Supplementary Material (ESI) for Green Chemistry


# Sulfated tungstate: an efficient catalyst for Ritter reaction

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## SUPPORTING INFORMATION

## Contents

## A) Experimental

### a) Reagents:

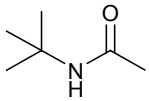
All chemicals were purchased from Spectrochem Pvt. Ltd. India and were used without further purification.

### b) General procedure for Ritter reaction:

A mixture of 1-phenylethanol (1g, 8.19 mmol), benzonitrile (0.844g, 8.19 mmol), and sulfated tungstate (0.368 g, 20 wt%) was placed in a round bottom flask. The materials were mixed and heated at 100 $^0$C for the given time. The progress of the reaction was monitored by TLC. After the completion of the reaction, diluted the reaction mixture with EtOAc (15ml) and filtered to recover the catalyst. The organic layer was concentrated under reduced pressure and crude residue obtained was recrystallised with hexane gave *N*-(1-Phenylethyl)benzamide as a white solid (entry 9).

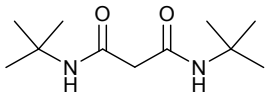
## B) Amide Analytical Data

Entry 1) *N*-*tert*-butylacetamide



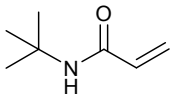
m.p. 95- 96 $^0$C (lit.[1] 97-98 $^0$C); $\nu_{max}$(KBr)/cm$^{-1}$ 3445 (NH), 1655 (C=O); $\delta_H$(300 MHz; $CDCl_3$; $Me_4Si$) 1.34 (9 H, s), 1.98 (3 H, s) and 7.57 (NH, br s); $\delta_C$(75 MHz; $CDCl_3$; $Me_4Si$) 23.9, 28.5, 51.0 and 170.3.

Entry 2) $N^1$, $N^3$-di-*tert*-butylmalonamide



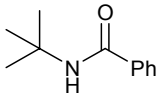
m.p. 114-115 $^0$C (lit.,[2] 112-113 $^0$C); $\nu_{max}$(KBr)/cm$^{-1}$ 3420 (NH), 1660 (C=O); $\delta_H$(300 MHz; $CDCl_3$; $Me_4Si$) 1.30 (18 H, s), 3.07 (2 H, s) and 6.70 (1 H, br s) ; $\delta_C$(75 MHz; $CDCl_3$; $Me_4Si$) 30.5, 44.0, 46.0 and 166.3.

Entry 3) *N-tert*-butylacrylamide



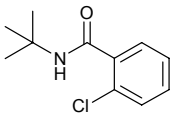
m.p. 125-127 $^0$C (lit.,[3] 126-128 $^0$C); $\nu_{max}$(KBr)/cm$^{-1}$ 3460 (NH), 1630 (C=C), 1660 (C=O); $\delta_H$(300 MHz; $CDCl_3$; $Me_4Si$) 1.38 (9 H, s), 5.42 (1 H, dd), 5.57 (1 H, dd), 6.17 (1 H, dd) and 7.24 (1 H, br s); $\delta_C$(75 MHz; $CDCl_3$; $Me_4Si$) 28.7, 51.2, 125.2, 131.8 and 165.3.

Entry 4) *N-tert*-butylbenzamide



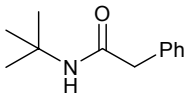
m.p. 129-130 $^0$C (lit.,[4] 128-129 $^0$C); $\nu_{max}$(KBr)/cm$^{-1}$ 3460 (NH), 1660 (C=O); $\delta_H$(300 MHz; $CDCl_3$; $Me_4Si$) 1.49 (9 H, s), 6.19 (1 H, br s) and 7.44-7.88 (5 H, m); $\delta_C$(75 MHz; $CDCl_3$; $Me_4Si$) 29.0, 49.5, 126.5, 128.4, 130.7,135.0 and 166.3.

Entry 5) *N-tert*-butyl-2-chlorobenzamide



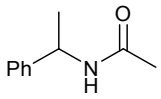
m.p. 106-107 $^0$C (lit.,[5] 106-108 $^0$C); $\nu_{max}$(KBr)/cm$^{-1}$ 3420 (NH), 1640 (C=O); $\delta_H$(300 MHz; $CDCl_3$; $Me_4Si$) 1.38 (9 H, s), 6.0 (1 H, br s) and 7.25 (4 H, m); $\delta_C$(75 MHz; $CDCl_3$; $Me_4Si$) 31.0, 47.5, 127.2, 128.4, 128.0, 129.4, 132.0, 133.2, 134.0 and 167.3.

Entry 6) *N-tert*-butyl-2-phenylacetamide



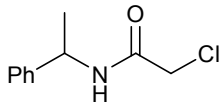
m.p. 113-115 $^0$C (lit.,[6] 115-116 $^0$C); $\nu_{max}$(KBr)/cm$^{-1}$ 3420 (NH), 1648 (C=O); $\delta_H$(300 MHz; $CDCl_3$; $Me_4Si$) 1.66 (9 H, s), 3.60 (2 H, s), 5.40 (1 H, br s) and 7.33 (5 H, m); $\delta_C$(75 MHz; $CDCl_3$; $Me_4Si$) 31.0, 41.5, 47.2, 127.2, 129.4, 130.0, 132.4 and 171.3.

Entry 7) *N*-(1-phenylethyl)acetamide



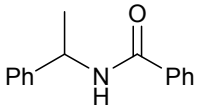
m.p. 75-76 $^0$C (lit.,[7] 75-77 $^0$C); $\nu_{max}$(KBr)/cm$^{-1}$ 3425 (NH), 1650(C=O); $\delta_H$(300 MHz; $CDCl_3$; $Me_4Si$) 1.42 (3 H, d), 1.76 (3 H, s), 5.34 (1 H, quartet), 6.31 (1 H, br s) and 7.15 (5 H, m); $\delta_C$(75 MHz; $CDCl_3$; $Me_4Si$) 21.0, 23.0, 49.5, 126.0, 127.2, 128.4, 143.0, and 170.0.

Entry 8) 2-chloro-*N*-(1-phenylethyl)acetamide



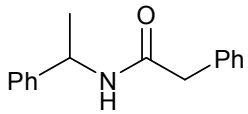
m.p. 69-71 $^0$C (lit.,[7] 70-72 $^0$C); $\nu_{max}$(KBr)/cm$^{-1}$ 3445 (NH), 1655(C=O); $\delta_H$(300 MHz; $CDCl_3$; $Me_4Si$) 1.64 (3 H, d), 4.06 (2 H, s), 5.34 (1 H, quartet), 6.26 (1 H, br s) and 7.26-7.34 (5 H, m); $\delta_C$(75 MHz; $CDCl_3$; $Me_4Si$) 21.0, 55.0, 49.5, 126.0, 127.7, 129.4, 143.5, and 171.0.

Entry 9) *N*-(1-Phenylethyl)benzamide



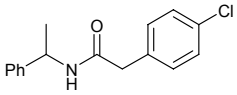
m.p. 103-105 $^0$C (lit.,[8] 103-104 $^0$C); $\nu_{max}$(KBr)/cm$^{-1}$ 3360 (NH), 1640(C=O); $\delta_H$(300 MHz; $CDCl_3$; $Me_4Si$) 1.58 (3 H, d), 5.20 (1 H, quartet), 6.5 (1 H, br s) and 7.34-7.90 (10 H, m); $\delta_C$(75 MHz; $CDCl_3$; $Me_4Si$) 21.0, 50.0, 126.8, 127.0, 127.4, 128.6, 128.9, 132.2, 143.5 and 167.5.

Entry 10) 2-phenyl-*N*-(1-phenylethyl)acetamide



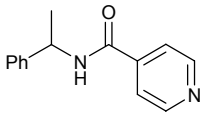
m.p. 100-101 $^0$C (lit.,[7] 98-100 $^0$C); $\nu_{max}$(KBr)/cm$^{-1}$ 3370 (NH), 1650(C=O); $\delta_H$(300 MHz; $CDCl_3$; $Me_4Si$) 1.59 (3 H, d), 3.52 (2 H, s), 5.23 (1 H, quartet), 7.6 (1 H, br s) and 7.26 (10 H, m); $\delta_C$(75 MHz; $CDCl_3$; $Me_4Si$) 21.0, 50.0, 54.0, 125.8, 127.0, 127.6, 128.2, 128.9, 131.2, 142.5 and 168.5.

Entry 11) 2-(4-chlorophenyl)-*N*-(1-phenylethyl)acetamide



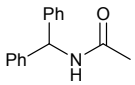

m.p. 108-109 $^0$C (lit.,[7] 110-111 $^0$C); $\nu_{max}$(KBr)/cm$^{-1}$ 3372(NH), 1657(C=O); $\delta_H$(300 MHz; $CDCl_3$; $Me_4Si$) 1.60 (3 H, d), 3.64 (2 H, s), 5.52 (1 H, quartet), 7.40 (1 H, br s) and 7.32-7.37 (9 H, m); $\delta_C$(75 MHz; $CDCl_3$; $Me_4Si$) 21.0, 41.0, 49.0, 126.8, 127.0, 128.0, 129.4, 131.1, 133.2, 133.8, 142.2 and 166.5.

Entry 12) *N*-(1-phenylethyl)isonicotinamide



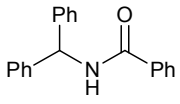

m.p. 119-120 $^0$C (lit.,[8] 118-120 $^0$C); $\nu_{max}$(KBr)/cm$^{-1}$ 3380(NH), 1640(C=O); $\delta_H$(300 MHz; $CDCl_3$; $Me_4Si$) 1.77 (3 H, d), 5.09 (1 H, quartet), 6.21 (1 H, br s), 7.66-7.74 (5 H, m), 8.56-8.89 (4 H, m); $\delta_C$(75 MHz; $CDCl_3$; $Me_4Si$) 21.0, 49.0, 122.8, 127.0, 126.8, 128.2, 140.0, 143.0, 149.0 and 167.5.

Entry 13) *N*-benzhydrylacetamide



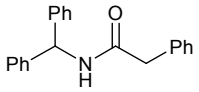

m.p. 144-146 $^0$C (lit.,[9] 146 $^0$C); $\nu_{max}$(KBr)/cm$^{-1}$ 3350(NH), 1645(C=O); $\delta_H$(300 MHz; $CDCl_3$; $Me_4Si$) 2.00 (3 H, s), 6.17 (1 H, s), 5.73 (1 H, br s), 7.24 (10 H, m); $\delta_C$(75 MHz; $CDCl_3$; $Me_4Si$) 23.0, 60.0, 126.8, 128.3, 129.3, 142.2 and 170.5.

Entry 14) *N*-benzhydrylbenzamide



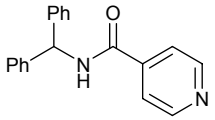

m.p. 171-172 $^0$C (lit.,[9] 170-172 $^0$C); $\nu_{max}$(KBr)/cm$^{-1}$ 3340(NH), 1635(C=O); $\delta_H$(300 MHz; $CDCl_3$; $Me_4Si$) 6.36 (1 H, s), 7.68 (1 H, br s), 7.19-7.72 (15 H, m); $\delta_C$(75 MHz; $CDCl_3$; $Me_4Si$) 60.0, 126.3, 127.5, 128.3, 129.3, 132.2, 134.2, 142.5 and 167.5.

Entry 15) *N*–benzhydryl-2-phenylacetamide



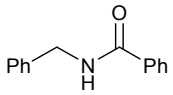

m.p. 138-140 $^0$C (lit.,[9] 137-140 $^0$C); $\nu_{max}$(KBr)/cm$^{-1}$ 3346(NH), 1650(C=O); $\delta_H$(300 MHz; $CDCl_3$; $Me_4Si$) 3.65 (2 H, s), 5.49 (1 H, s), 6.25 (1 H, br s), 7.30-7.40 (15 H, m); $\delta_C$(75 MHz; $CDCl_3$; $Me_4Si$) 42.0, 60.0, 125.3, 126.3, 128.7, 129.8, 131.2, 133.2, 141.5 and 170.5.

Entry 16) *N*-benzhydrylisonicotinamide



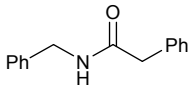

m.p. 213-215 $^0$C (lit.,[10] 213-214 $^0$C); $\nu_{max}$(KBr)/cm$^{-1}$ 3385(NH), 1645(C=O); $\delta_H$(300 MHz; $CDCl_3$; $Me_4Si$) 5.39 (1 H, quartet), 8.77 (1 H, br s), 7.31-7.60 (14 H, m); $\delta_C$(75 MHz; $CDCl_3$; $Me_4Si$) 61.0, 122.8, 127.0, 126.3, 127.2, 141.4, 142.6, 149.8 and 167.5.

Entry 17) *N*-Benzylbenzamide



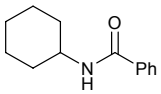

m.p. 129-130 $^0$C (lit.,[11] 128-130 $^0$C); $\nu_{max}$(KBr)/cm$^{-1}$ 3445 (NH), 1655 (C=O); $\delta_H$(300 MHz; $CDCl_3$; $Me_4Si$) 4.65 (2 H, d, J=6), 6.42 (1 H, br s), 7.25-7.56 (8 H, m) and 7.79 (2 H, m); $\delta_C$(75 MHz; $CDCl_3$; $Me_4Si$) 44.0, 127.1, 127.5, 127.6, 127.8, 128.5, 128.6, 134.3, 138.1 and 167.3.

Entry 18) *N*-Benzyl-2-phenylacetamide



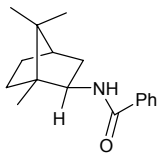

m.p. 117 $^0$C (lit.,[12] 117-119 $^0$C); $\nu_{max}$(KBr)/cm$^{-1}$ 3271 (NH) and 1630 (C=O); $\delta_H$(300 MHz; $CDCl_3$; $Me_4Si$) 3.62 (2 H, s), 4.4 (2 H, d, *J* =6Hz), 5.9 (1 H, br s) and 7.15-7.55 (10 H, m); $\delta_C$(75 MHz; $CDCl_3$; $Me_4Si$) 43.4, 43.6, 127.2, 127.3, 127.4, 128.5, 128.9, 129.3, 134.8, 138.1 and 170.9.

Entry 19) *N*-cyclohexylbenzamide



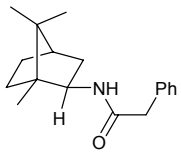
m.p. 137-139 $^0$C (lit.,[13] 139-141 $^0$C); $\nu_{max}$(KBr)/cm$^{-1}$ 3345 (NH), 1645 (C=O); $\delta_H$(300 MHz; $CDCl_3$; $Me_4Si$) 1.18-1.28 (3 H, m), 1.32-1.43 (2 H. m), 1.62-1.78 (3 H, m), 1.96-2.04 (2 H, m), 3.93-4.06 (1 H, m), 5.22 (1 H, br s) and 7.2-7.38 (5 H, m); $\delta_C$(75 MHz; $CDCl_3$; $Me_4Si$) 24.6, 25.4, 32.9, 48.0, 127.2, 128.9, 129.3, 135.1 and 169.9.

Entry 20) (±) *exo*- *N*- bornylbenzamide



m.p. 129-130 $^0$C (lit.,[14] 125-126 $^0$C); $\nu_{max}$(KBr)/cm$^{-1}$ 3345 (NH), 1645 (C=O); $\delta_H$(300 MHz; $CDCl_3$; $Me_4Si$) 0.88 (3 H, s), 0.92 (3 H, s), 1.01 (3 H, s), 1.19-1.25 (1 H. m), 1.33-1.42 (1 H, m), 1.59-1.84 (4 H, m), 1.93-2.01 (1 H, m), 4.08-4.15 (1 H, m), 6.08 (1 H, br s) and 7.40-7.72 (5 H, m); $\delta_C$(75 MHz; $CDCl_3$; $Me_4Si$) 11.8, 20.3, 20.3, 27.1, 35.6, 39.2, 44.7, 47.2, 48.8, 57.3, 126.5, 128.5, 131.0, 135.4 and 166.9.

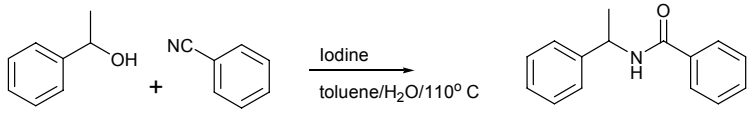
Entry 21) (±) *exo*- *N*- bornyl- 2-phenylacetamide



m.p. 140-141 $^0$C (lit.,[15] 143 $^0$C); $\nu_{max}$(KBr)/cm$^{-1}$ 3345 (NH), 1645 (C=O); $\delta_H$(300 MHz; $CDCl_3$; $Me_4Si$) 0.44 (3 H, s), 0.63 (3 H, s), 0.71 (3 H, s), 1.04-1.12 (1 H. m), 1.18-1.19 (1 H, m), 1.22-1.26 (1 H, m), 1.31-1.40 (1 H, m), 1.43-1.52 (1 H, m), 1.58-1.64 (2 H, m), 1.73-1.80 (2 H, m), 3.49-3.62 (2 H, m), 3.77-3.85 (1 H, m), 5.27 (1 H, br s) and 7.20-7.37 (5 H, m); $\delta_C$(75 MHz; $CDCl_3$; $Me_4Si$) 14.4, 19.5, 23.5, 31.3, 33.8, 41.4, 46.0, 51.1, 53.4, 127.3, 129.5, 129.7, 135.7 and 170.4.

## C) Green Metrics

1) Calculations for the synthesis of *N-(*1-phenylethyl) benzamide catalysed by Iodine[16].

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| Input | | Output | |
|---|---|---|---|
| 1-phenylethanol | 1 g | Crude *N-(*1-phenylethyl) benzamide | 1.55g |
| Benzonitrile | 0.93g | | |
| Iodine | 0.42 g | Aqueous waste | 30.72 g |
| Water | 0.3 g | | |
| EtOAc | 18 g (20 ml) | | |
| $Na_2S_2O_3$ (aq) | 15 g | Organic Solvent Waste | 1.8 g |
| Brine | 15 g | | |
| Total | 50.65g | Total | 32.52 g |

$$\text{E-Factor,} \quad \left( \frac{\text{32.52 g of waste produced}}{\text{1.55 g of crude product}} \right) = 20.98$$

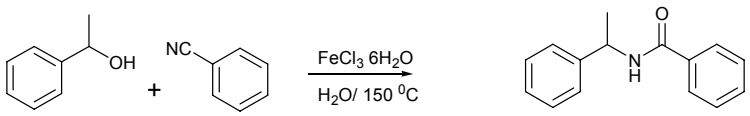
$$\text{Mass Intensity,} \quad \left( \frac{\text{50.65 g of raw material used}}{\text{1.55 g of crude product}} \right) = 32.67$$

$$\text{Atom Economy,} \quad \left( \frac{225}{122 + 103} \right) 100 = 100\%$$

Assumptions

1. 90% of organic solvents are recovered.

2) Calculations for the synthesis of *N-(*1-phenylethyl) benzamide catalysed by $FeCl_3$ $6H_2O$[17].

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| Input | | Output | |
|---|---|---|---|
| 1-phenylethanol | 1 g | Crude *N-(*1-phenylethyl) benzamide | 0.99 g |
| Benzonitrile | 0.84g | | |
| $FeCl_3$ $6H_2O$ | 0.22 g | Aqueous waste | 0.52 g |
| Water | 0.3 g | | |
| EtOAc | 30.49 g (34 ml) | | |
| | | Organic Solvent Waste | 3.04 g |
| Total | 32.85 g | Total | 3.56 g |

$$\text{E-Factor,} \quad \left( \frac{\text{3.56 g of waste produced}}{\text{0.99 g of crude product}} \right) = 3.59$$

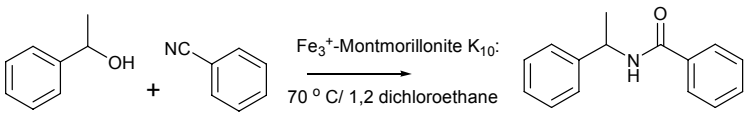
$$\text{Mass Intensity,} \quad \left( \frac{\text{32.85 g of raw material used}}{\text{0.99 g of crude product}} \right) = 33.18$$

$$\text{Atom Economy,} \quad \left( \frac{225}{122 + 103} \right) 100 = 100\%$$

Assumptions

1. 90% of organic solvents were recovered.
2. Calculations did not take into account of recrystallisation of the product.

3) Calculation for the synthesis of *N-(*1-phenylethyl) benzamide catalysed by $Fe^{3+}$-Mont. K10[18].




85 %

| Input | | Output | |
|---|---|---|---|
| 1-phenylethanol | 1 g | Crude *N-(*1-phenylethyl) benzamide | 1.56g |
| Benzonitrile | 2.11 g | | |
| $Fe^{3+}$-Mont. K10 | 1.55 g | Aqueous waste | 00 g |
| 1,2-Dichloroethane | 125.3 g (100 ml) | | |
| | | Organic Solvent Waste | 12.53 g |
| Total | 129.96 g | Total | 12.53 g |

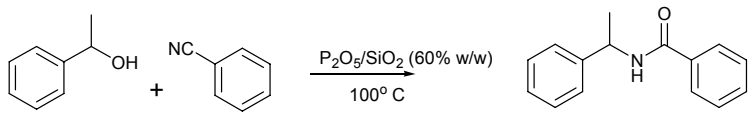
$$\text{E-Factor,} \quad \left( \frac{\text{12.53 g of waste produced}}{\text{1.56 g of crude product}} \right) = 8.03$$

$$\text{Mass Intensity,} \quad \left( \frac{\text{129.96 g of raw material used}}{\text{1.56 g of crude product}} \right) = 83.30$$

$$\text{Atom Economy,} \quad \left( \frac{225}{122 + 103} \right) 100 = 100\%$$

1. 90%recovery of organic solvents.
2. Calculations did not account for the synthesis of catalyst.
3. Calculations did not take into account of recrystallisation of the product.

4) Calculations for the synthesis of *N-(*1-phenylethyl) benzamide catalysed $P_2O_5/SiO_2$[19].




68%

| Input | | Output | |
|---|---|---|---|
| 1-phenylethanol | 1 g | Crude *N-(*1-phenylethyl) benzamide | 1.25g |
| Benzonitrile | 0.84g | | |
| $P_2O_5/SiO_2$ | 1.1 g | Aqueous waste | 15 g |
| EtOAc | 57.40 g (64 ml) | | |
| $NaHCO_3$ (aq) | 15 g | Organic Solvent Waste | 5.74 g |
| Total | 75.34 g | Total | 32.52 g |

$$\text{E-Factor,} \quad \left( \frac{\text{20.74 g of waste produced}}{\text{1.25 g of crude product}} \right) = 16.59$$

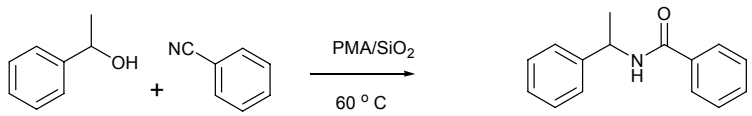
$$\text{Mass Intensity,} \quad \left( \frac{\text{75.34 g of raw material used}}{\text{1.25 g of crude product}} \right) = 60.27$$

$$\text{Atom Economy,} \quad \left( \frac{225}{122 + 103} \right) 100 = 100\%$$

Assumptions

1. 90% of organic solvents were recovered.
2. Calculations did not account for the synthesis of catalyst.
3. Calculations did not take into account of recrystallisation of the product.

5) Calculations for the synthesis of *N-(*1-phenylethyl) benzamide catalysed by $PMA/SiO_2$[20].




85 %

| Input | | Output | |
|---|---|---|---|
| 1-phenylethanol | 0.35 g | Crude *N-(*1-phenylethyl) benzamide | 0.51 g |
| Benzonitrile | 0.26 g | | |
| $PMA/SiO_2$ | 0.25 g | Aqueous waste | 20 g |
| EtOAc | 67.27 g (75ml) | Organic Solvent Waste | 6.72 g |
| Brine | 20g | | |
| Total | 88.13 g | Total | 26.72g |

$$\text{E-Factor,} \quad \left( \frac{\text{26.72 g of waste produced}}{\text{0.51 g of crude product}} \right) = 52.39$$

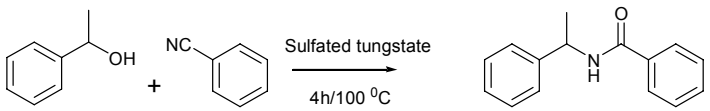
$$\text{Mass Intensity,} \quad \left( \frac{\text{88.13 g of raw material used}}{\text{0.51 g of crude product}} \right) = 172.80$$

$$\text{Atom Economy,} \quad \left( \frac{225}{122 + 103} \right) 100 = 100\%$$

Assumptions

1. 90% recovery of organic solvents.
2. Calculations did not account for the synthesis of the catalyst.
3. Calculations did not take into account of recrystallisation of the product.

6. Calculations for the synthesis of *N-(*1-phenylethyl) benzamide catalysed by Sulfated tungstate.




85 %

| Input | | Output | |
|---|---|---|---|
| 1-phenylethanol | 1 g | Crude *N-(*1-phenylethyl) benzamide | 1.56 g |
| Benzonitrile | 0.84g | | |
| Sulfated tungstate | 0.36 g | Aqueous waste | 00 g |
| EtOAc | 13.45 g (15 ml) | | |
| | | Organic Solvent Waste | 1.34 g |
| Total | 15.70 g | Total | 1.34 g |

$$\text{E-Factor,} \quad \left( \frac{\text{1.34 g of waste produced}}{\text{1.56 g of crude product}} \right) = 0.85$$

$$\text{Mass Intensity,} \quad \left( \frac{\text{15.70 g of raw material used}}{\text{1.56 g of crude product}} \right) = 10.06$$

$$\text{Atom Economy,} \quad \left( \frac{225}{122 + 103} \right) 100 = 100\%$$

Assumptions

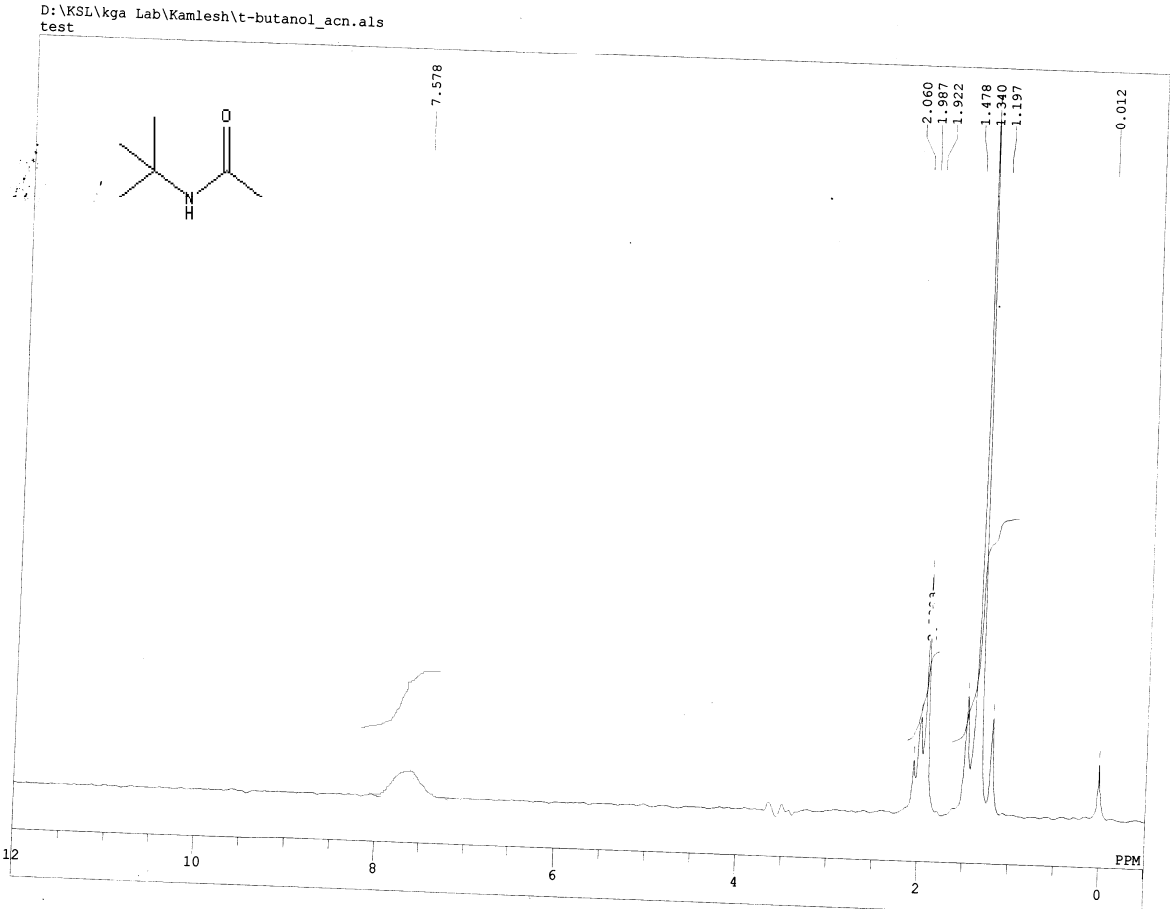
1 90% recovery of organic solvents.

2 Calculations did not account for the synthesis of the catalyst.

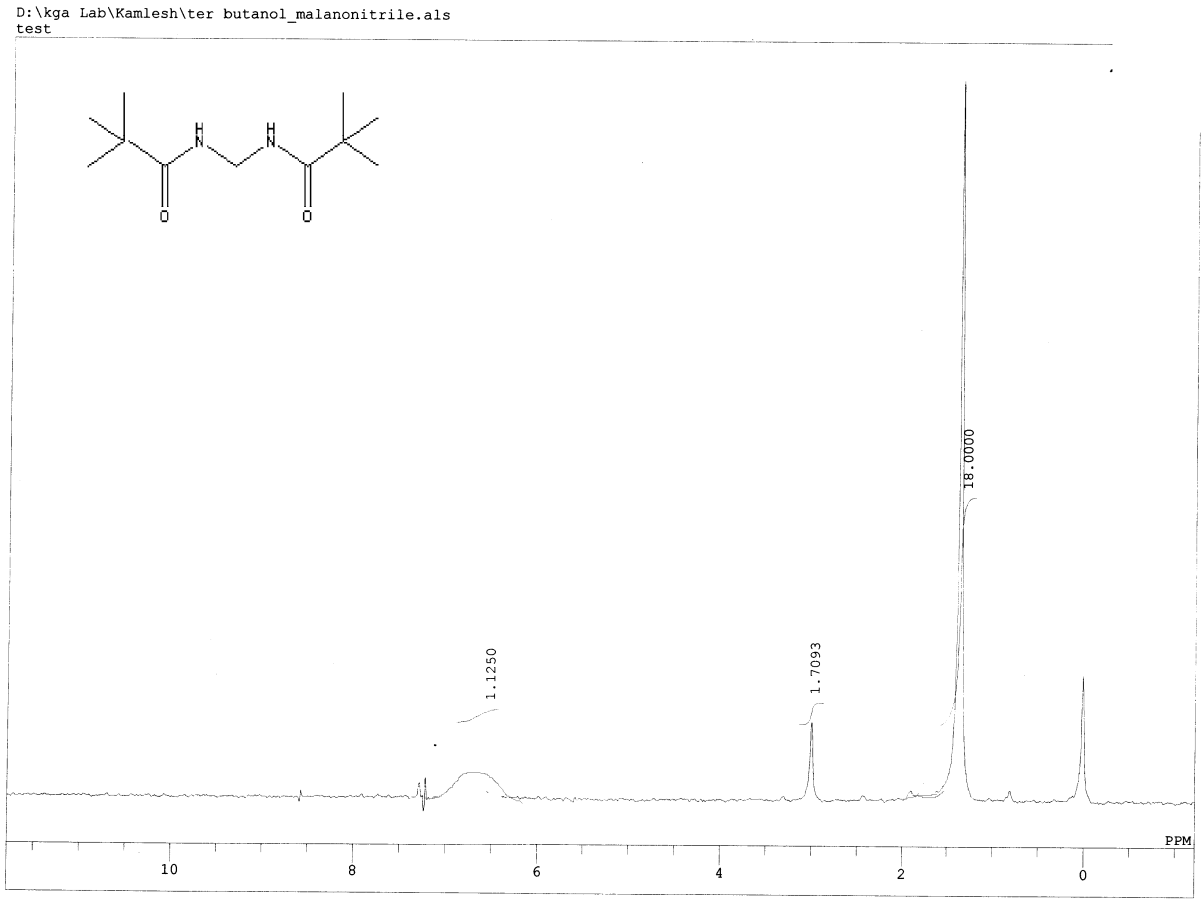
3 Calculations did not take into account of recrystallisation of the product.

## D) NMR Spectra:

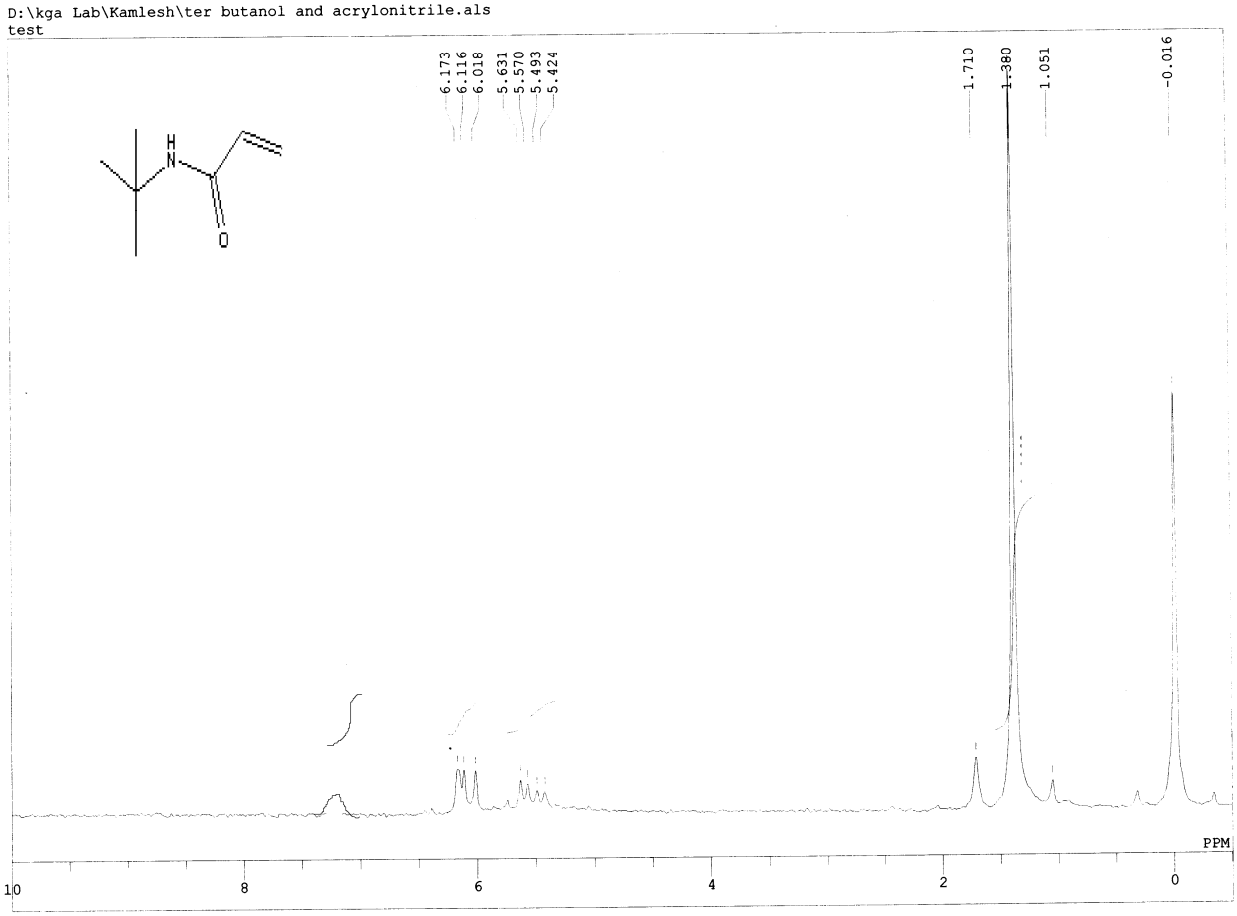
Entry 1) *N*-*tert*-butylacetamide



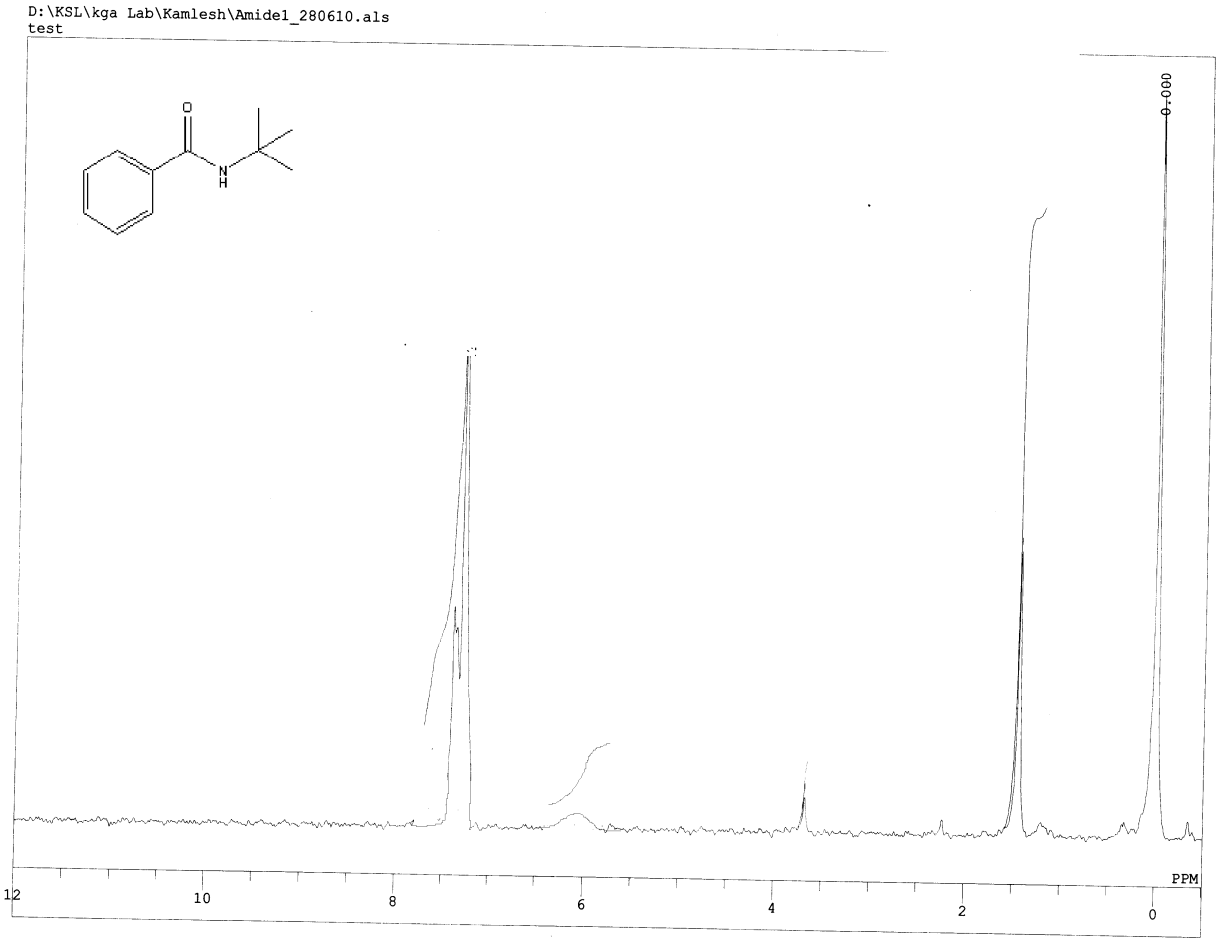
Entry 2) $N^1$, $N^3$-di-*tert*-butylmalonamide



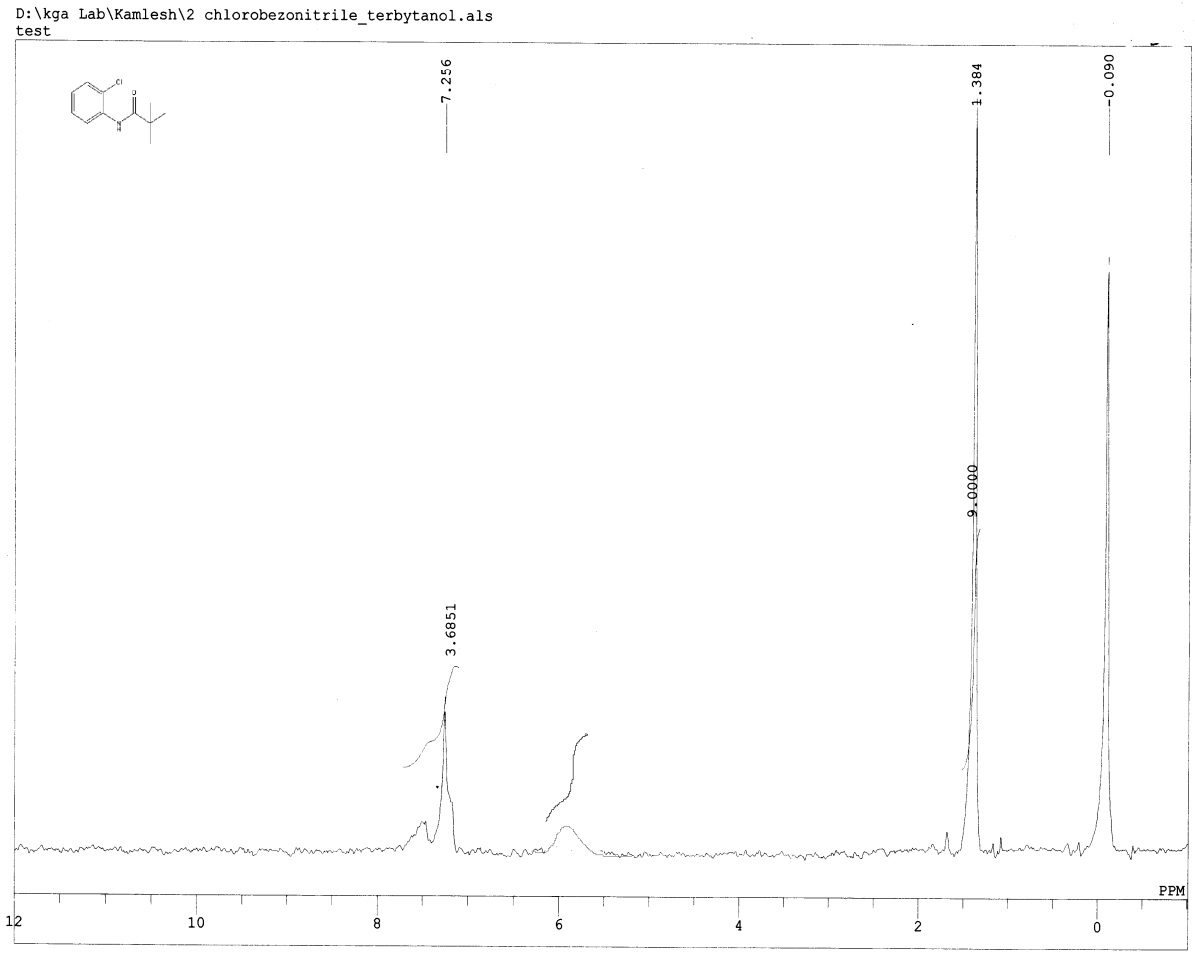
Entry 3) *N-tert*-butylacrylamide



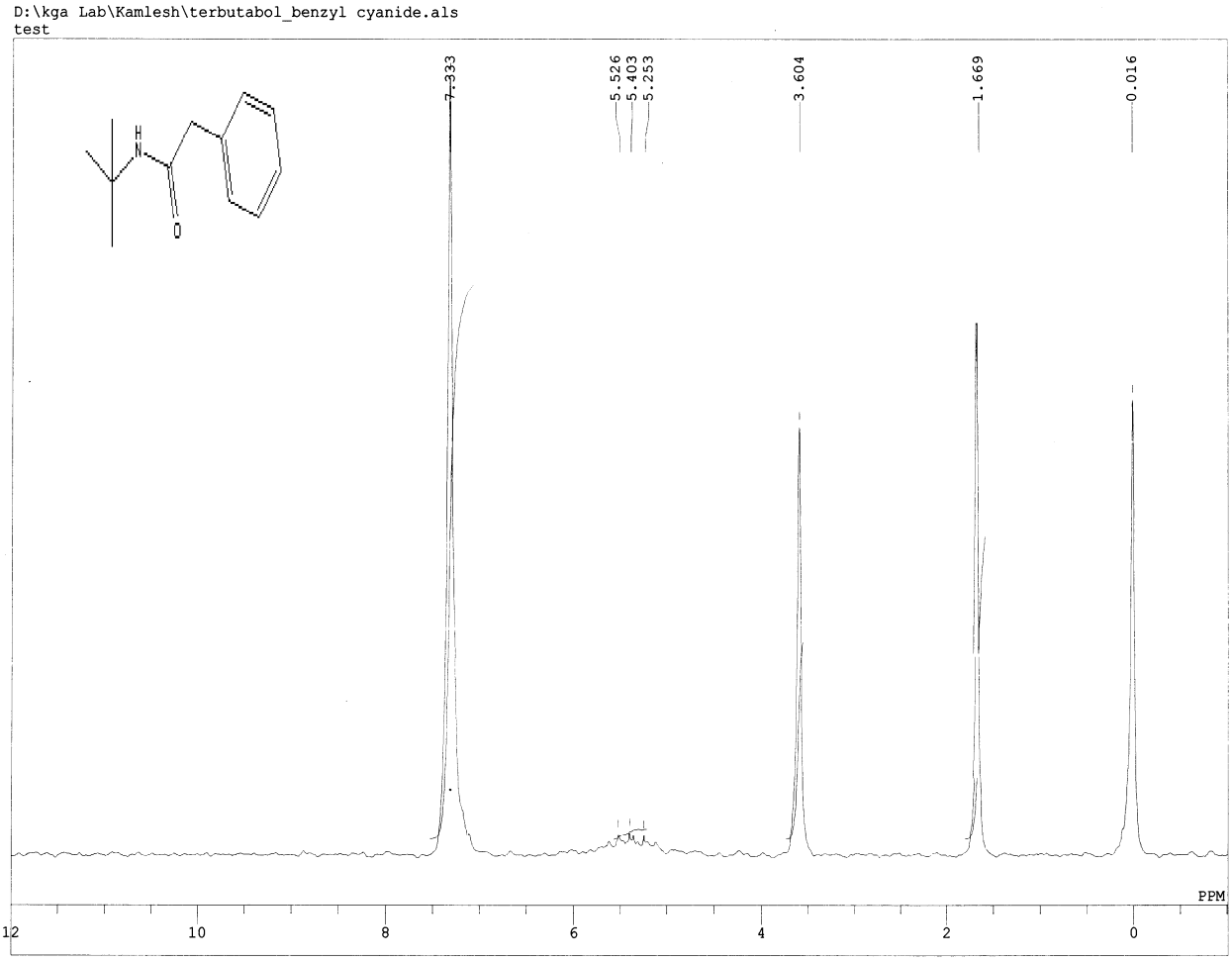
Entry 4) *N-tert*-butylbenzamide



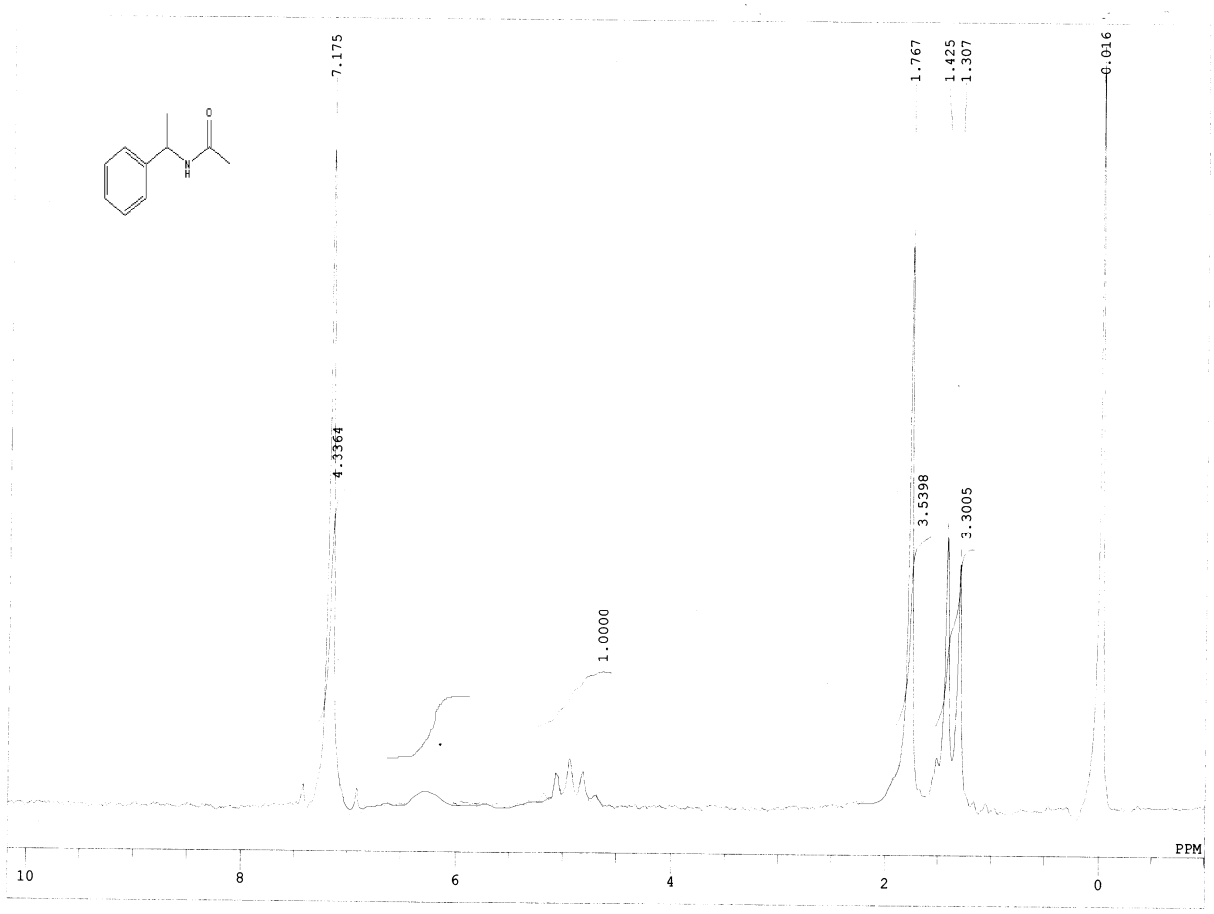
Entry 5) *N-tert*-butyl-2-chlorobenzamide



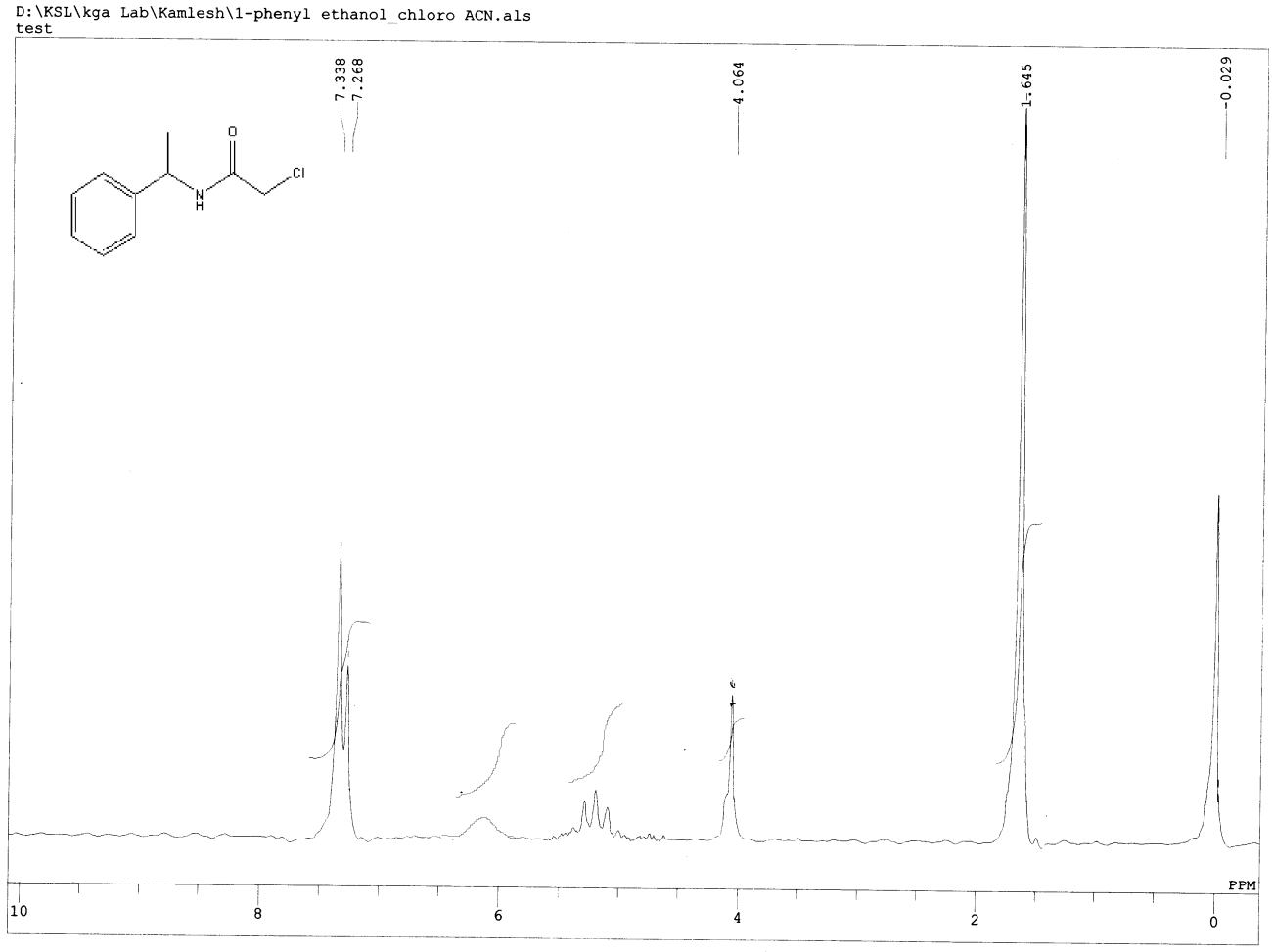
Entry 6) *N-tert*-butyl-2-phenylacetamide



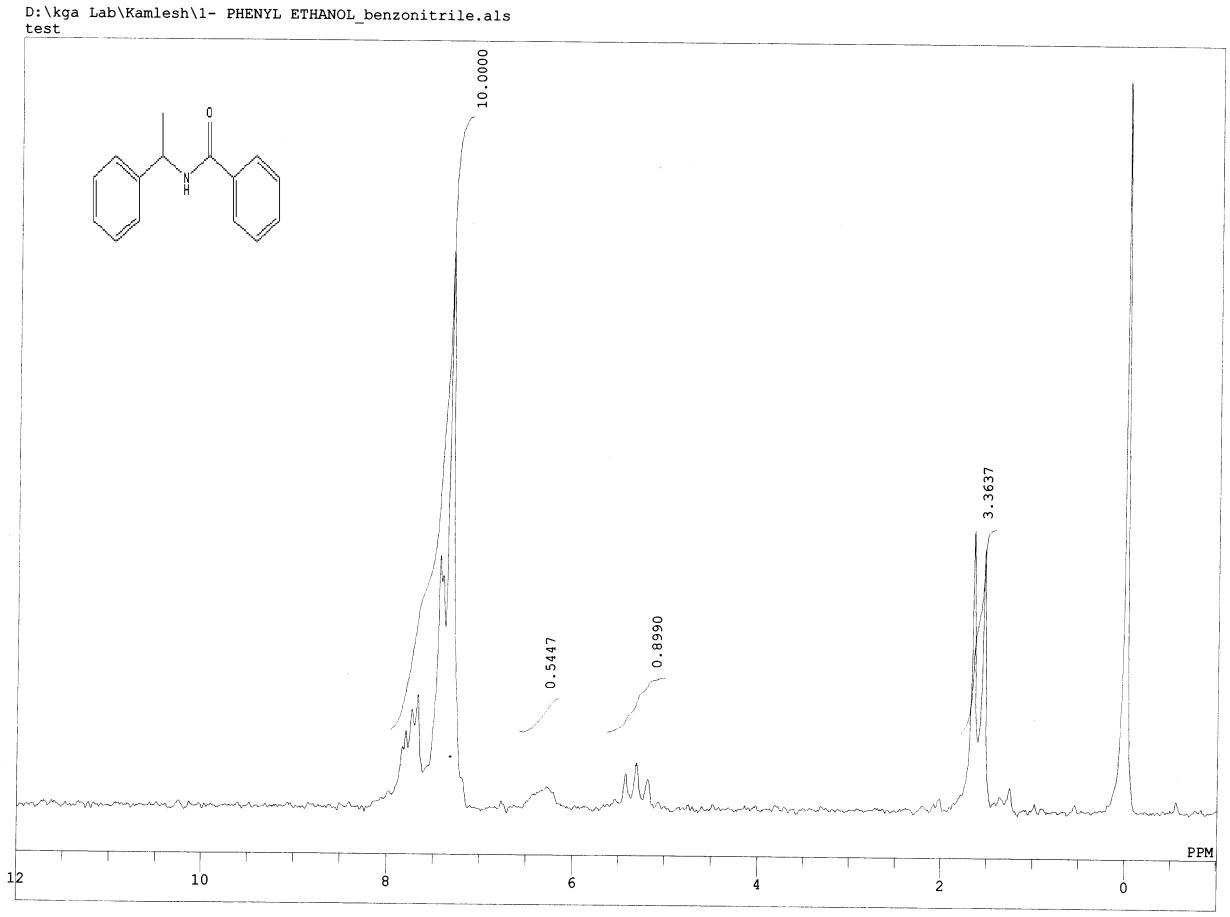
Entry 7) *N*-(1-phenylethyl)acetamide



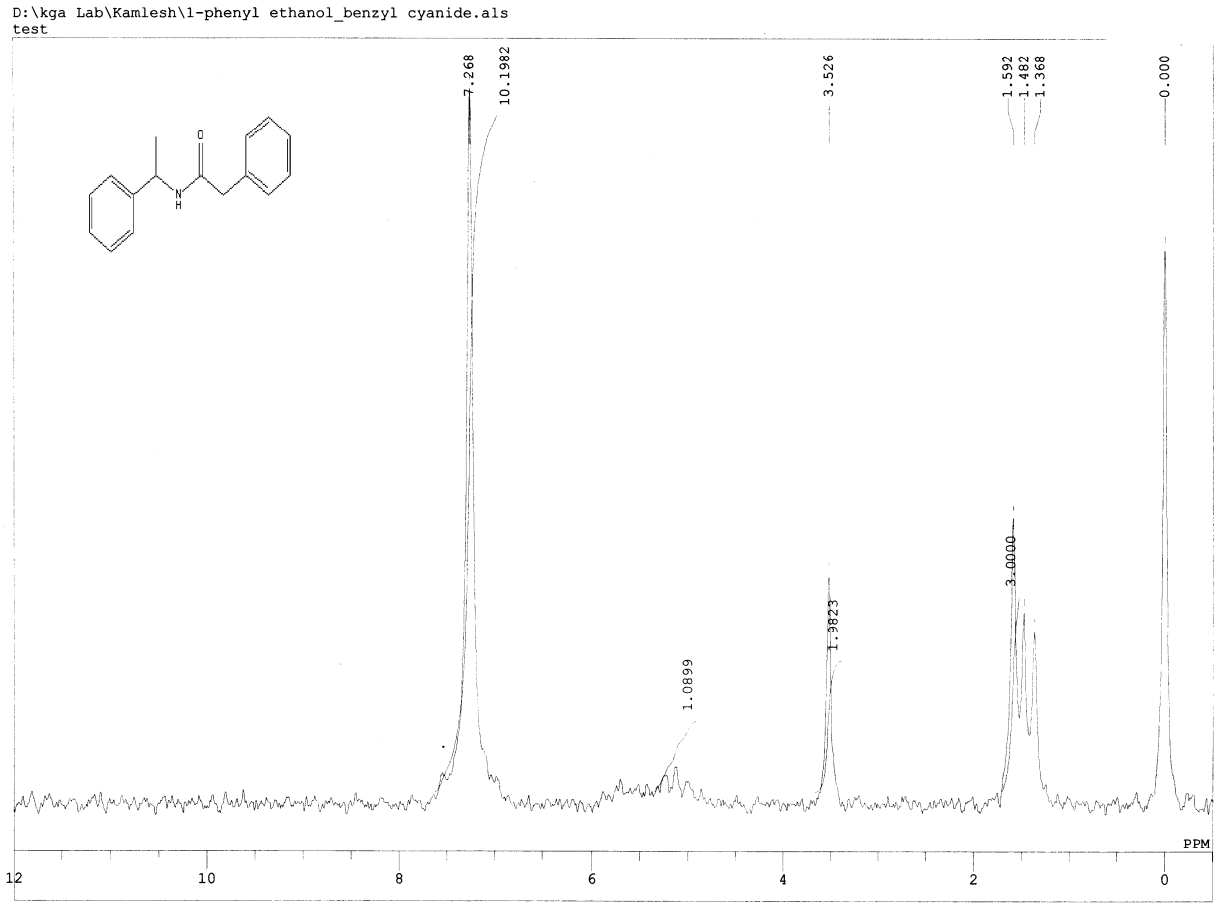
Entry 8) 2-chloro-*N*-(1-phenylethyl)acetamide



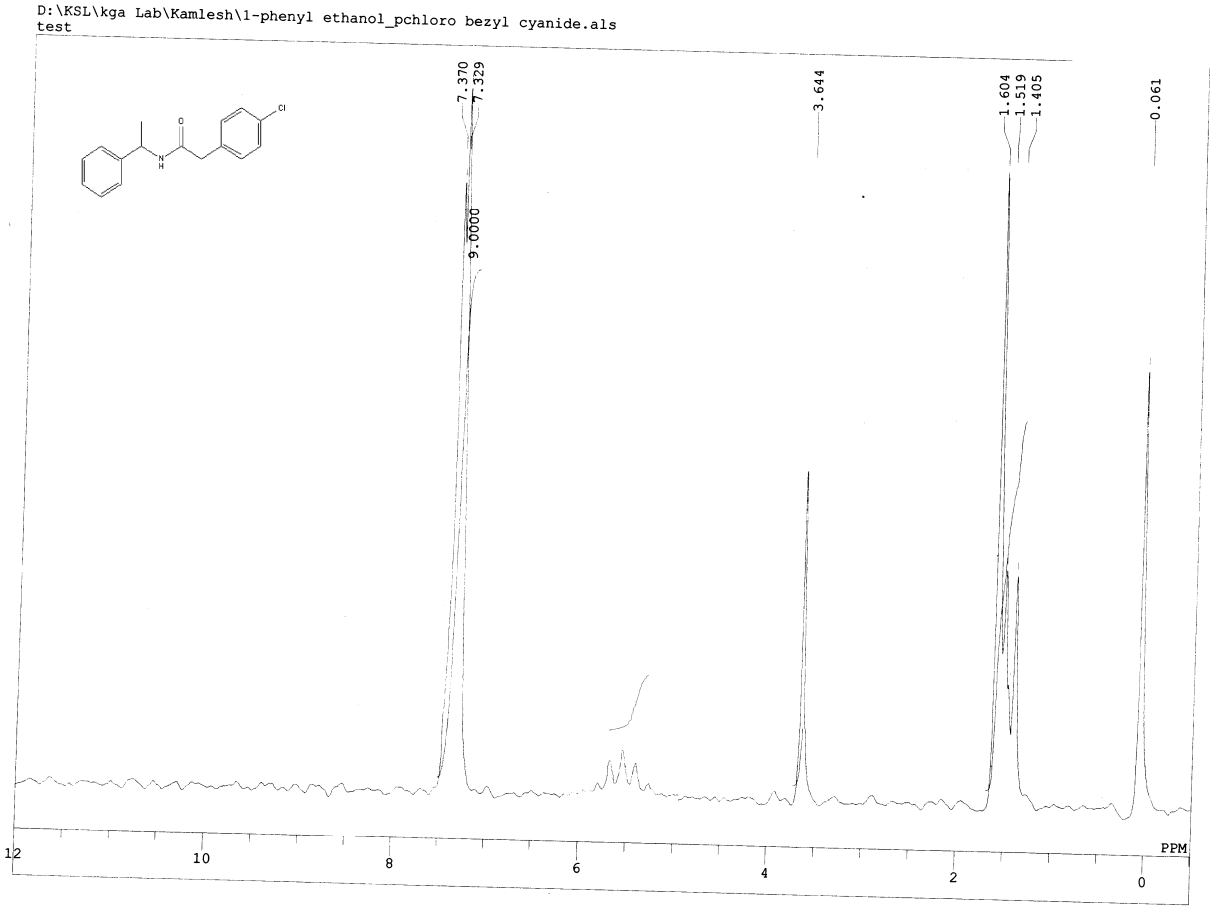
Entry 9) *N*-(1-Phenylethyl)benzamide



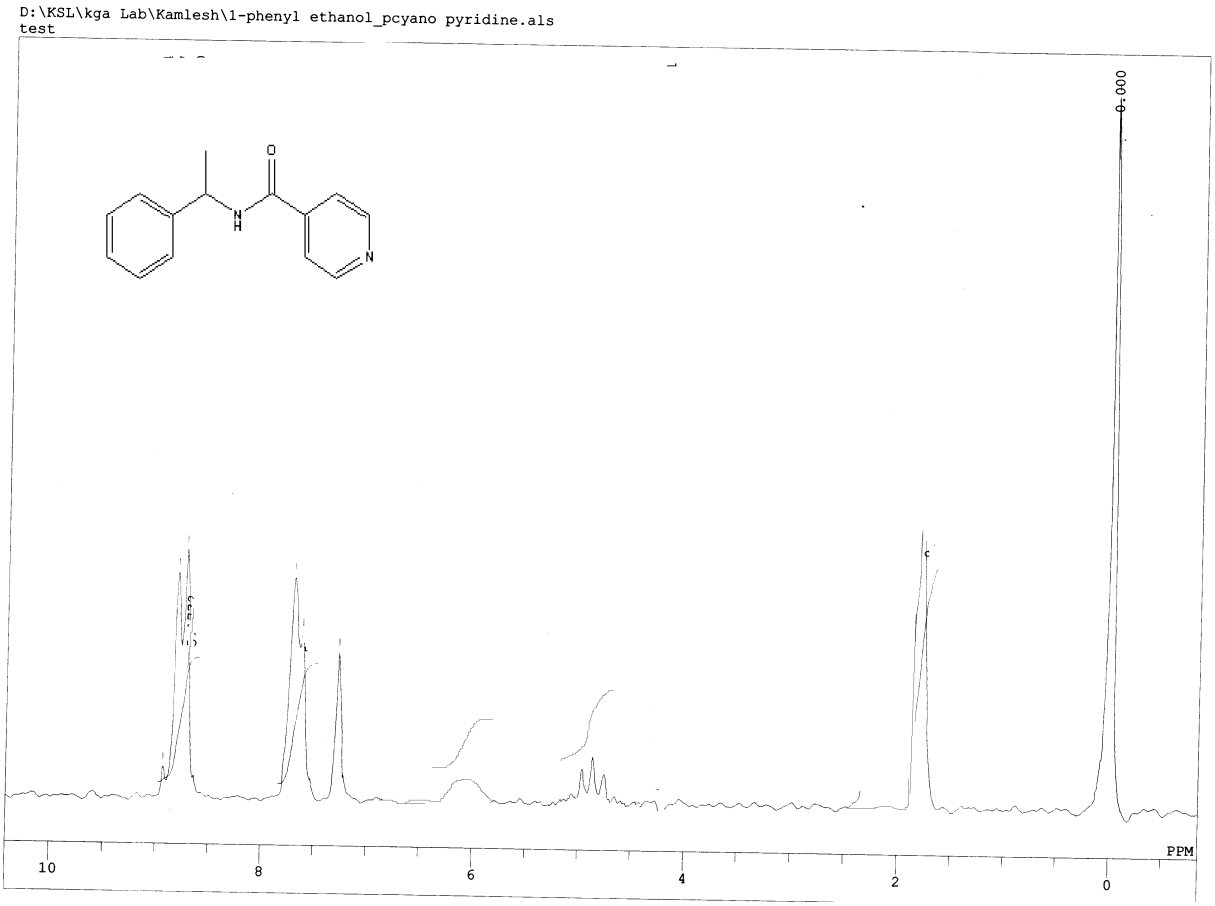
Entry 10) 2-phenyl-*N*-(1-phenylethyl)acetamide



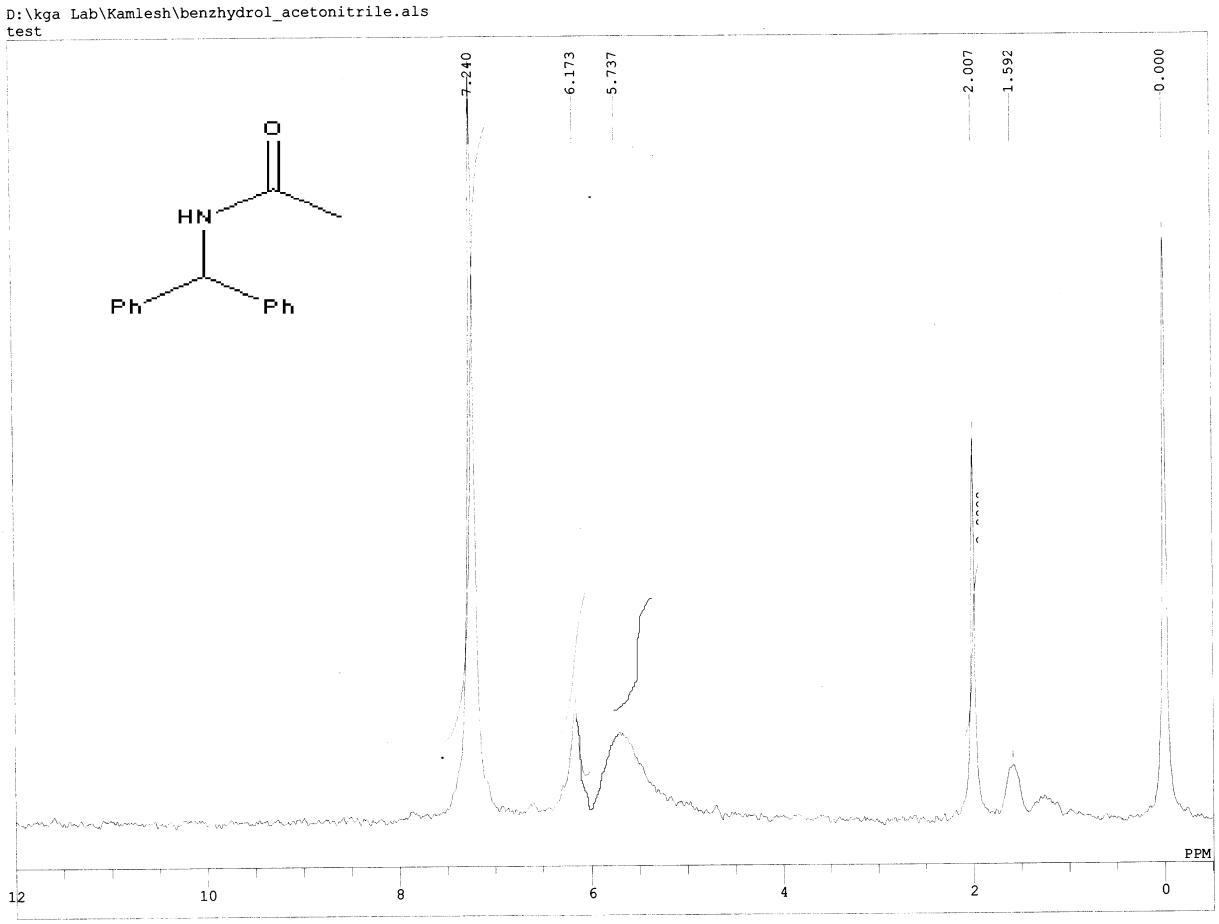
Entry 11) 2-(4-chlorophenyl)-*N*-(1-phenylethyl)acetamide



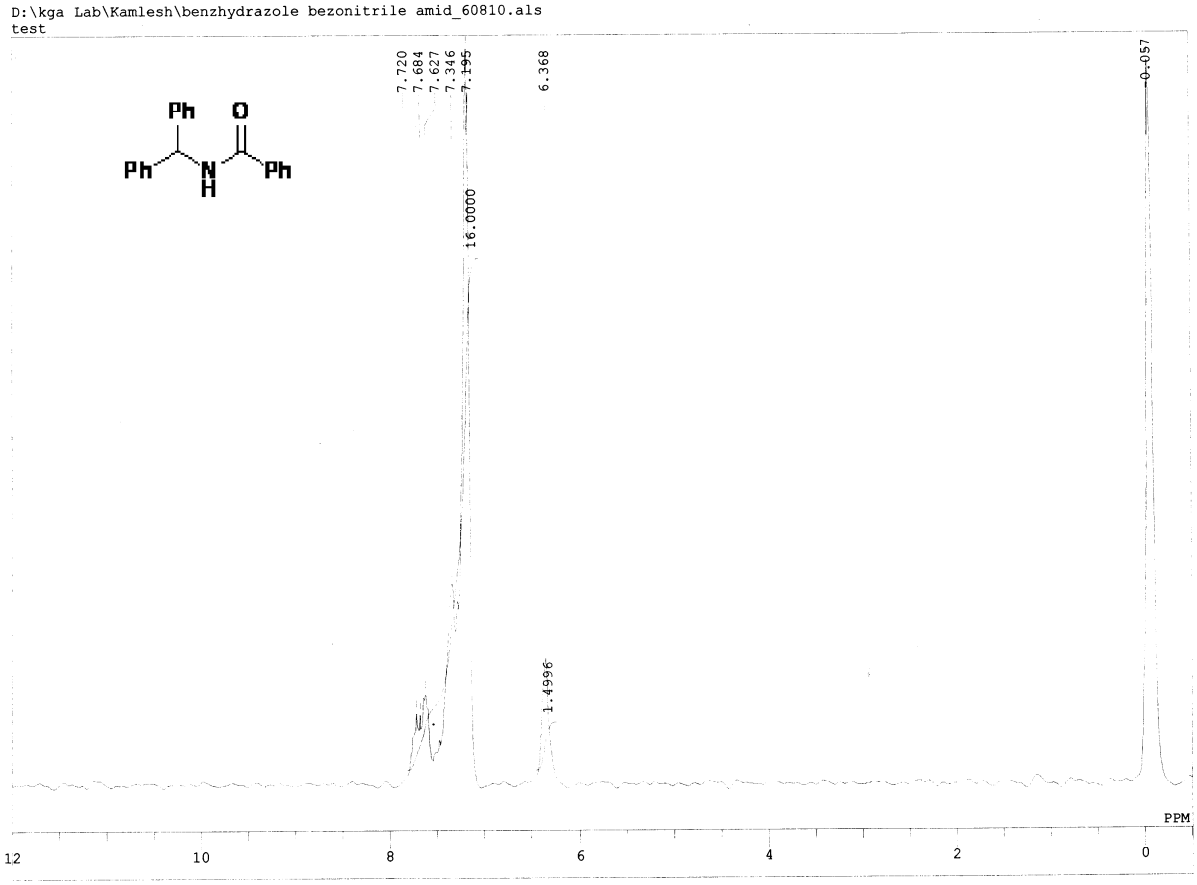
Entry 12) *N*-(1-phenylethyl)isonicotinamide



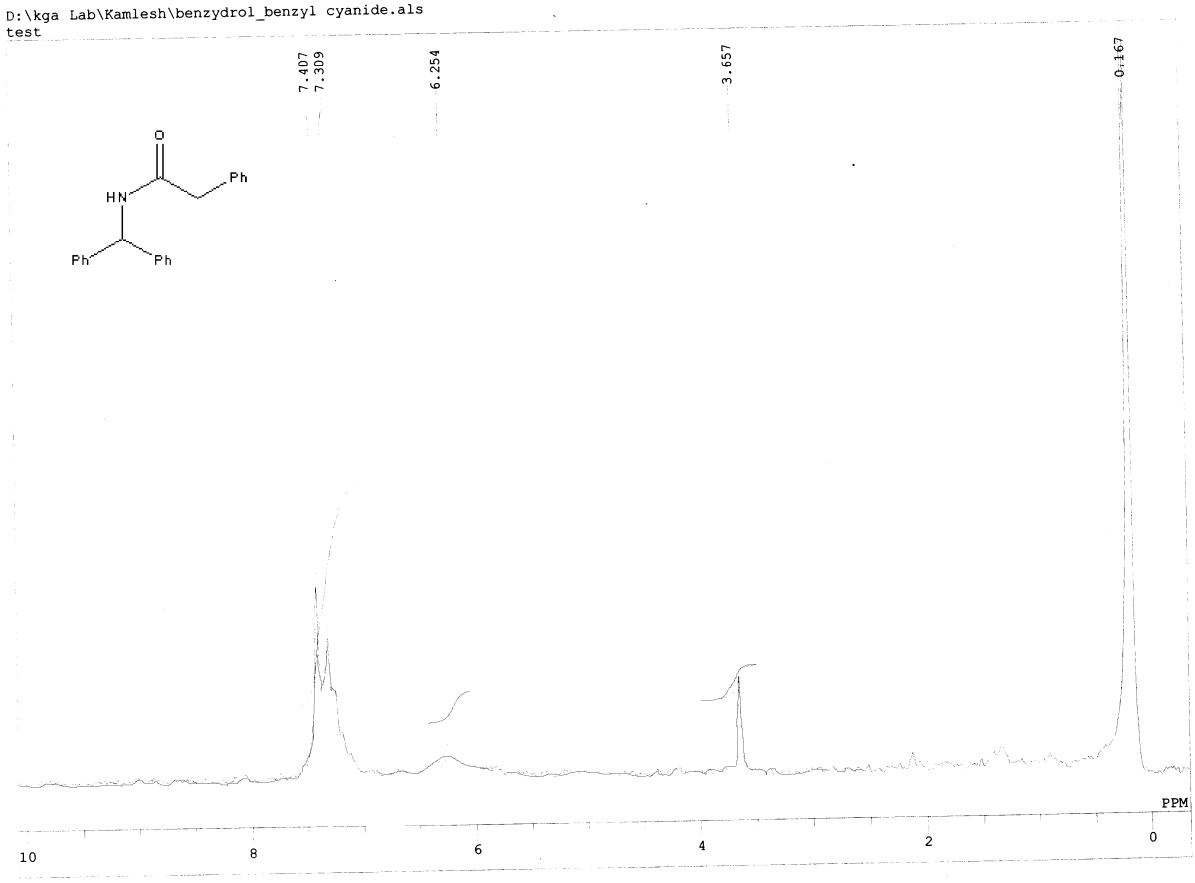
Entry 13) *N*-benzhydrylacetamide



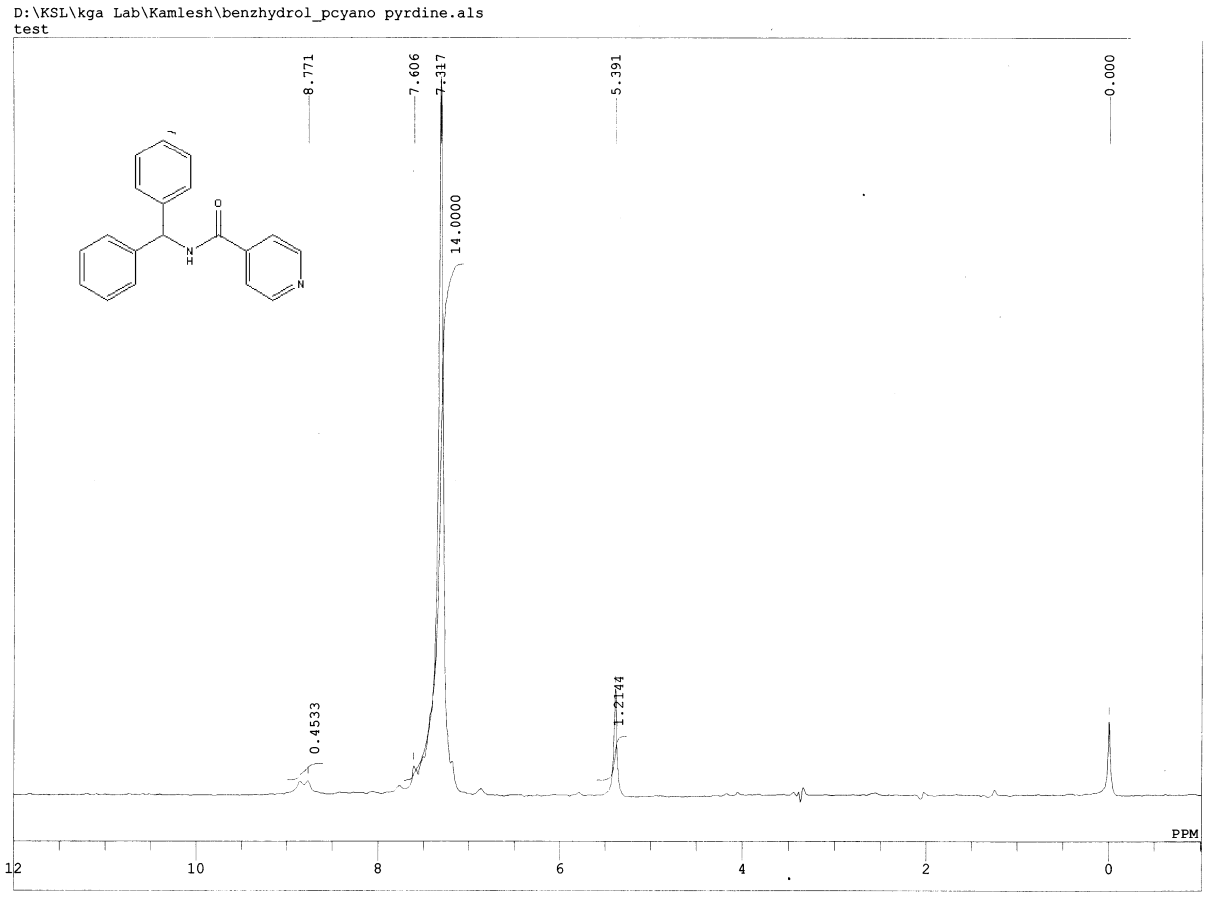
Entry 14) *N*-benzhydrylbenzamide



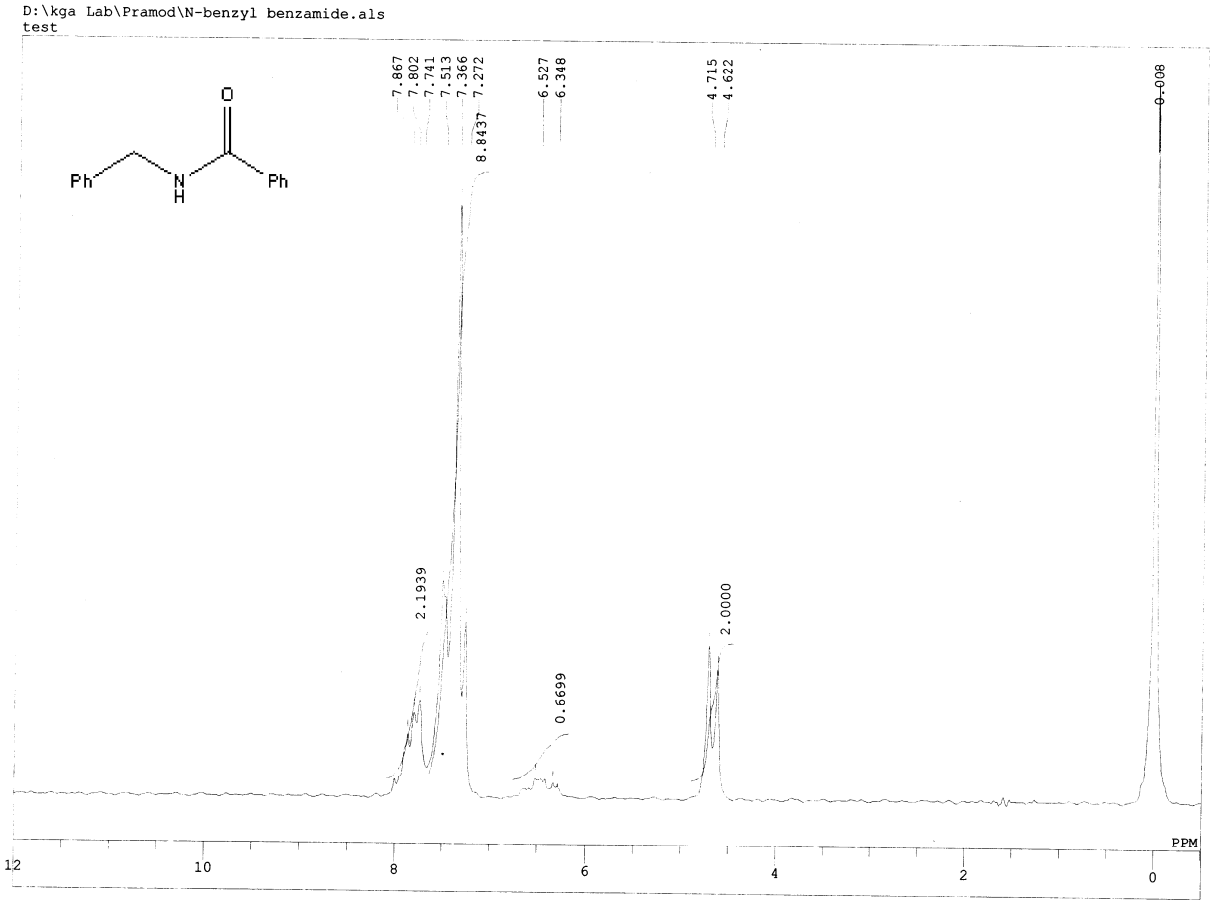
Entry 15) *N*–benzhydryl-2-phenylacetamide



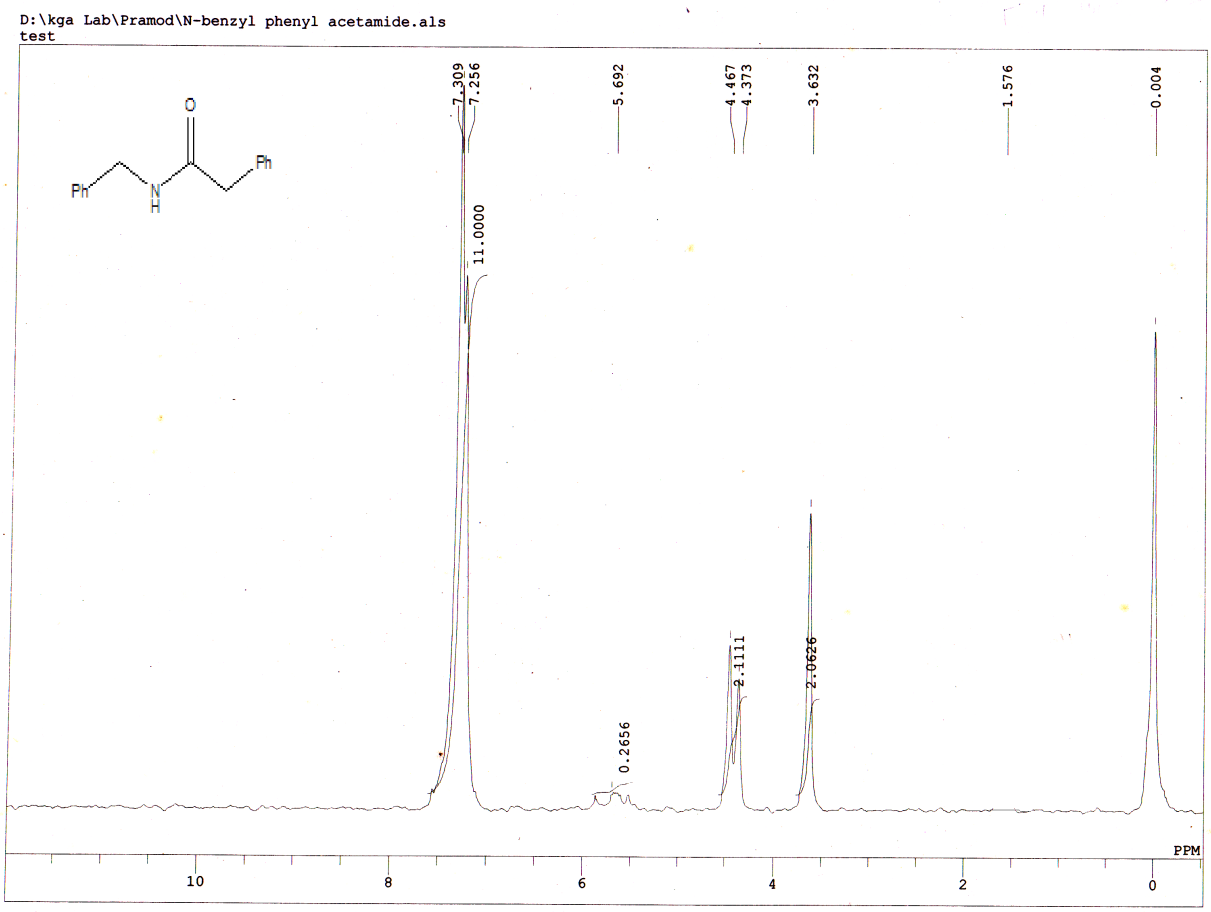
Entry 16) *N*-benzhydrylisonicotinamide



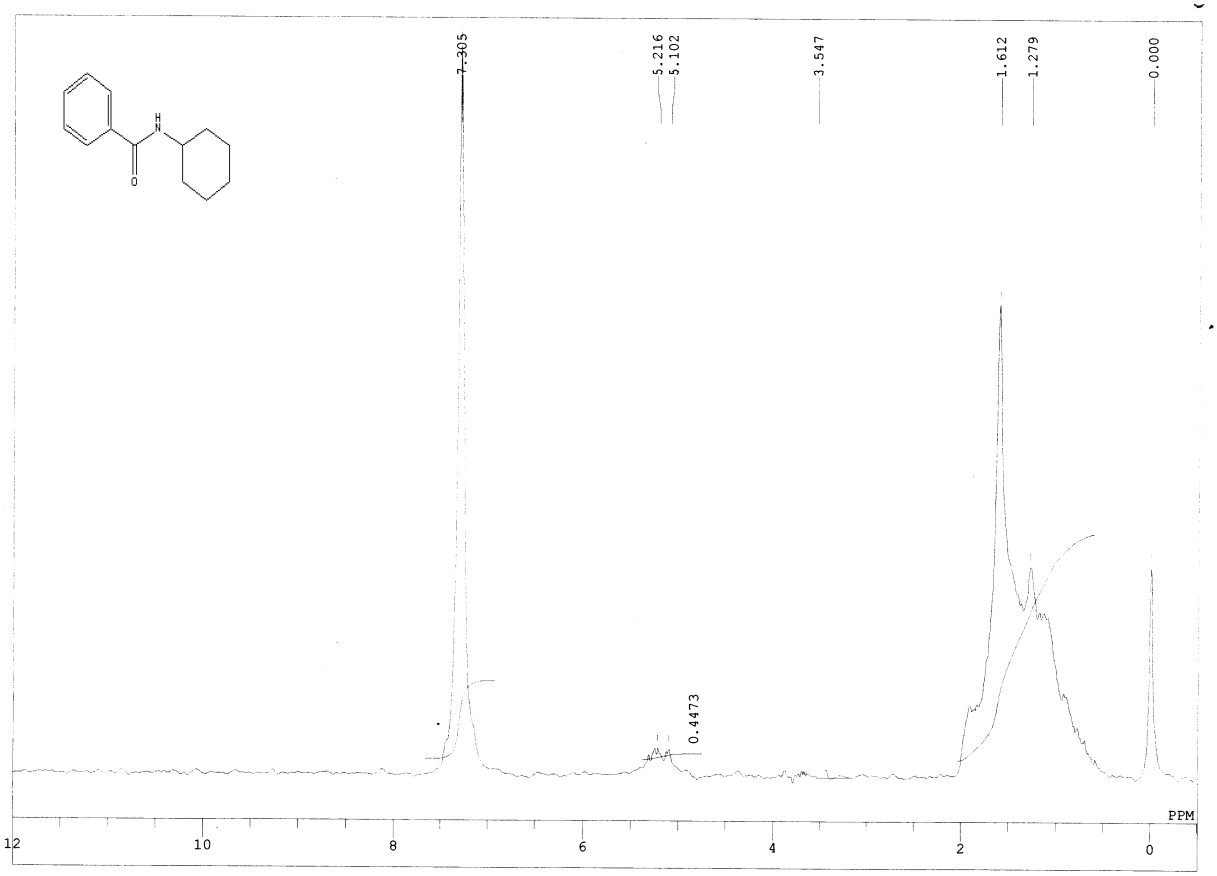
Entry 17) *N*-Benzylbenzamide



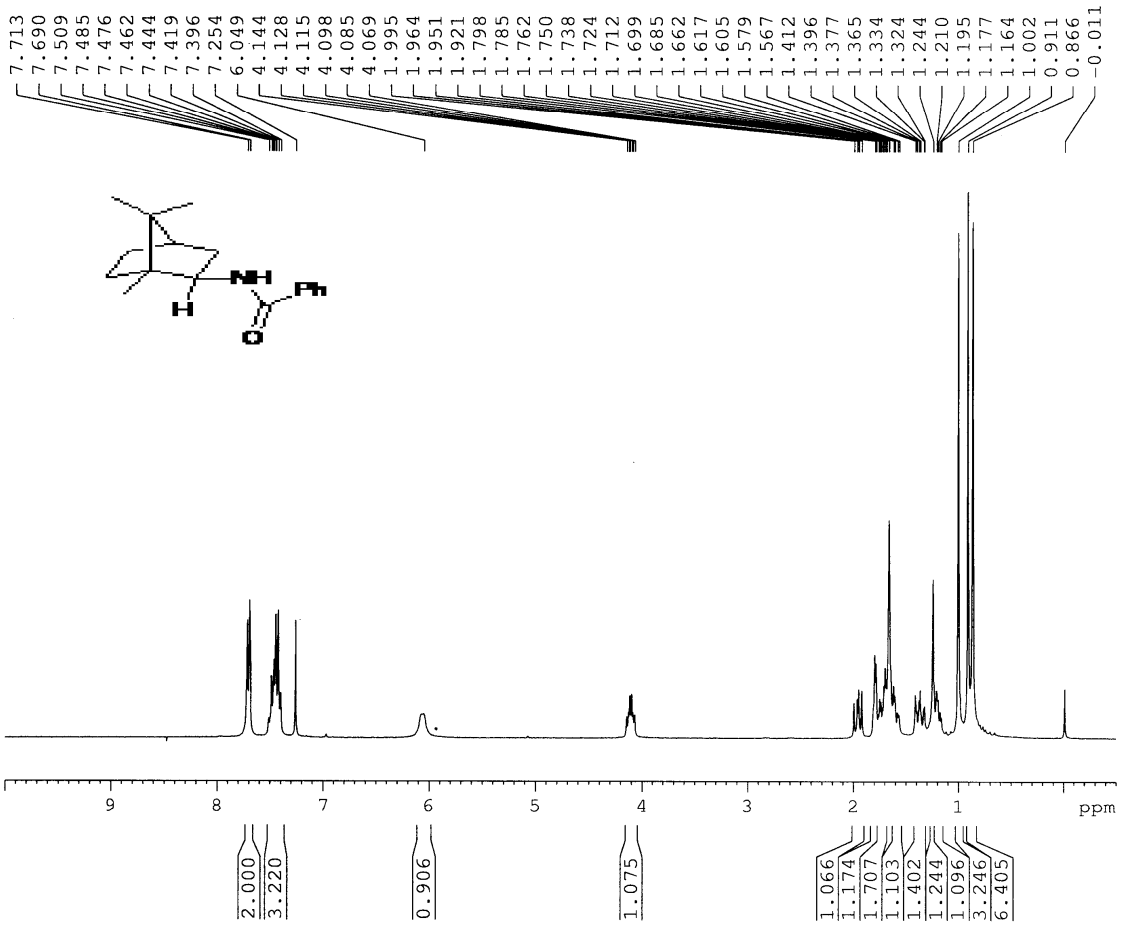
Entry 18) *N*-Benzyl-2-phenylacetamide



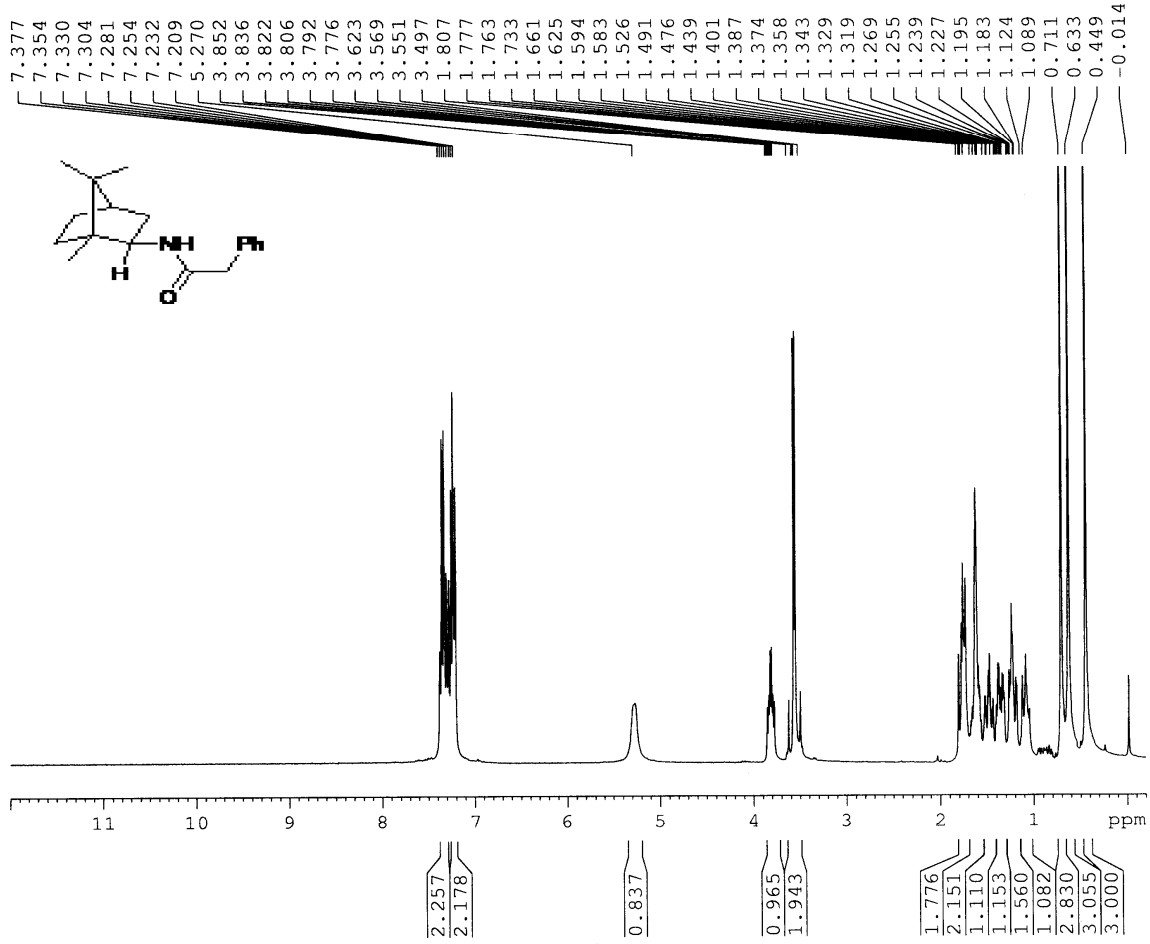
Entry 19) *N*-cyclohexylbenzamide



Entry 20) (±) *exo*- *N*- bornylbenzamide



Entry 21) (±) *exo*- *N*- bornyl- 2-phenylacetamide



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