Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Supporting Information

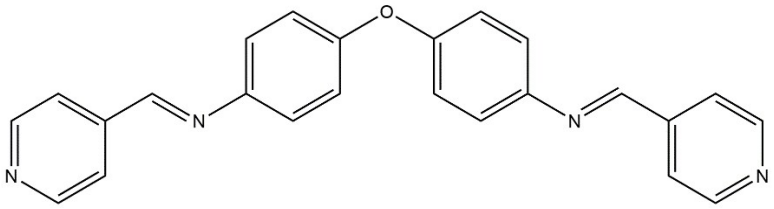
Highly Effective Brønsted Base/Lewis Acid Cooperative Catalysis: A new Cd metal-organic framework for synthesis of Hantzsch 1, 4-DHPs at ambient temperature

Farzaneh Rouhani and Ali Morsali*

Department of Chemistry, Faculty of Sciences, Tarbiat Modares University, P.O. Box 14115-175, Tehran, Iran

*To whom correspondence should be addressed, E-mail: morsali_a@modares.ac.ir

Supporting Information



Scheme. S.1. N,N'-(oxybis(4,1-phenylene))bis(1-(pyridin-4-yl)methanimine), OPP ligand.

Table S.1. Crystal data and structure refinements for compound TMU-33.

Identification code	TMU-33
Chemical formula	$C_{54}H_{44}Cd_3N_6O_{15}$,2($C_2H_7N$)
Formula weight	1444.32
T(K)	298
Crystal syst	Monoclinic
Space group	C_2/c
a (Å)	32.476(8)
b (Å)	11.761(2)
c (Å)	16.740(3)
β (deg)	112.62(3)
V (Å^3)	5902(2)
Z	4
F(000)	2904
Θ range (°)	2.43-25.00
Goodness-of-fit on F^2	0.894
R_1[a] [I>2σ(I)]	0.1660
wR_2[b]	0.1591
CCDC number	1522499

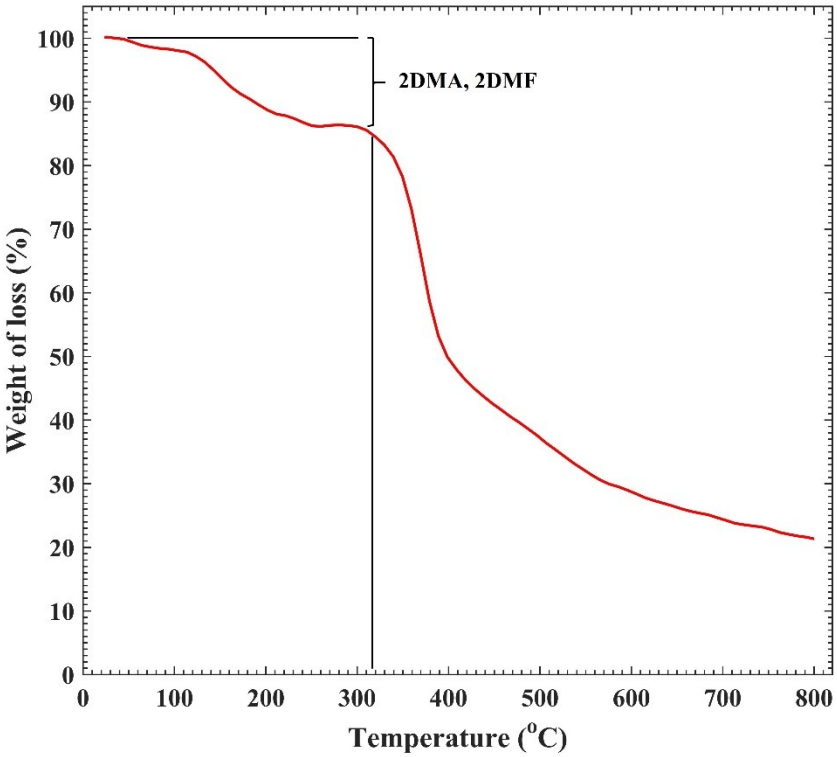
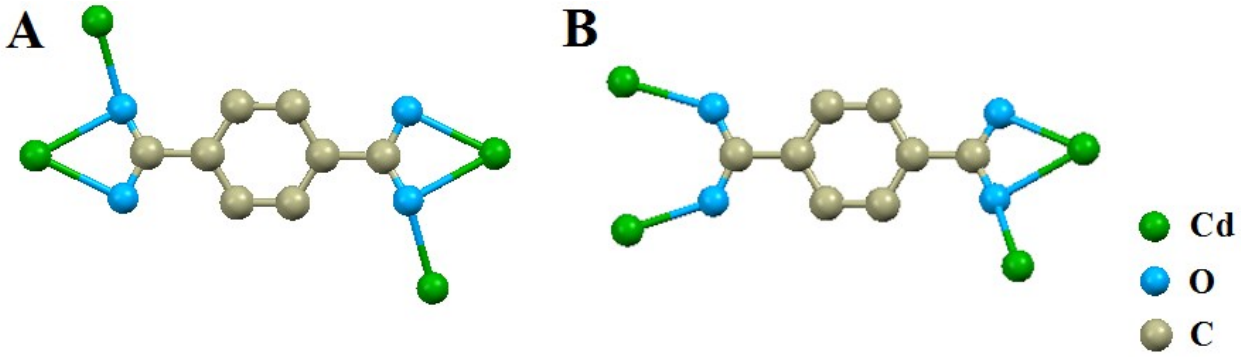


Fig. S.1. TGA curves of TMU-33.



Scheme S.2. Two different coordination mode of terephthalic acid at TMU-33.

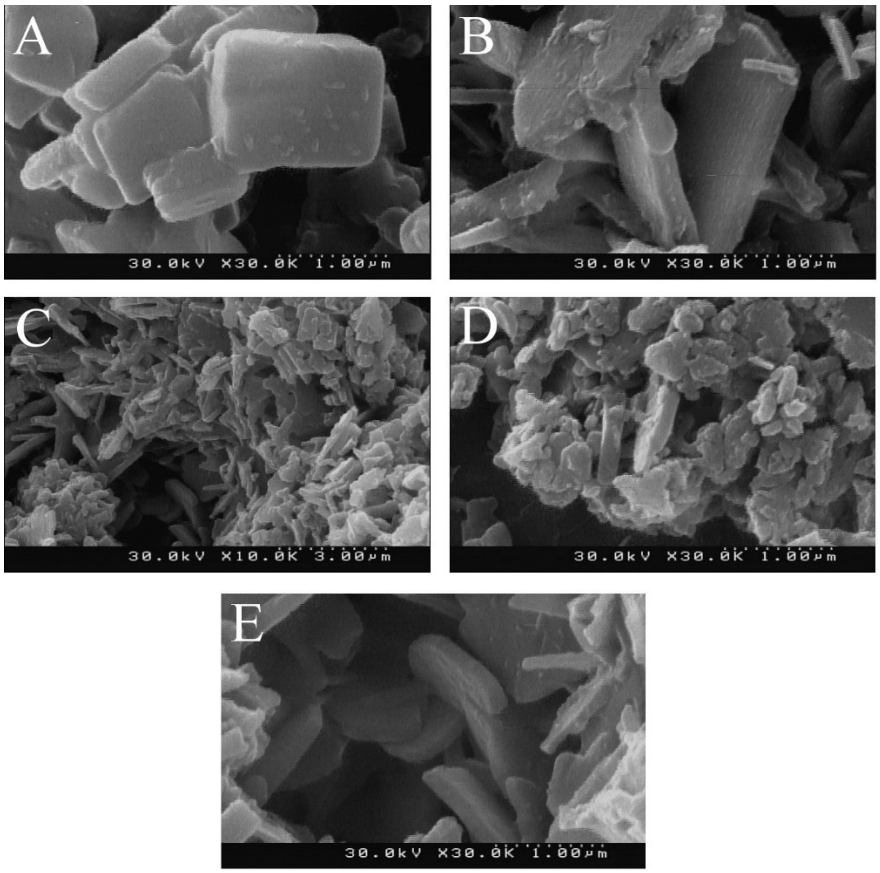


Fig. S.2. SEM images of (A) constant concentration of [0.05] M, 20 min for sonication time and 12 W as sonication power (B) [0.01] M, 20 min, 12 W and (C) [0.005] M, 20 min, 12 W (D)) [0.01] M,40 min, 12 W (E) [0.01] M, 20 min, 24 W

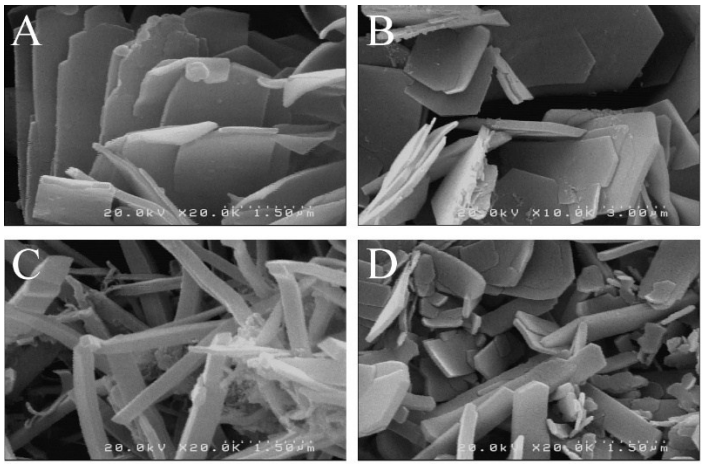


Fig. S.3. (A) SEM pictures of plate by r=2, (B) plate by r=5, (C) rod by r=2, (D) rod by r=5.

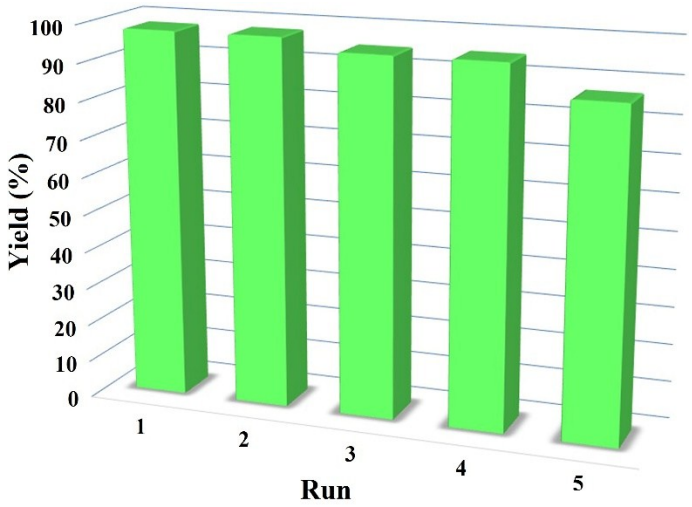
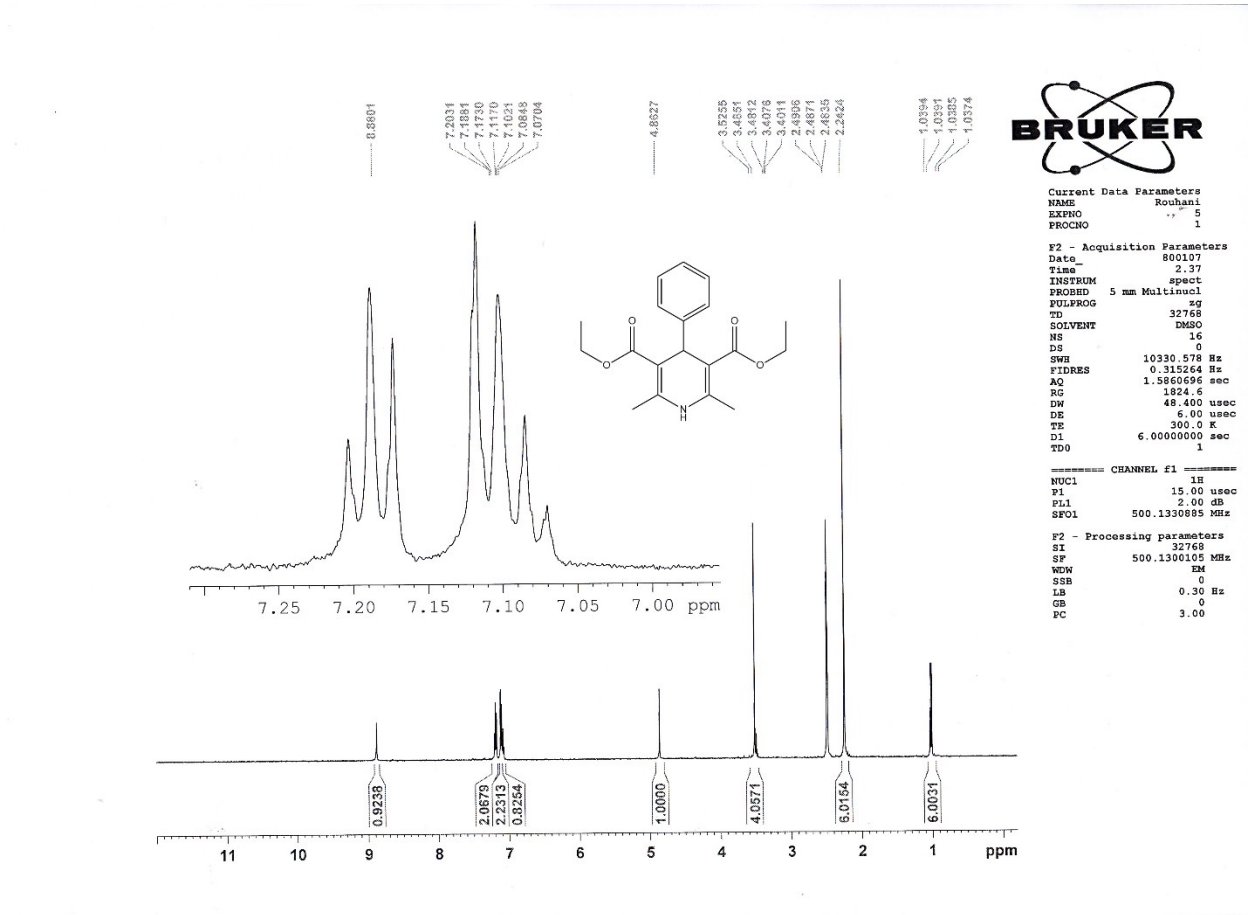


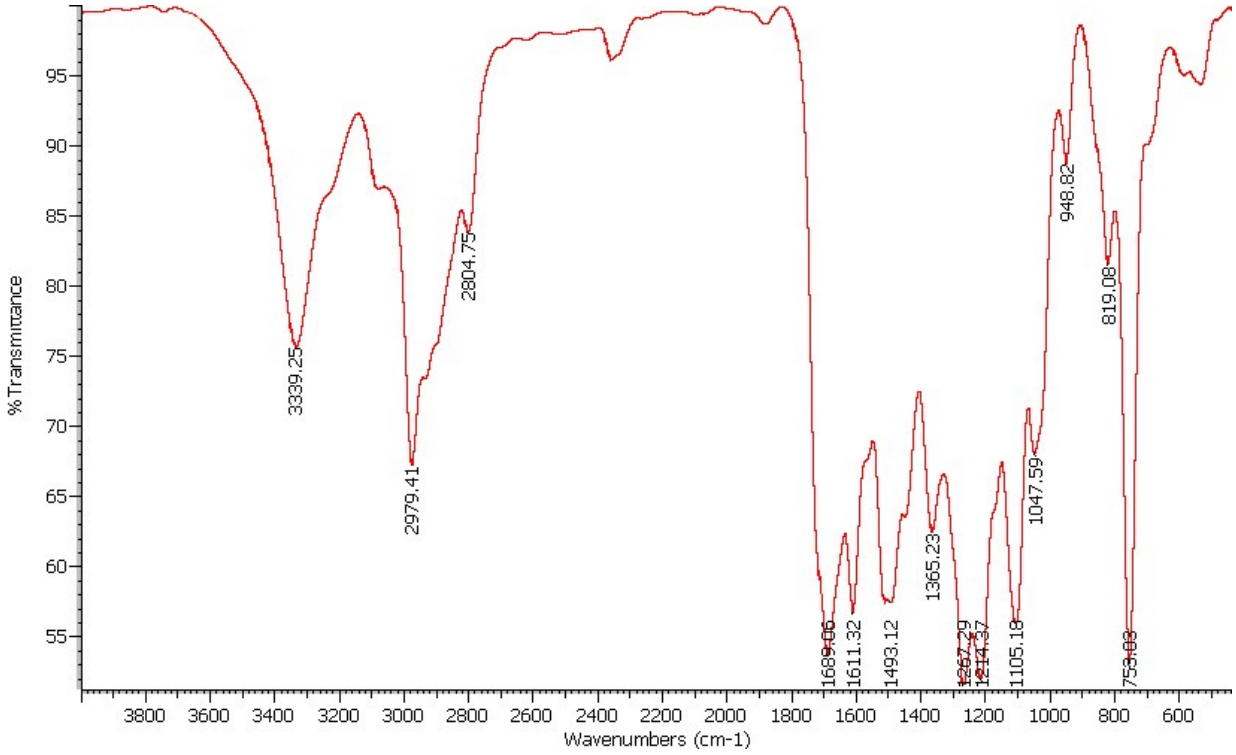
Fig. S.4. Recyclability of TMU-33 (C) in the reaction.

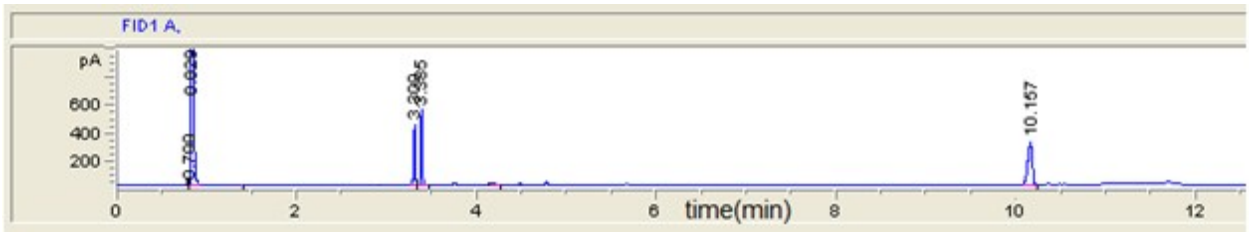
Supporting Information

^{1}H NMR, IR, Mp data and GC spectrum for some of synthesis products:

Diethyl 4-(Phenyl)-2,6-dimethyl-1,4-dihydropyridine-3,5-dicarboxylate



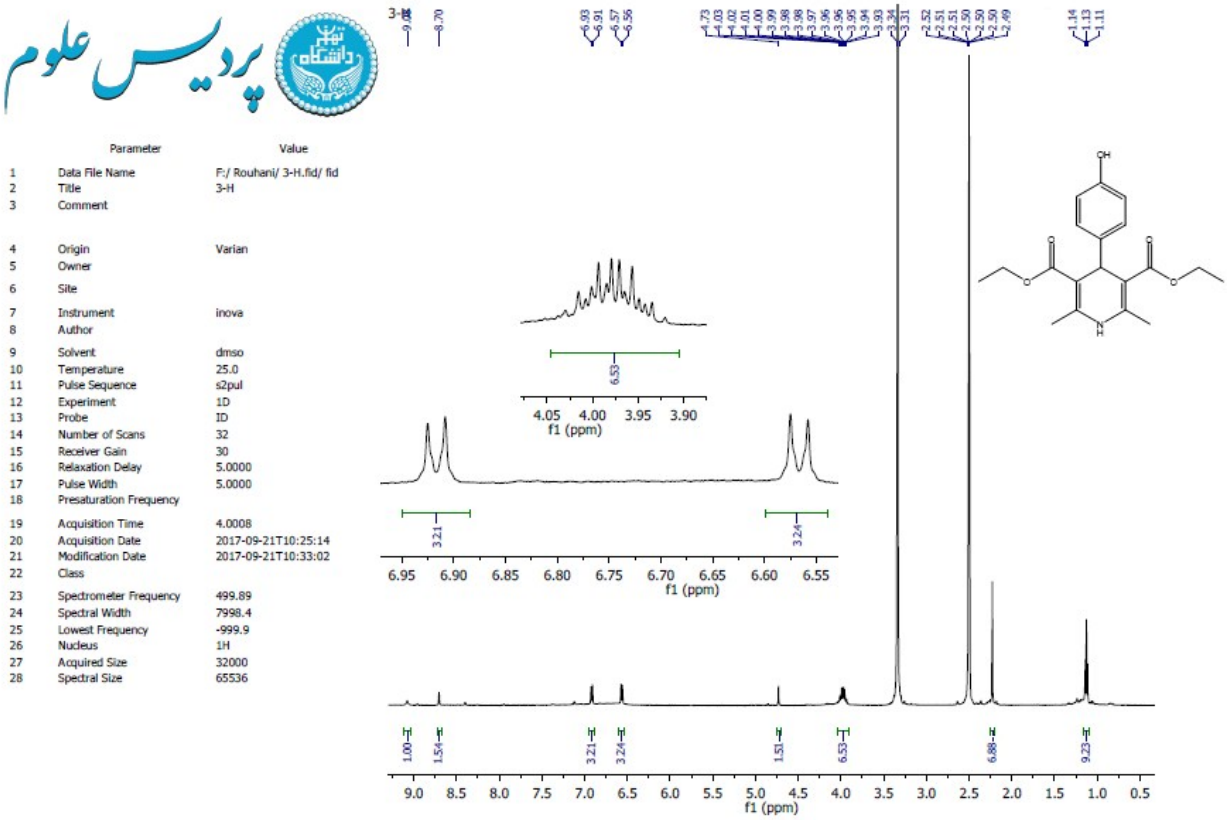




Mp 200-203 °C; ^{1}H NMR (500 MHz, DMSO): δ 8.88 (s, 1H, -NH), 7.07-7.20 (m, 5H, Ar-H), 4.86 (s, 1H, C-4H), 3.40-3.52 (q, 4H, 2x -OCH2CH3), 2.24 (s, 6H, 2x -CH3), 1.037-1.039 (t, 6H, 2x -CH2CH3), ,. IR (KBr): υ_{max} 3339, 2979, 1689, 16511, 1493, 1214, 1105, 759 cm^{-1}.

Supporting Information

Diethyl 4-(4-Hydroxyphenyl)-2,6-dimethyl-1,4-dihydropyridine-3,5-dicarboxylate



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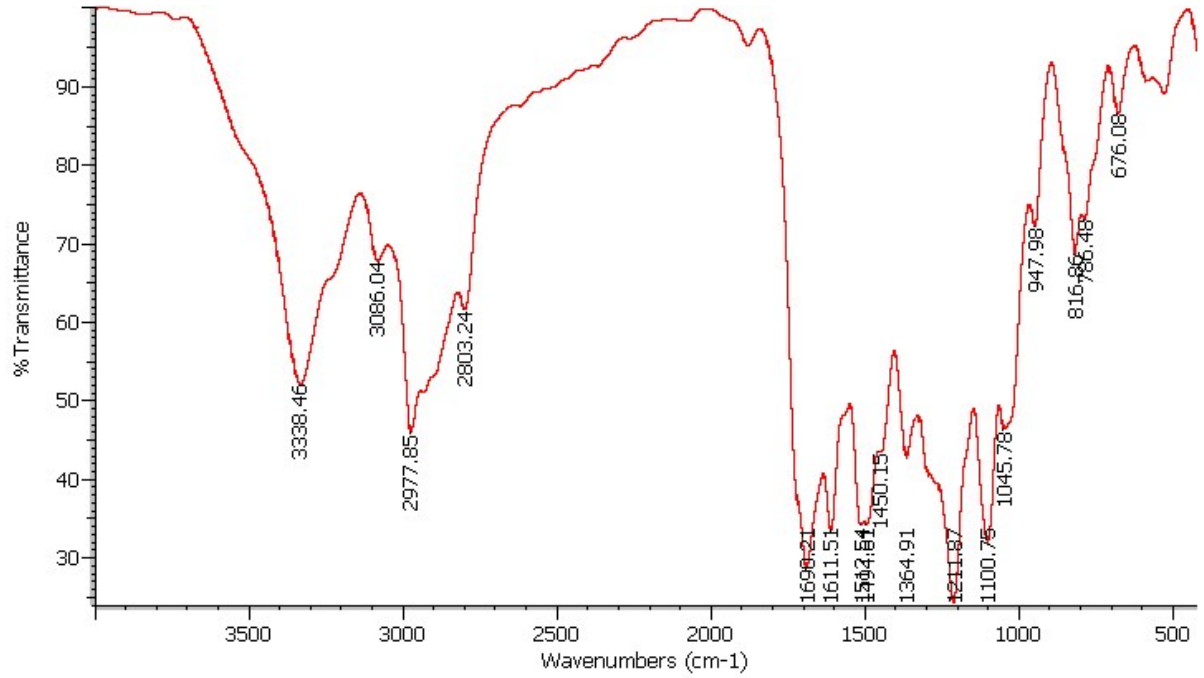
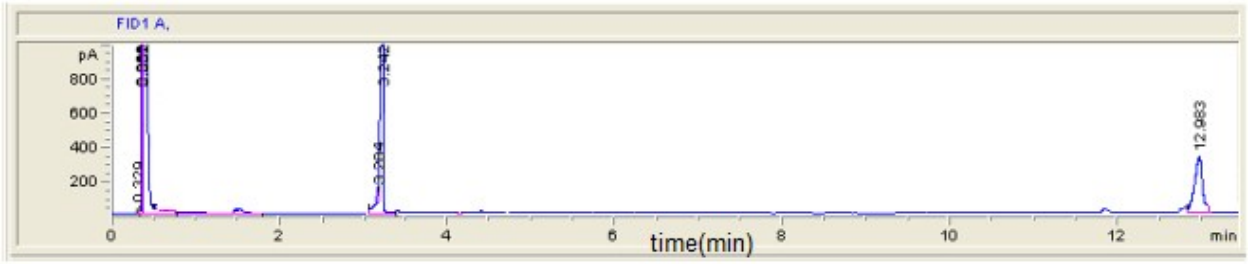
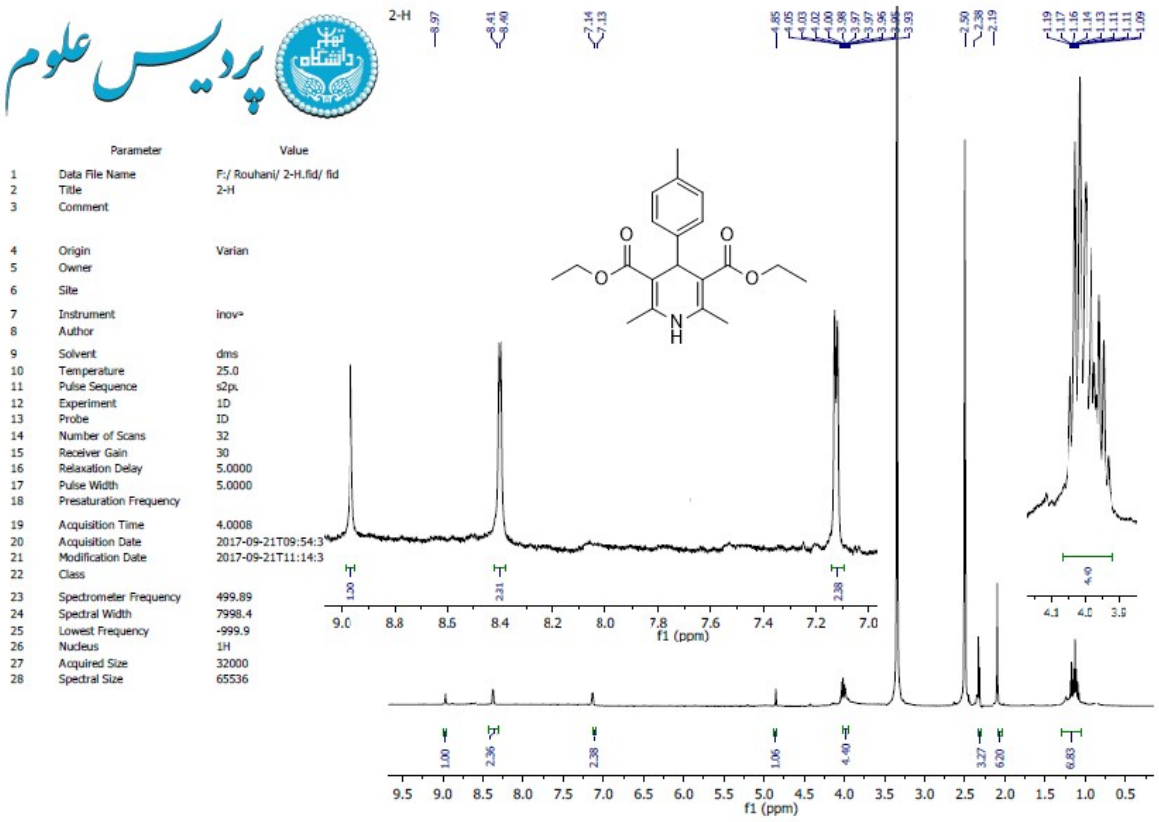
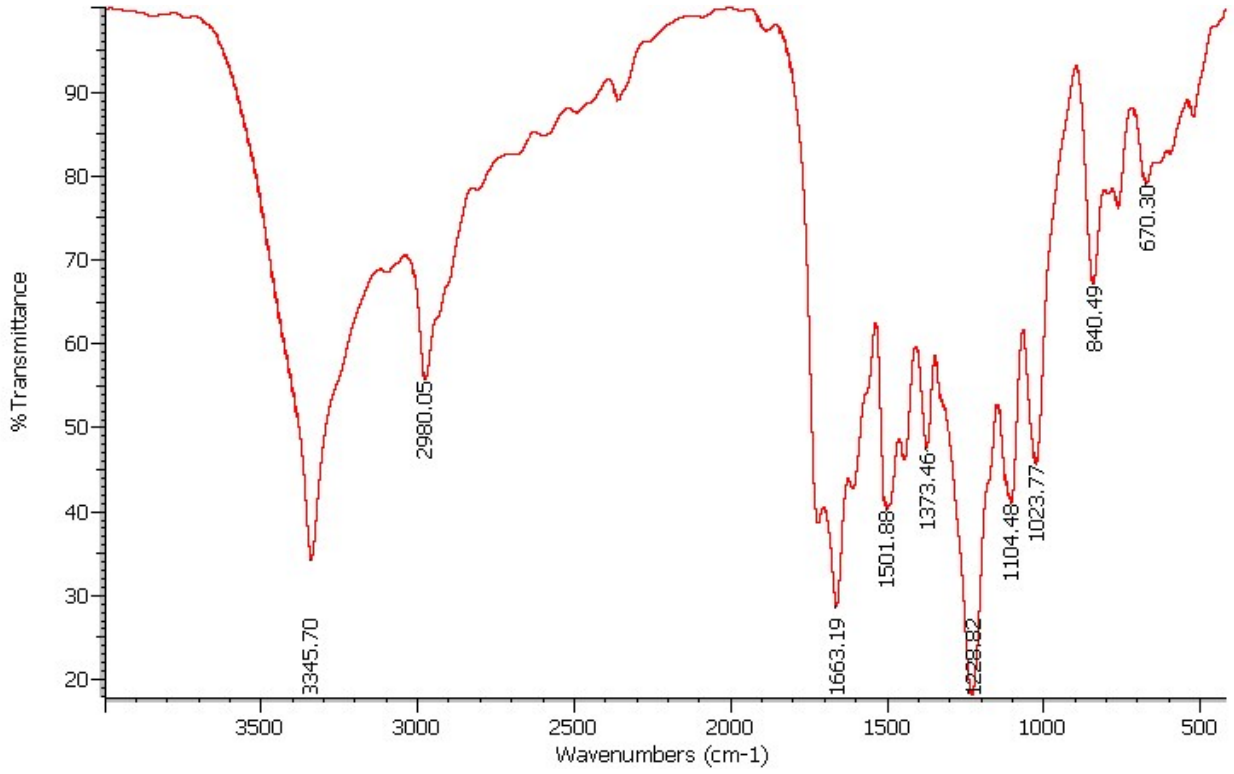


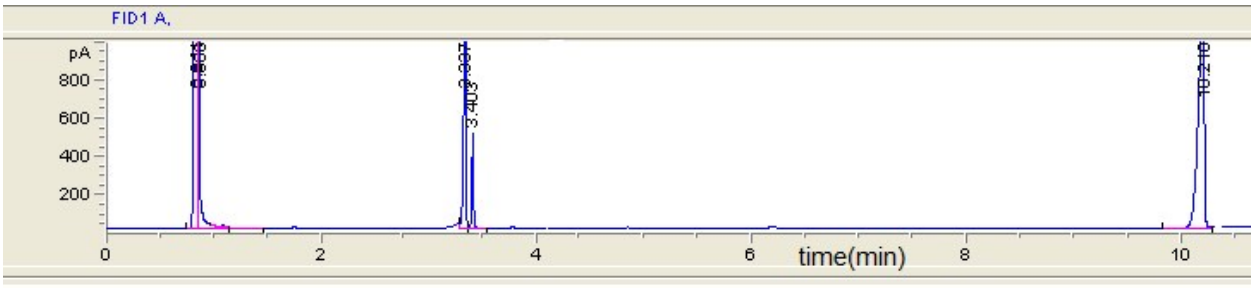


Mp 220-223 °C. ^{1}H NMR (500 MHz, DMSO): δ = 1.11-1.14 (t, 6 H, -CH_2CH_3), 2.49 (s, 6 H, -CH_3), 3.93-4.03 (q, 4 H, -OCH_2CH_3),4.73(s, 1H), 6.53-6.93 (m, 4 H, Ar-H), 8.7 (s, 1 H, -NH), 9 (s, 1 H, -OH),. FT-IR (KBr) υ $_{max}$: 3338, 2977, 1690, 1611, 1512, 1211, 1100, 676 cm^{-1}.

Diethyl-4-(4-methylphenyl)-2,6-dimethyl-1,4-dihydropyridin-3,5-dicarboxylate



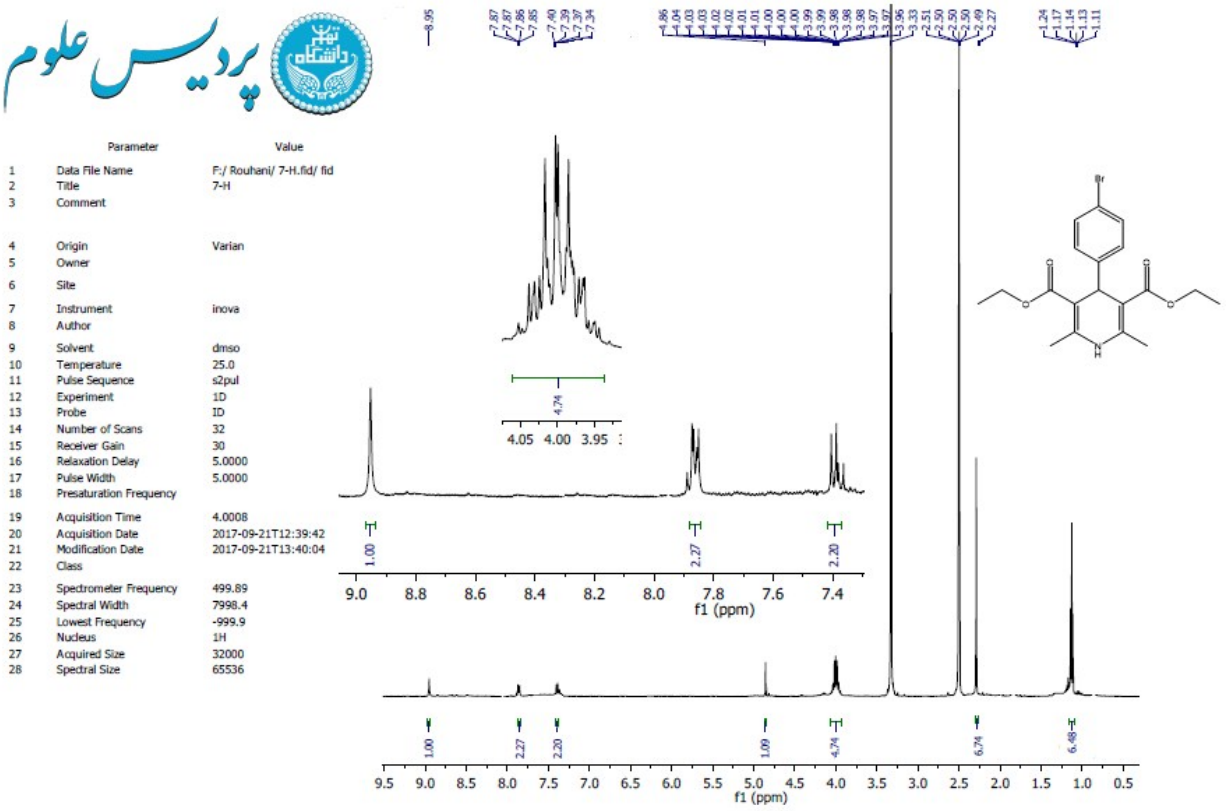




Mp 200-202 °C. ^{1}H NMR (500 MHz, DMSO): δ 1.09-1.19 (t, 6H, -CH_2CH_3), 2.19 (s, 3H, -CH_3), 2.25 (s, 6H, -CH_3), 3.78 (s, 3H, -OCH_3), 3.95-4.05 (q, 4H, -OCH_2CH_3), 4.8 (s, 1H, C-4H), 7.13-7.14 (d, 2H, Ar-H), 8.40-8.41 (d, 2H, Ar-H), 8.97(s, 1H, NH) ppm. ; IR (KBr): υ_{max} 3345, 2980, 1689, 1663, 1501, 1228, 1104, 720 cm^{-1}.

Supporting Information

Diethyl 4-(4-Bromophenyl)-2,6-dimethyl-1,4-dihydropyridine-3,5-dicarboxylate



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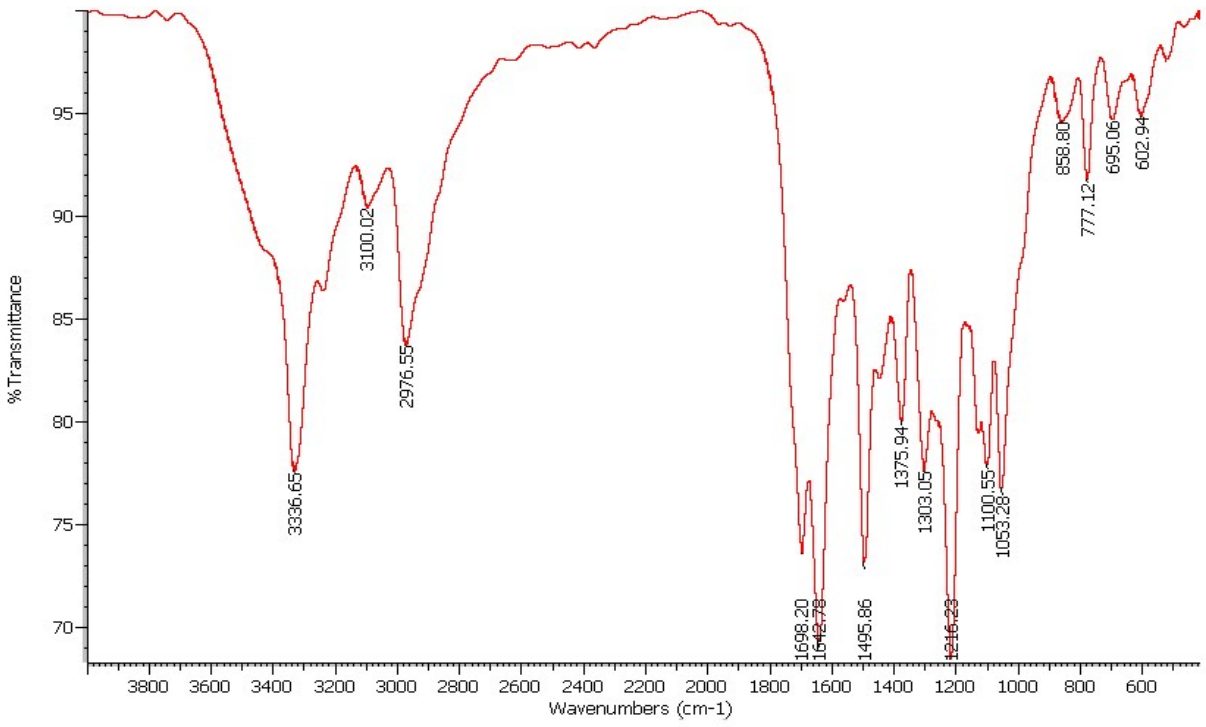
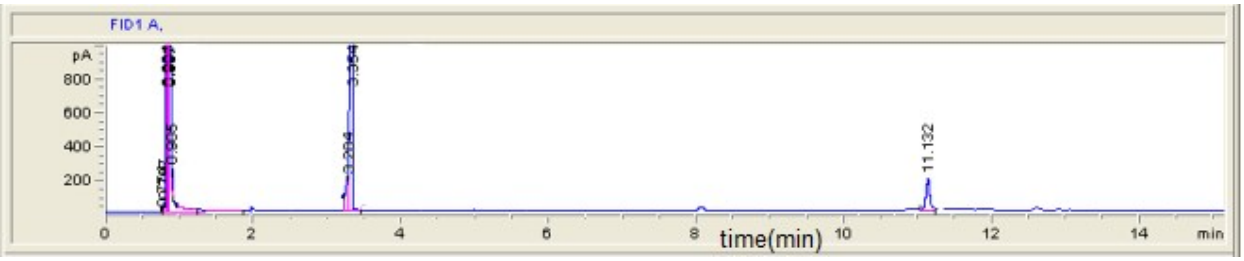
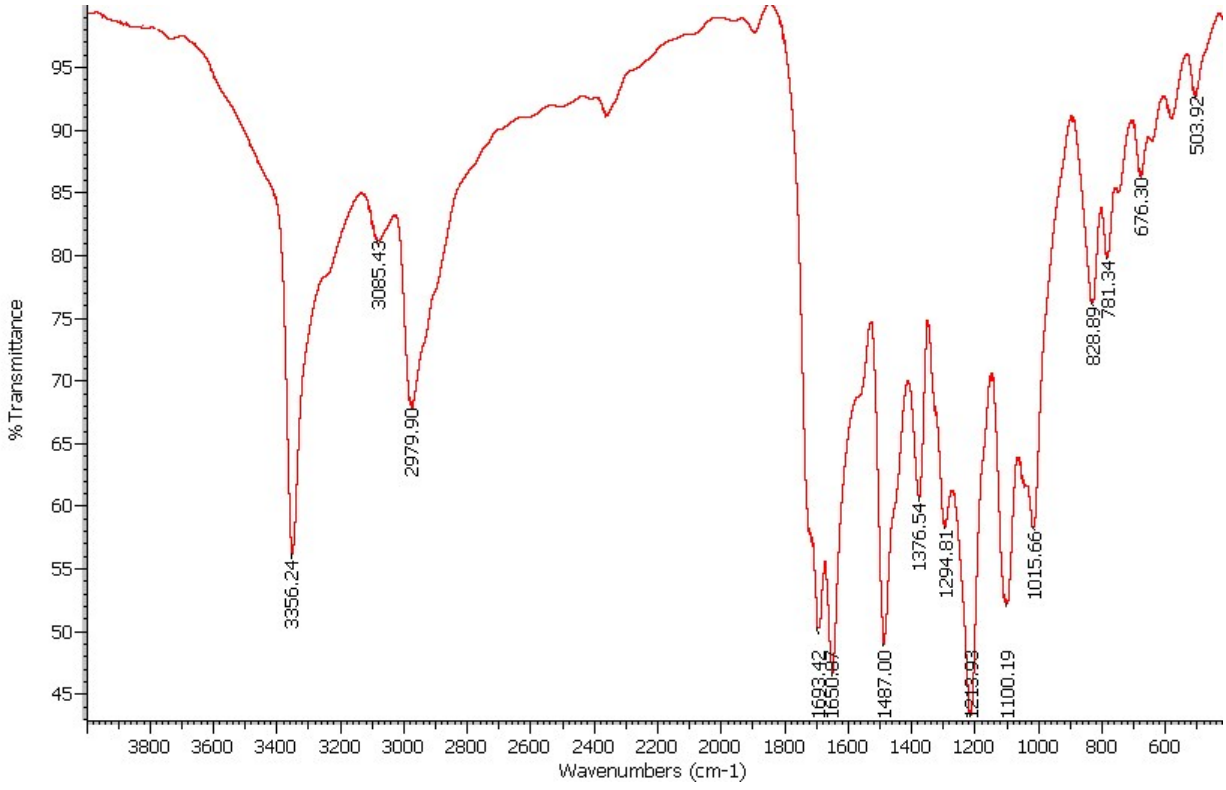


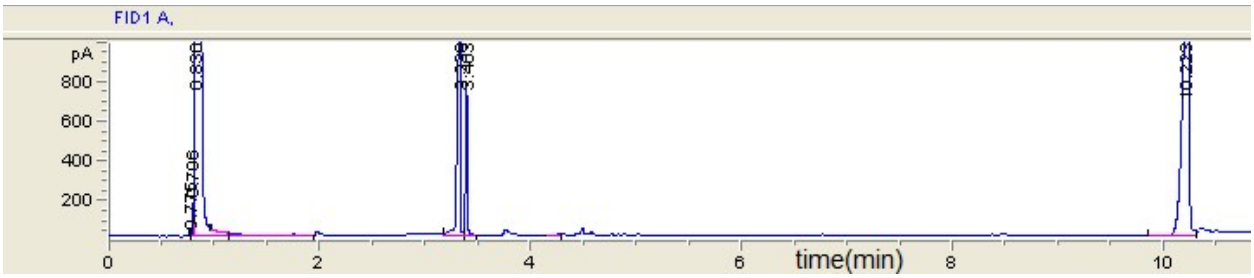


Mp 200-202 °C. ^{1}H NMR (500 MHz, DMSO): δ 8.95 (s,1H,NH), 7.26–7.24 (m, 2H), 7.11–7.08 (m, 2H), 5.56 (s, 1H), 4.87 (s, 1H), 4.03 (m, 4H), 2.29 (s, 6H), 1.15 (t, J = 7.1 Hz, 6H) ppm; IR (KBr): υ_{max} 3336, 3100, 2976, 1698, 1642, 1495, 1216, 1100,777 cm^{-1}.

Diethyl 4-(4-Chlorophenyl)-2,6-dimethyl-1,4-dihydropyridine-3,5-dicarboxylate

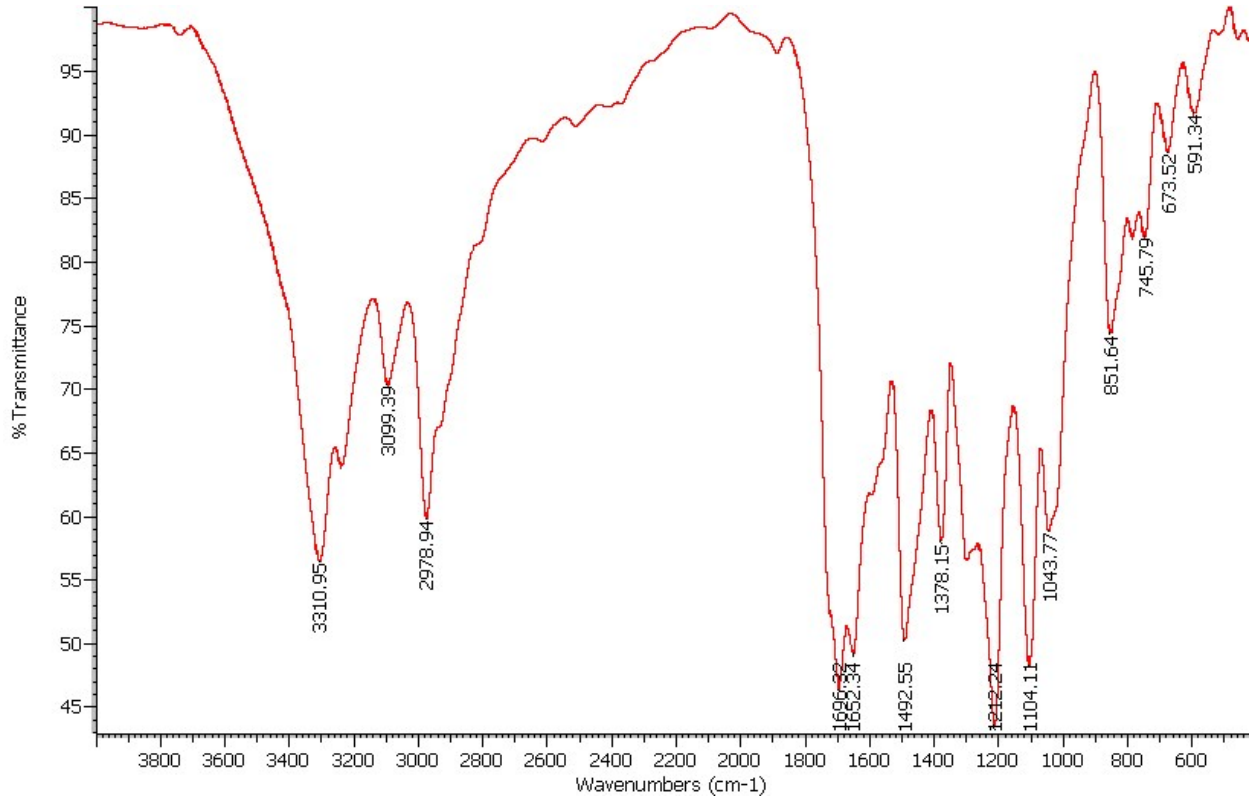
Mp 209-211 °C.; IR (KBr): υ_{max} 3356, 3085, 2979, 1693, 1650, 1376, 1213, 1100, 781 cm^{-1}.

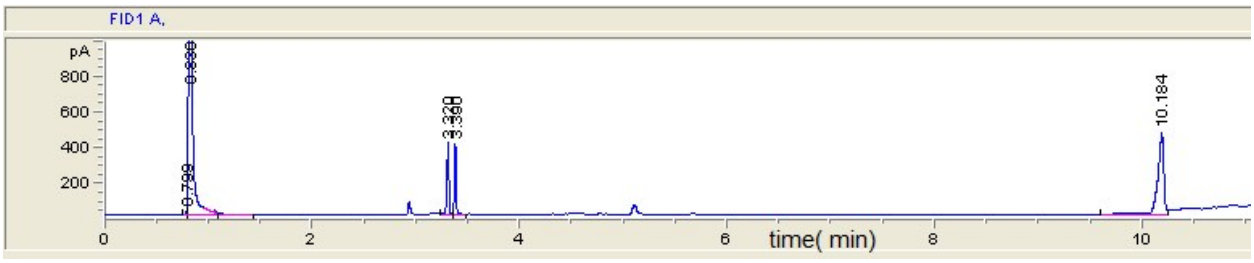




Diethyl 4-(4-Nitrophenyl)-2,6-dimethyl-1,4-dihydropyridine-3,5-dicarboxylate

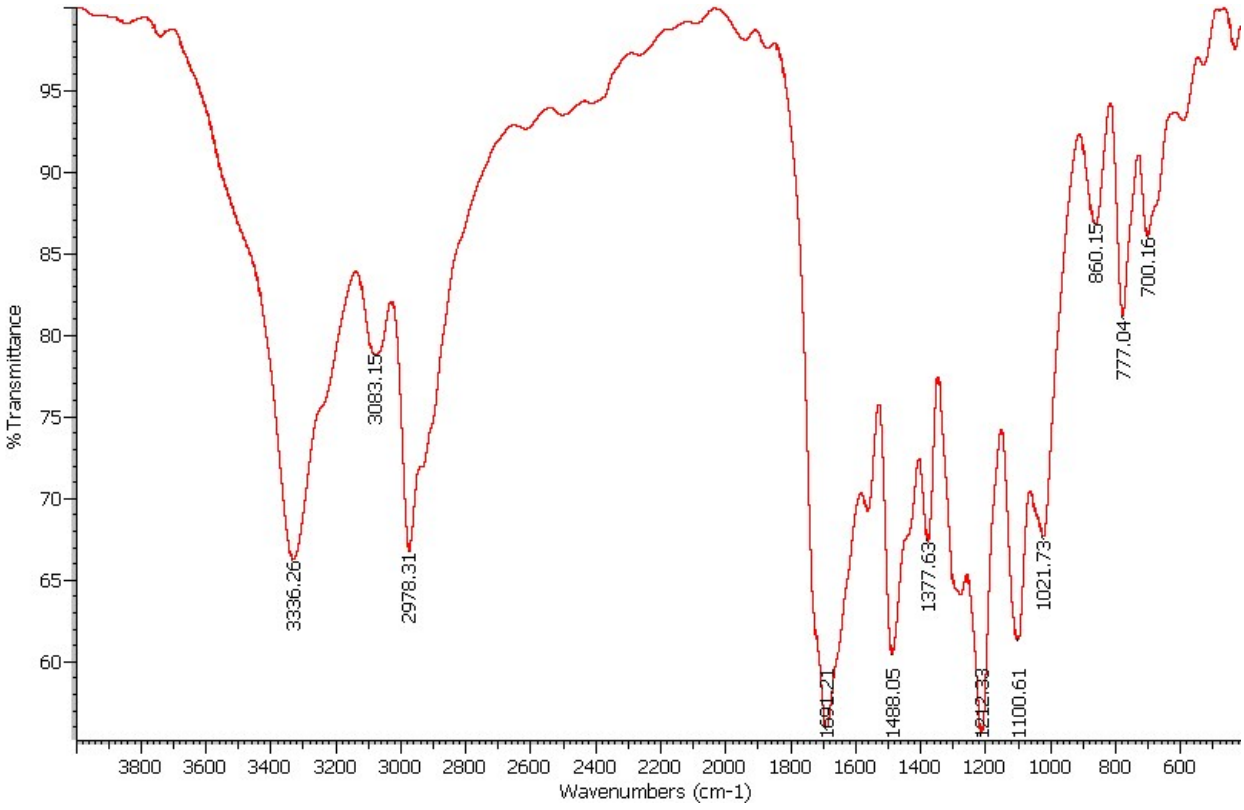
Mp 208-211 °C; IR (KBr): υ_{max} 3310, 3099, 2978, 1696, 1652, 1492, 1212, 1104, 745 cm^{-1}.

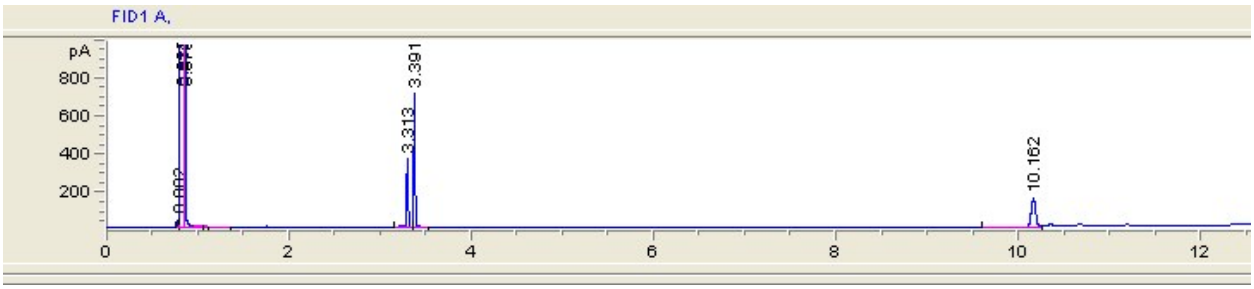




Diethyl 4-(4-Methoxyphenyl)-2,6-dimethyl-1,4-dihydropyridine-3,5-dicarboxylate

Mp 200-202 °C; IR (KBr):υ $_{max}$ 3336, 3083, 2978, 1691, 1630, 1488, 1212, 1100,777 cm^{-1}.

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