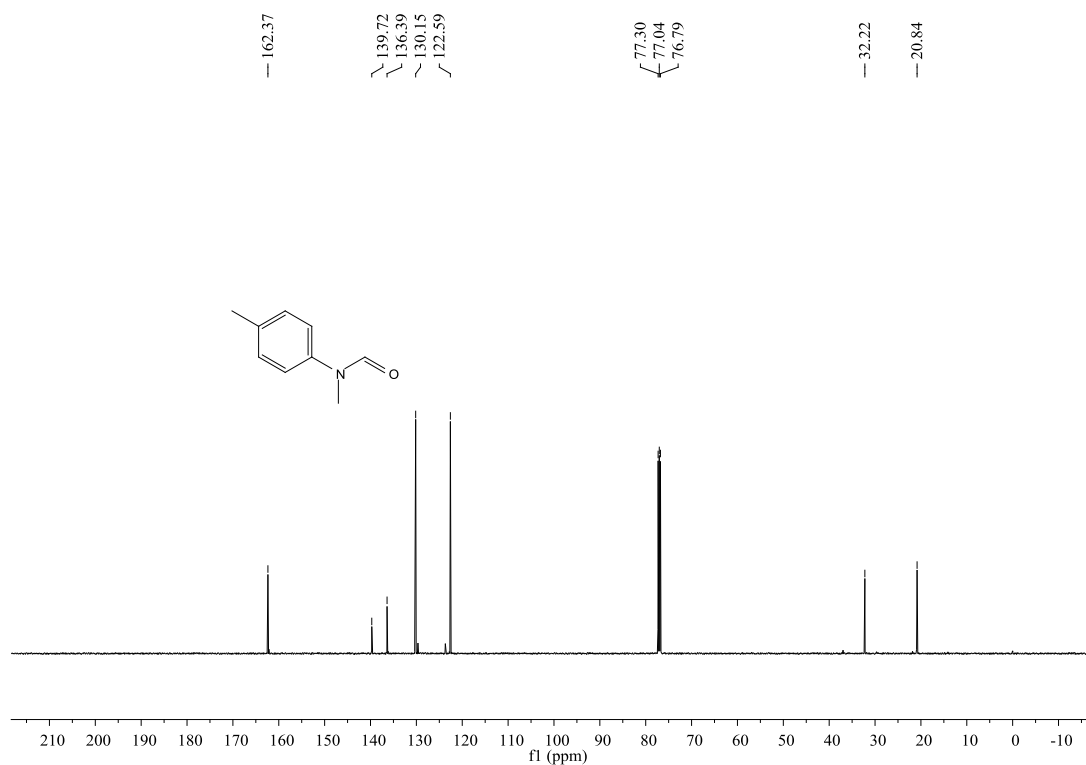
¹H NMR: *N*-methyl-*N*-phenylformamide (2k')



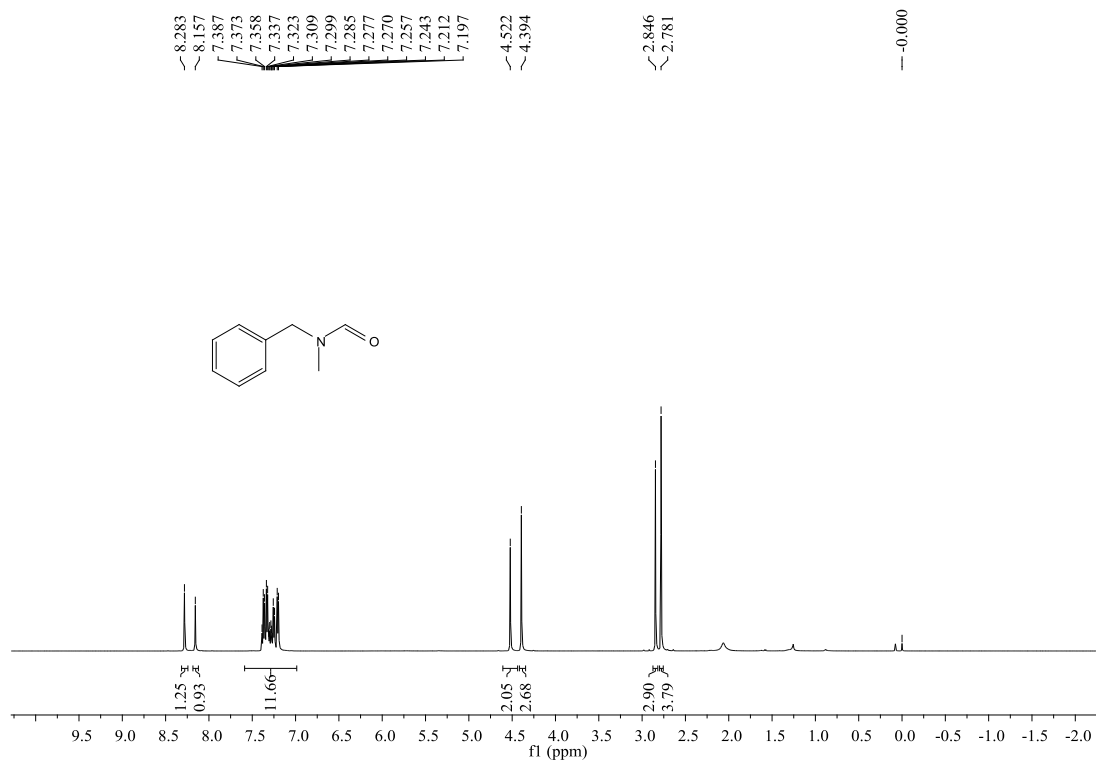
¹³C NMR: *N*-methyl-*N*-phenylformamide (2k')



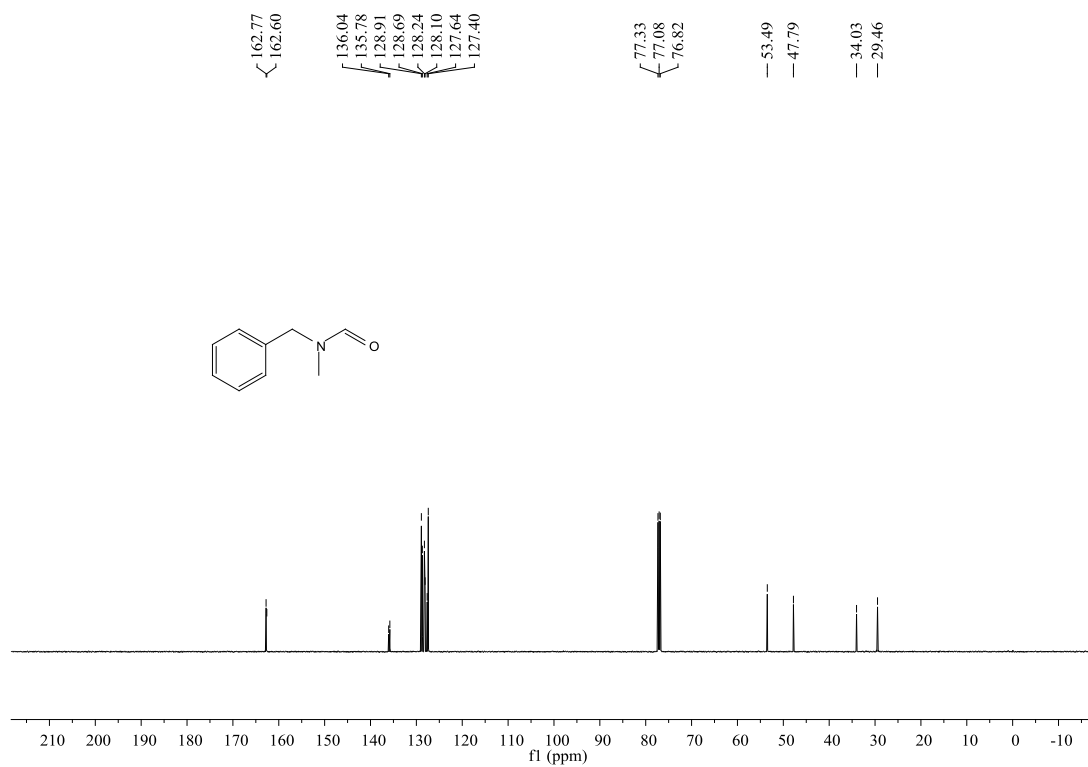
¹H NMR: *N*-methyl-*N*-(*p*-tolyl)formamide (**2I'**)



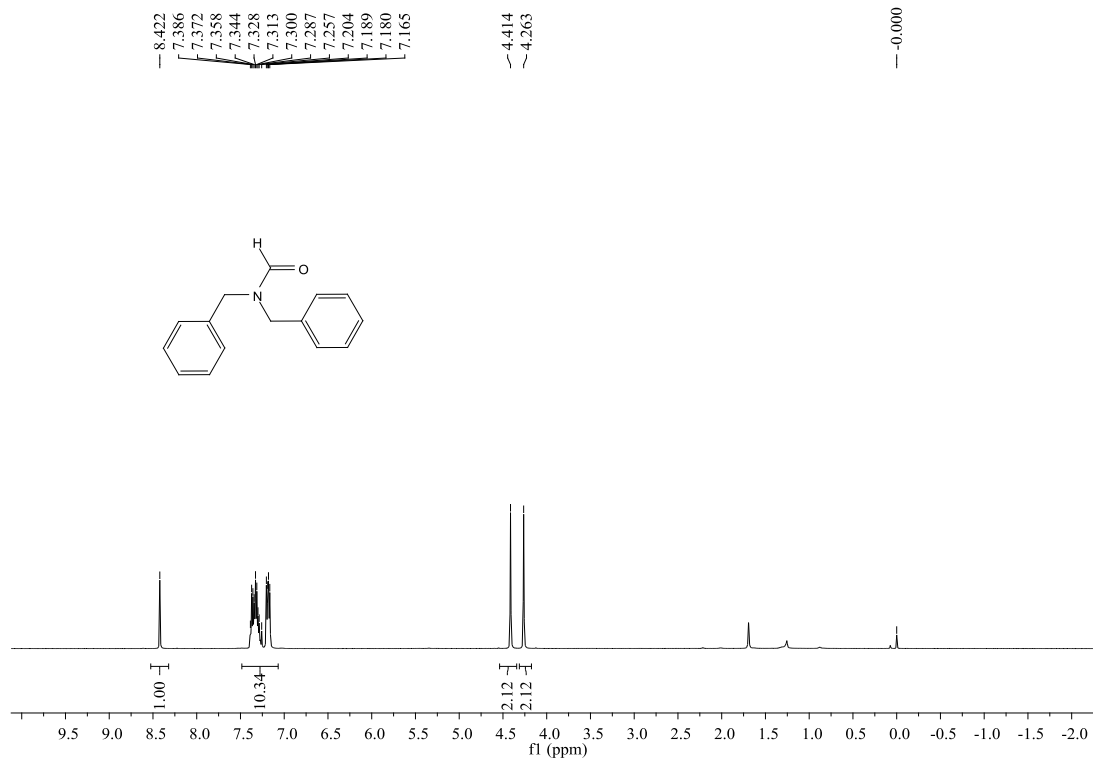
¹³C NMR: *N*-methyl-*N*-(*p*-tolyl)formamide (**2I'**)



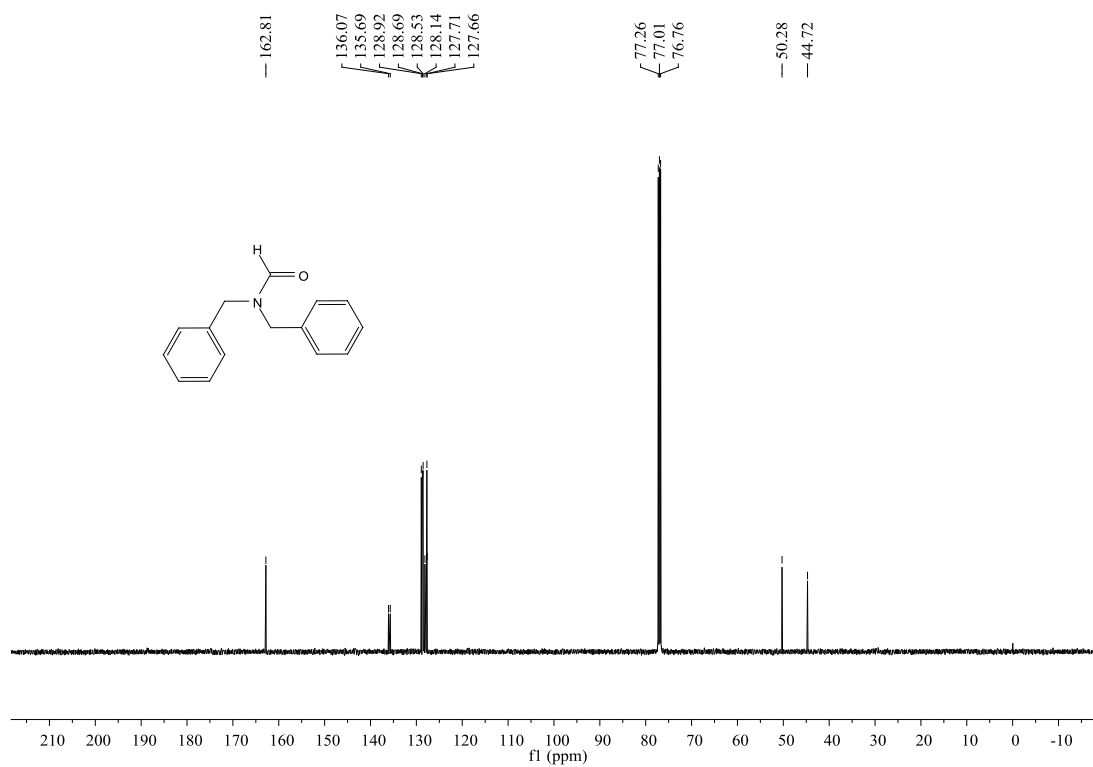
¹H NMR: *N*-benzyl-*N*-methylformamide (**2m'**)



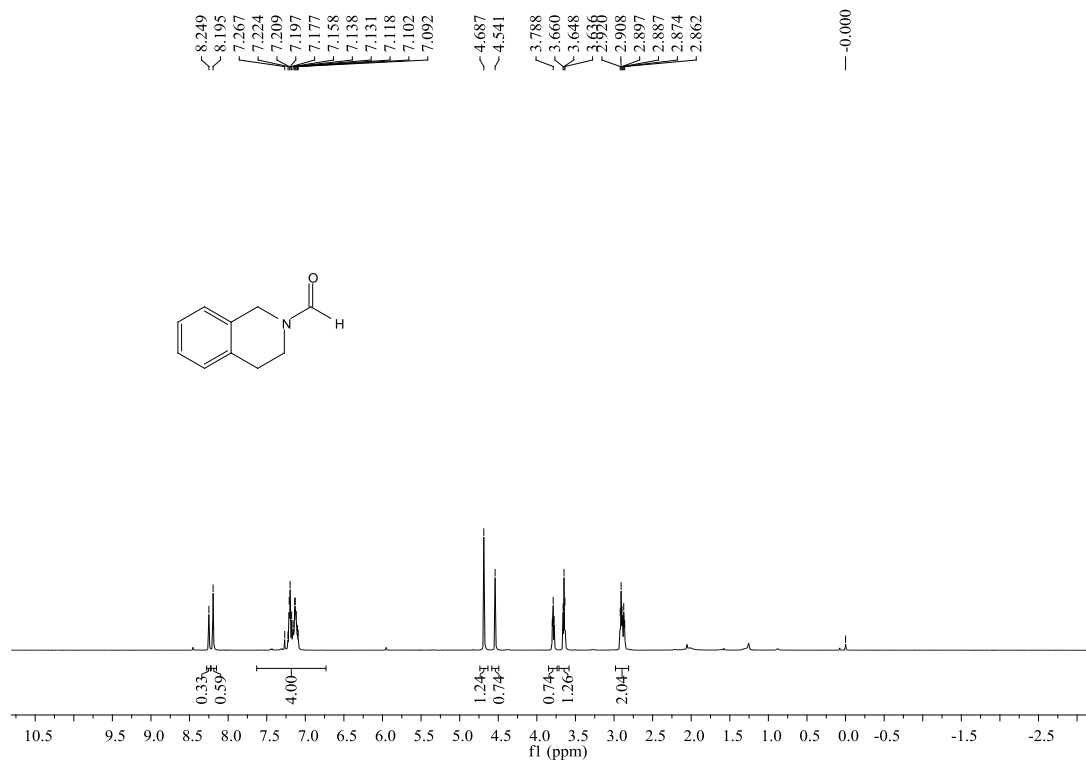
¹³C NMR: *N*-benzyl-*N*-methylformamide(**2m'**)



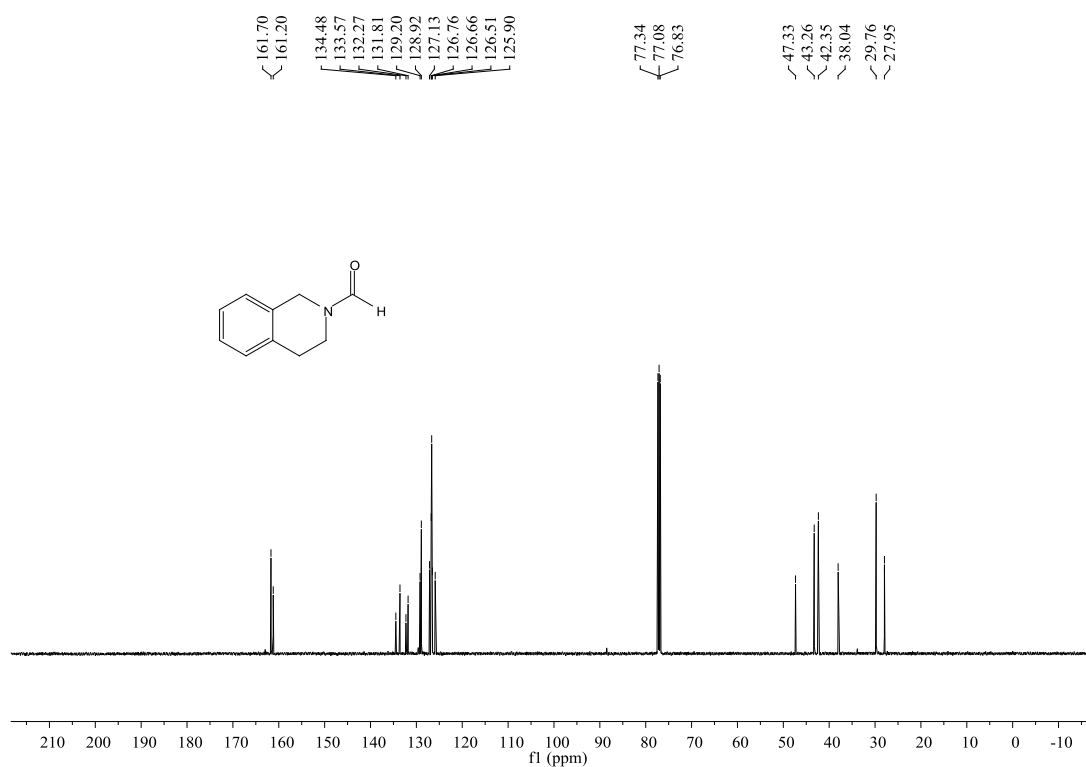
¹H NMR: *N,N*-dibenzylformamide (**2n'**)



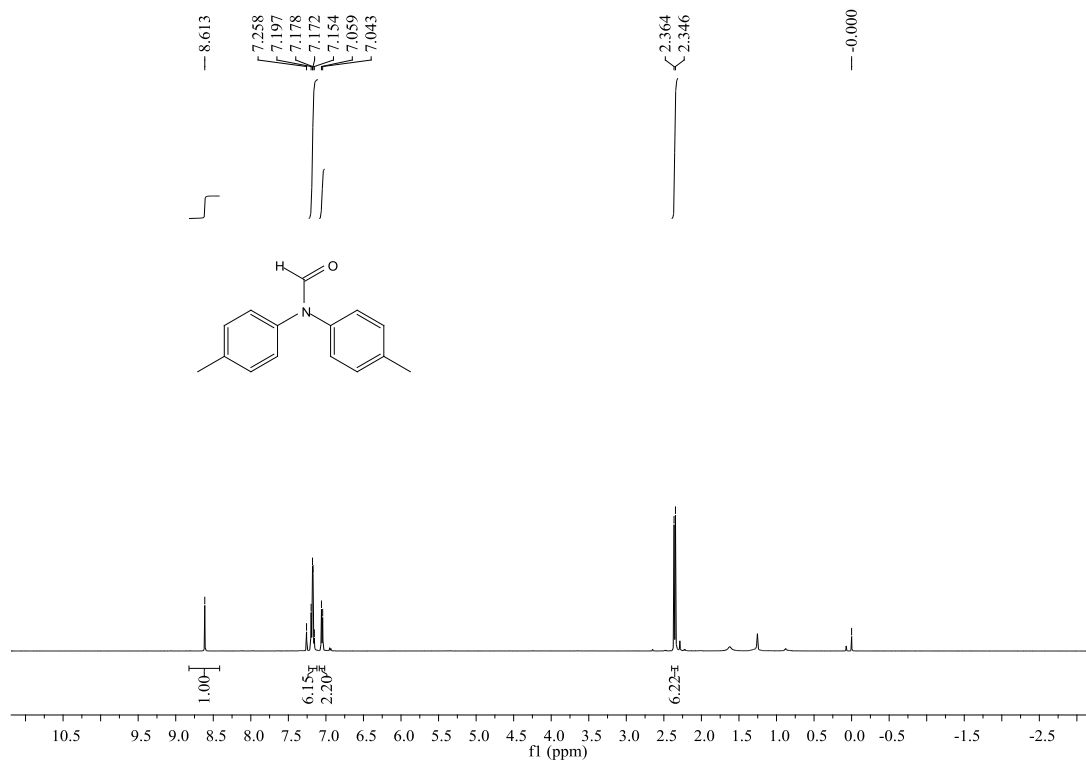
¹³C NMR: *N,N*-dibenzylformamide (**2n'**)



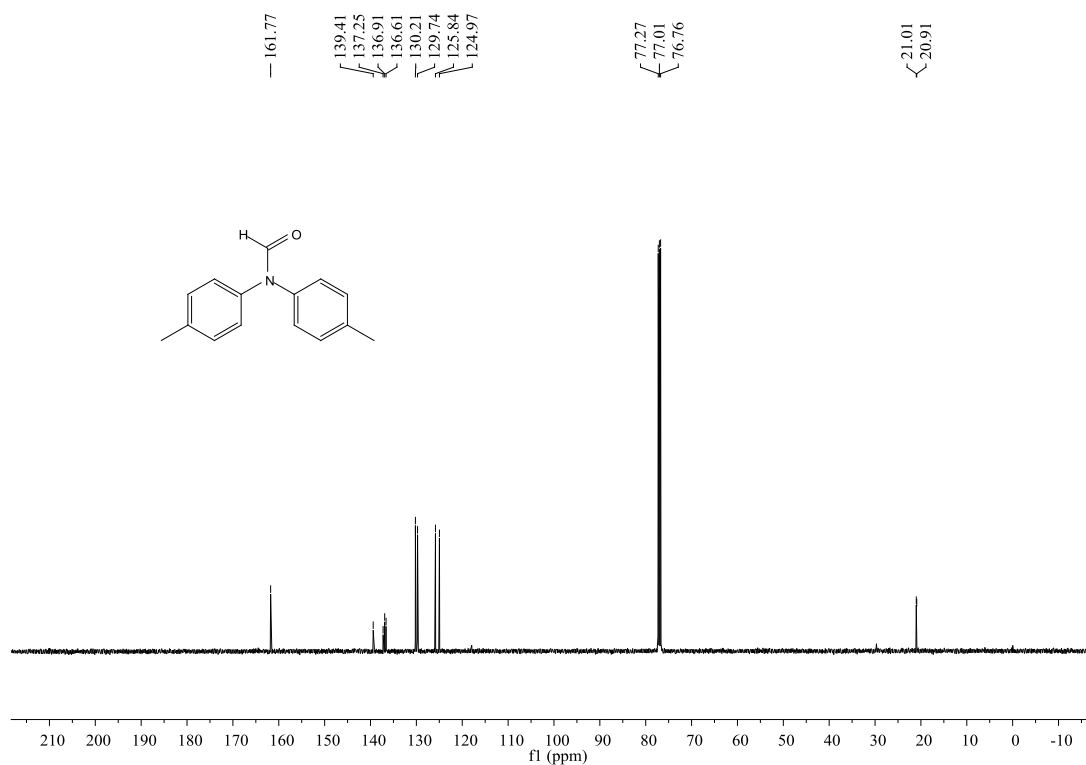
$^1\text{H NMR}$: 3,4-dihydroisoquinoline-2(1H)-carbaldehyde (**2o'**)



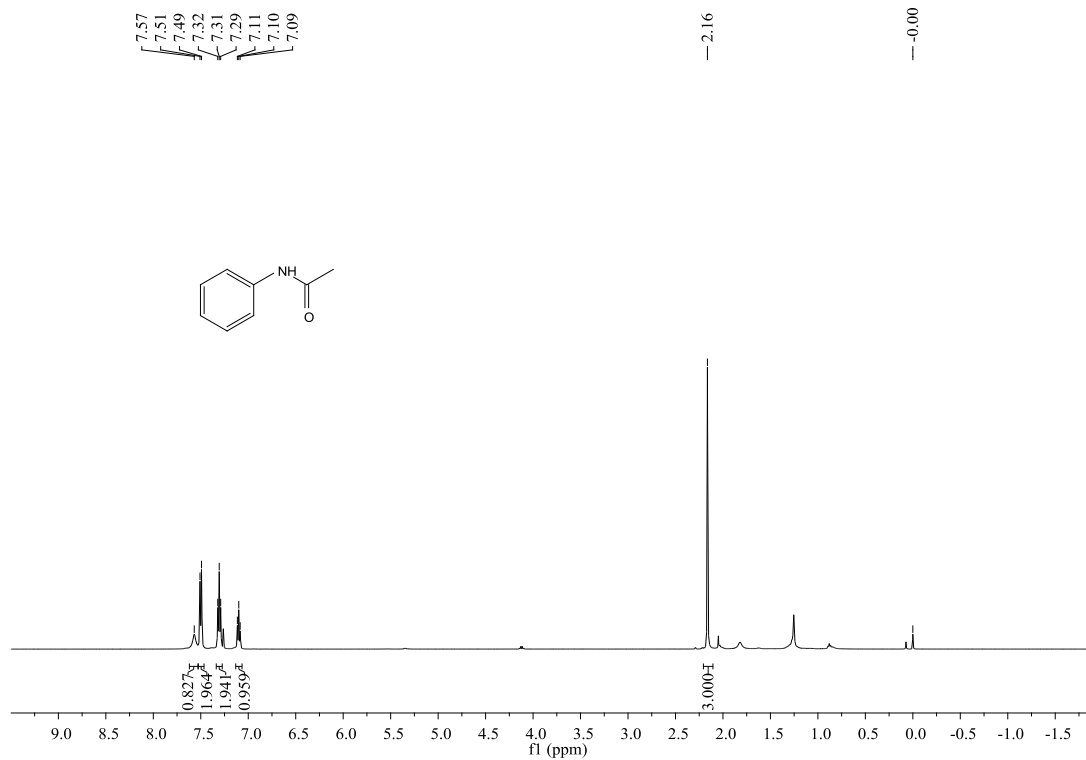
$^{13}\text{C NMR}$: 3,4-dihydroisoquinoline-2(1H)-carbaldehyde (**2o'**)



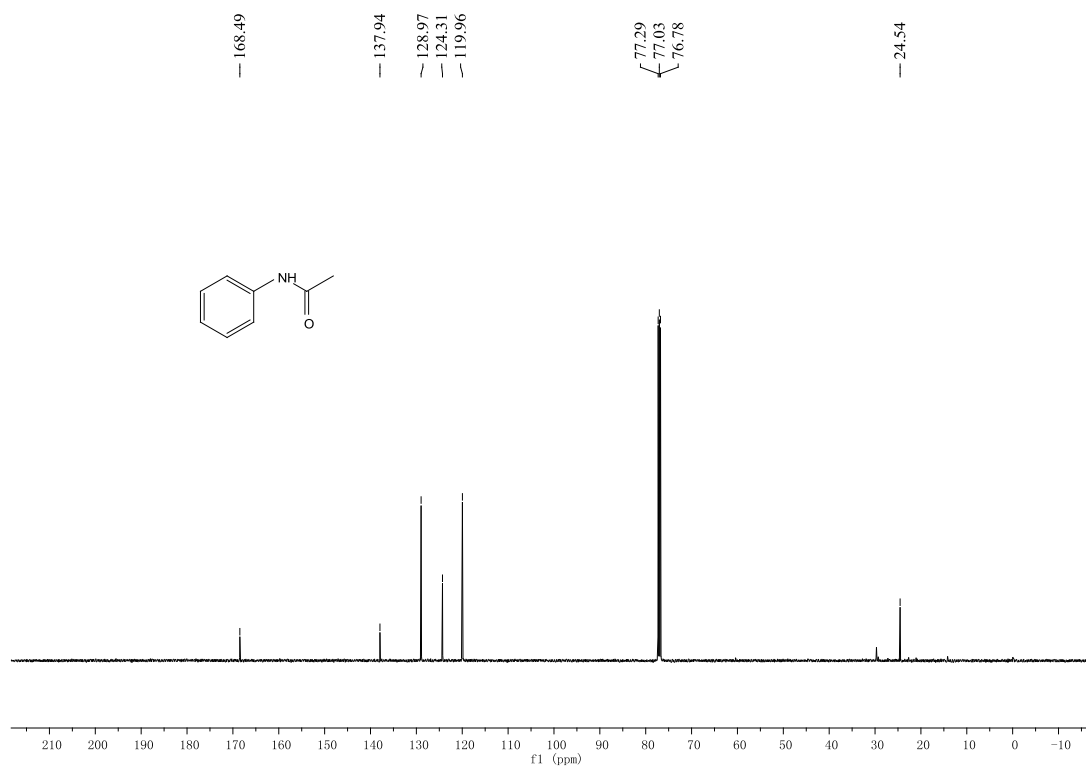
¹H NMR: *N,N*-di-*p*-tolylformamide (**2q'**)



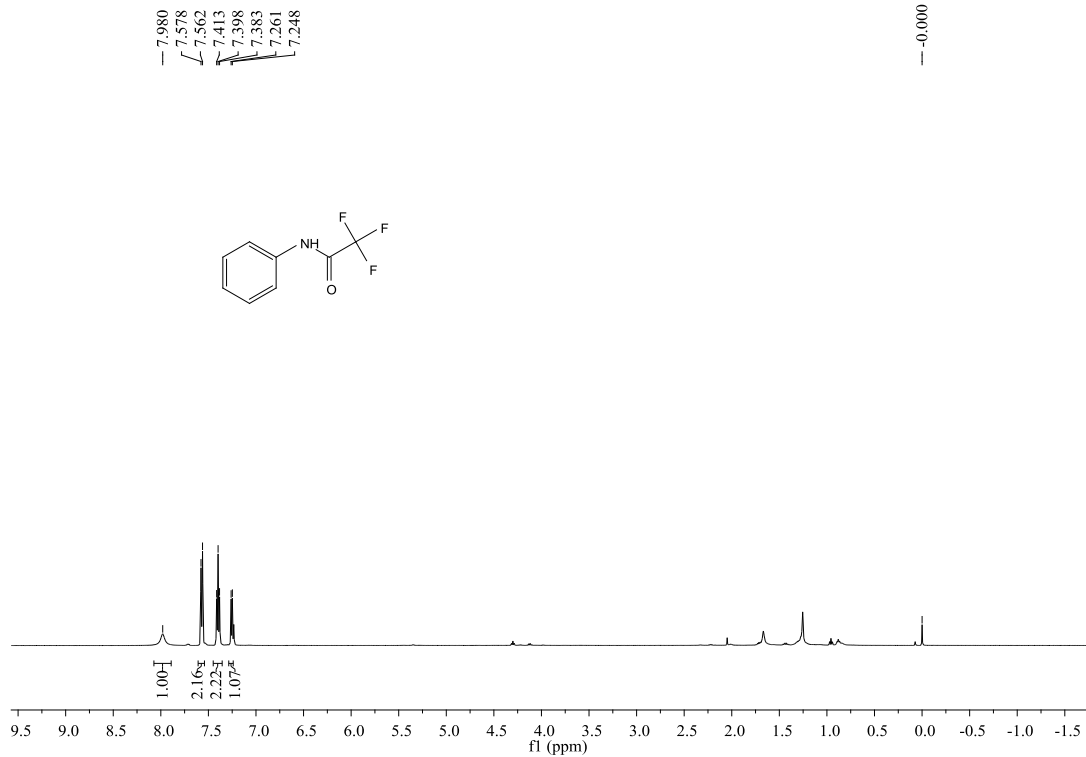
¹³C NMR: *N,N*-di-*p*-tolylformamide (**2q'**)



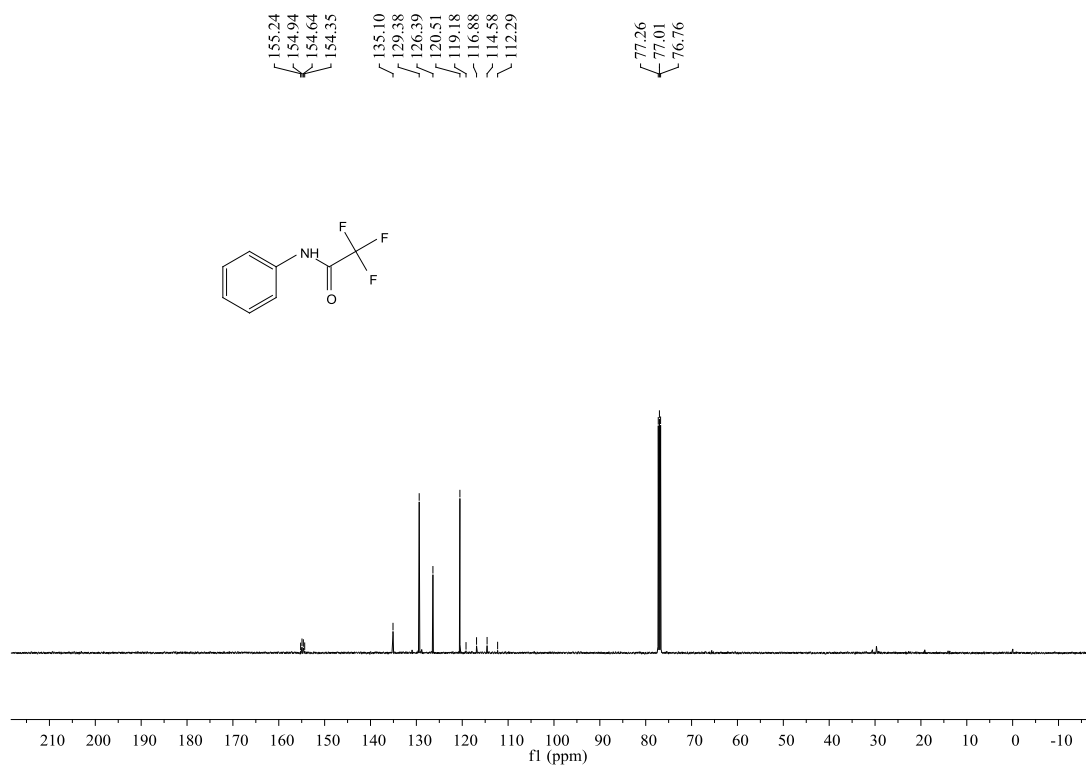
¹H NMR: *N*-phenylacetamide (**5a**)



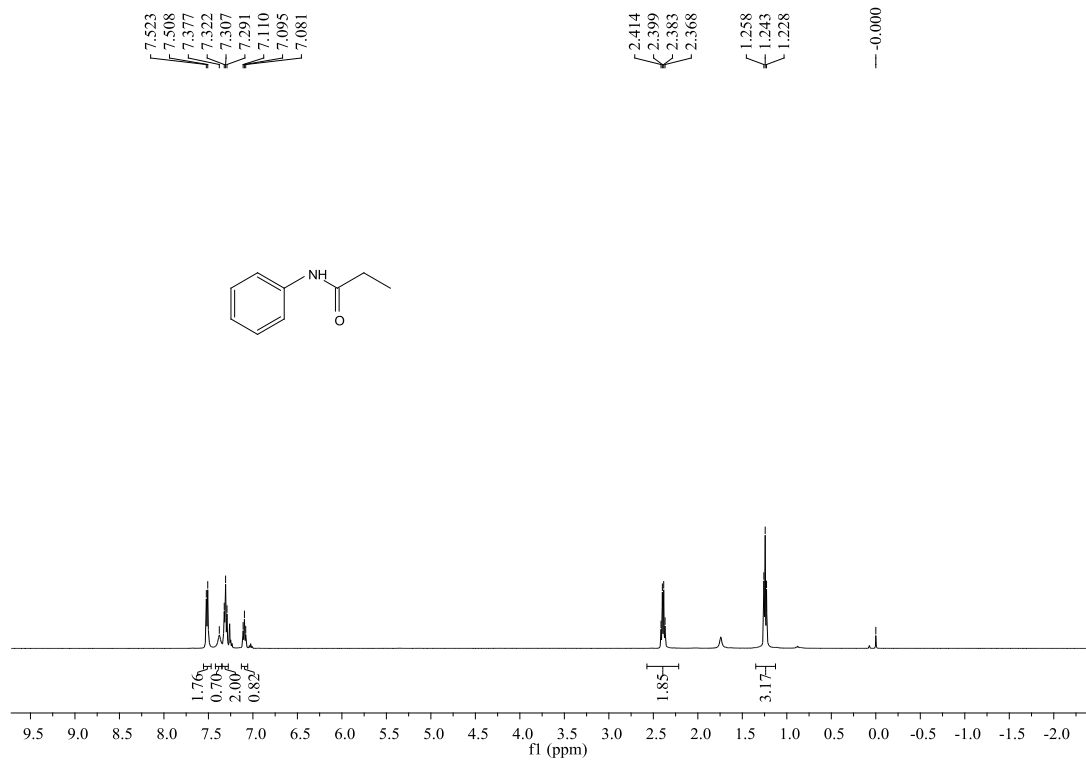
¹³C NMR: *N*-phenylacetamide (**5a**)



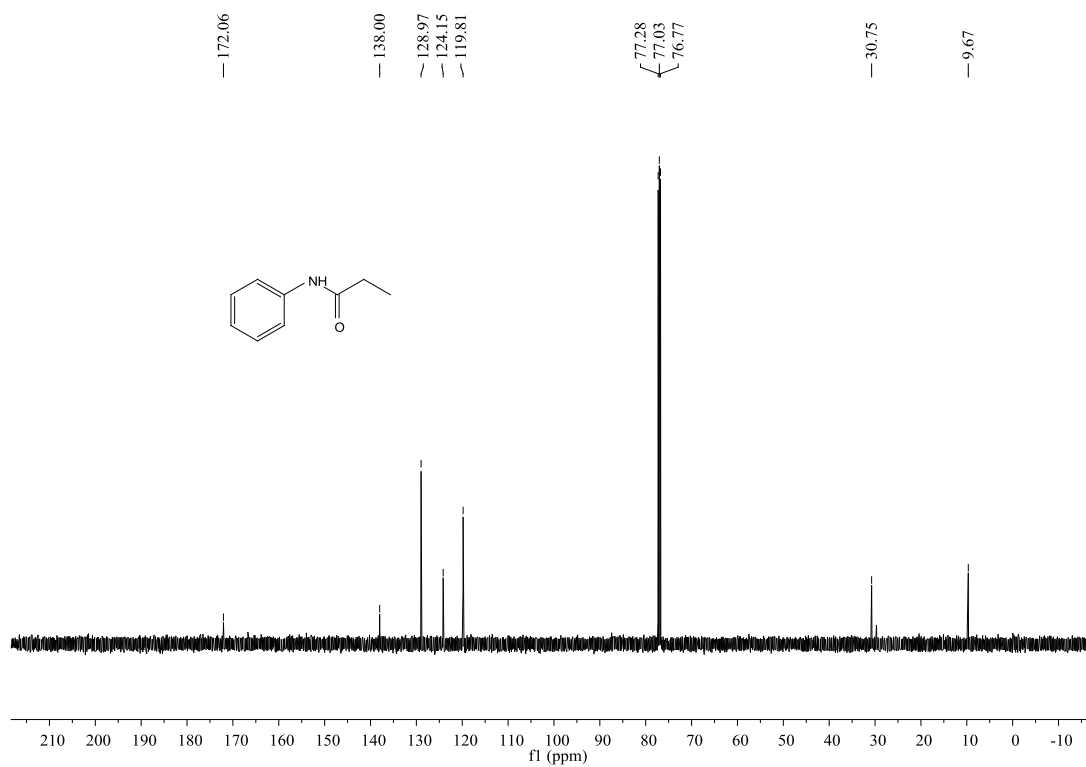
¹H NMR: 2,2,2-trifluoro-*N*-phenylacetamide (**5b**)



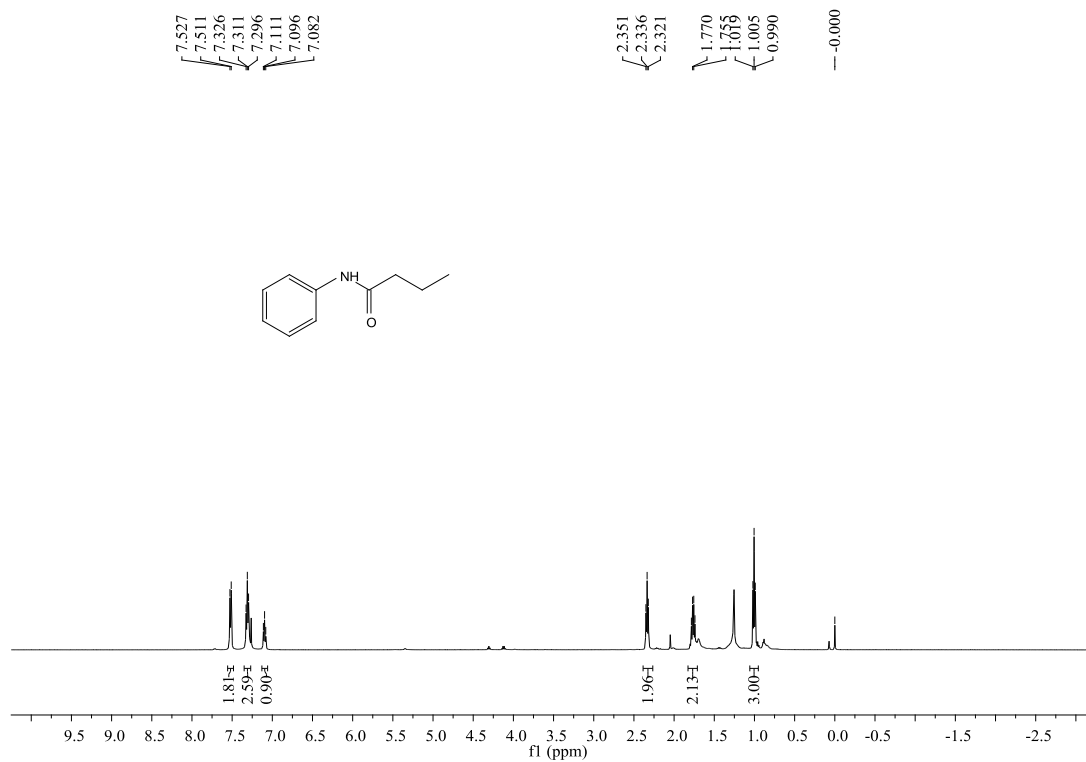
¹³C NMR: 2,2,2-trifluoro-*N*-phenylacetamide (**5b**)



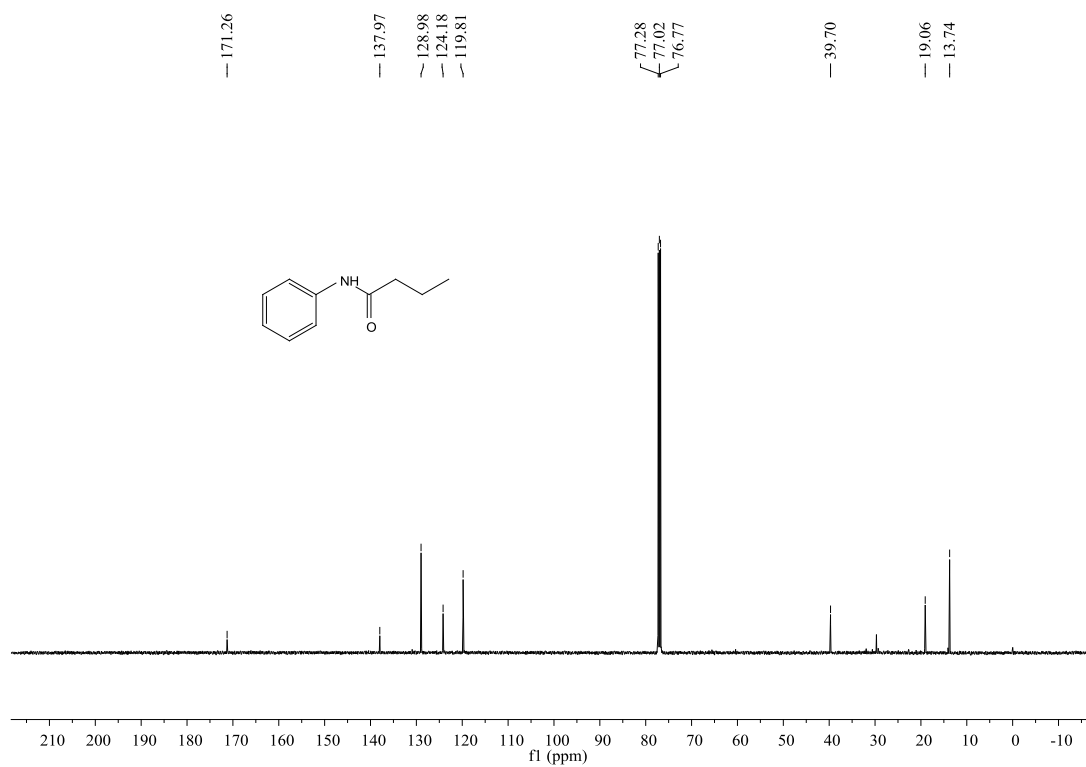
¹H NMR: *N*-phenylpropionamide (5c)



¹³C NMR: *N*-phenylpropionamide (5c)



¹H NMR: *N*-phenylbutyramide (5d)



¹³C NMR: *N*-phenylbutyramide (5d)