Supporting Information

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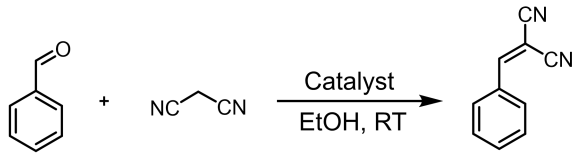
Table S1. Knoevenagel condensation reaction between benzaldehyde and malononitrile using mixing catalyst.



Entry	Catalyst	Time (min)	Conversion (%)
1[a]	UiO-66-(alkyne)$_2$+Co(PPh$_3$)$_2$Cl$_2$	10	6.5
2[b]	UiO-66+Co(PPh$_3$)$_2$Cl$_2$	10	16.7

[a] The simple mixing of nearly equivalent UiO-66-(alkyne)$_2$ (7 mg) and Co(PPh$_3$)$_2$Cl$_2$ (3 mg) according to UiO-66-(alkyne-Co)$_2$.

[b] The simple mixing of nearly equivalent UiO-66-(alkyne)$_2$ (7 mg) and Co(PPh$_3$)$_2$Cl$_2$ (3 mg) according to UiO-66-(alkyne-Co)$_2$.

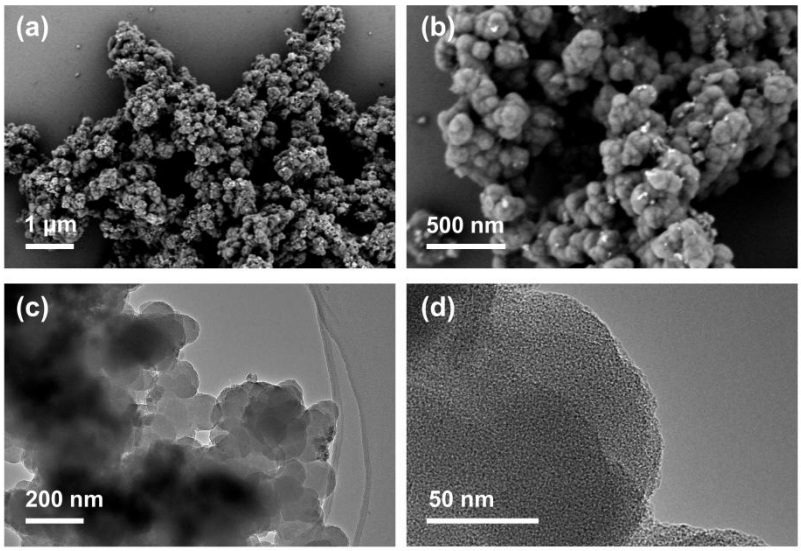


Fig. S1 SEM (a-b) and TEM (c-d) images of UiO-66-(alkyne-Co)$_2$-recycle.

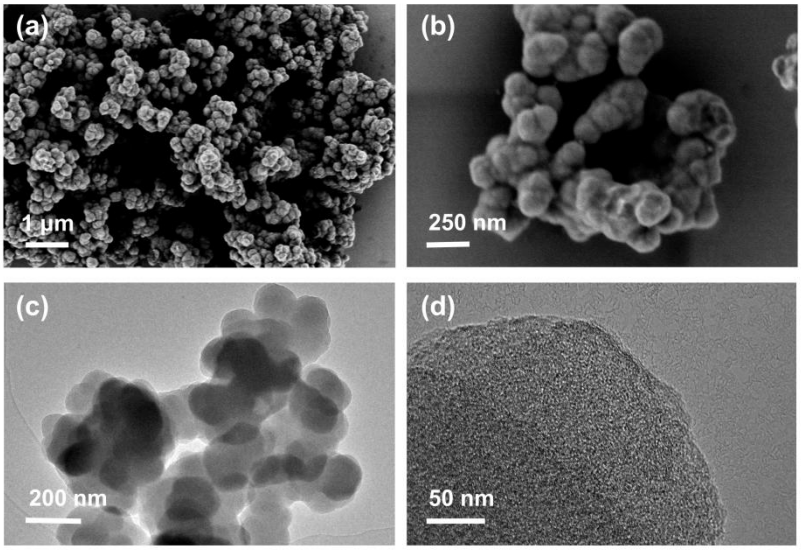


Fig. S2 SEM (a-b) and TEM (c-d) images of UiO-66.

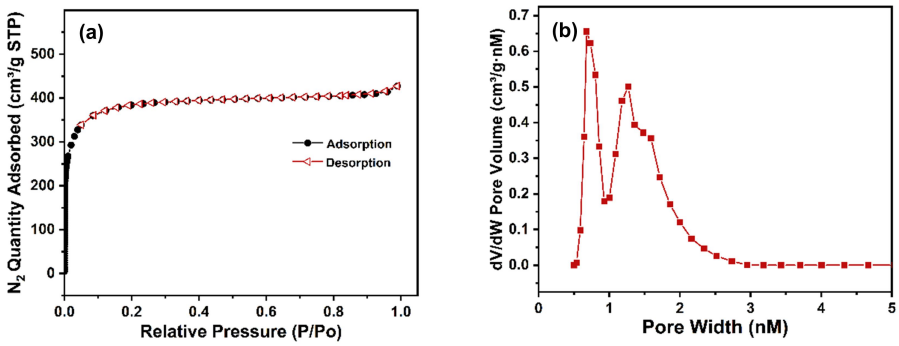
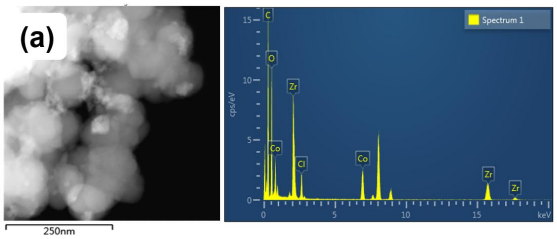
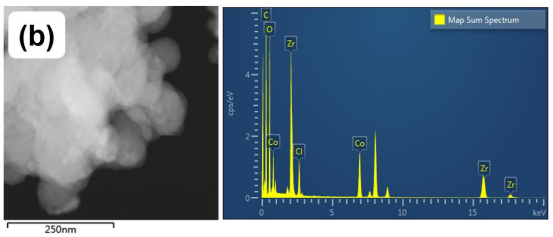


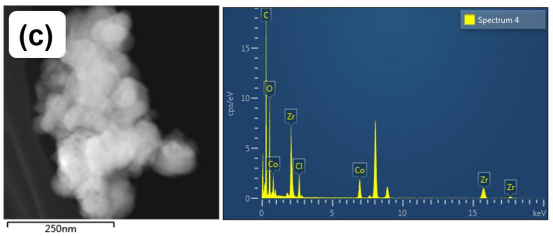
Fig. S3 Nitrogen adsorption measurements at 77 K for UiO-66.



Element	Line Type	k Factor	Absorption Correction	Wt%	Wt% Sigma	Atomic%
C	K series	1.726	1.00	51.93	0.47	71.63
O	K series	1.260	1.00	20.90	0.34	21.65
Cl	K series	0.641	1.00	4.13	0.12	1.93
Co	K series	0.762	1.00	6.10	0.15	1.72
Zr	K series	2.252	1.00	16.94	0.40	3.08
Total:				100.00		100.00

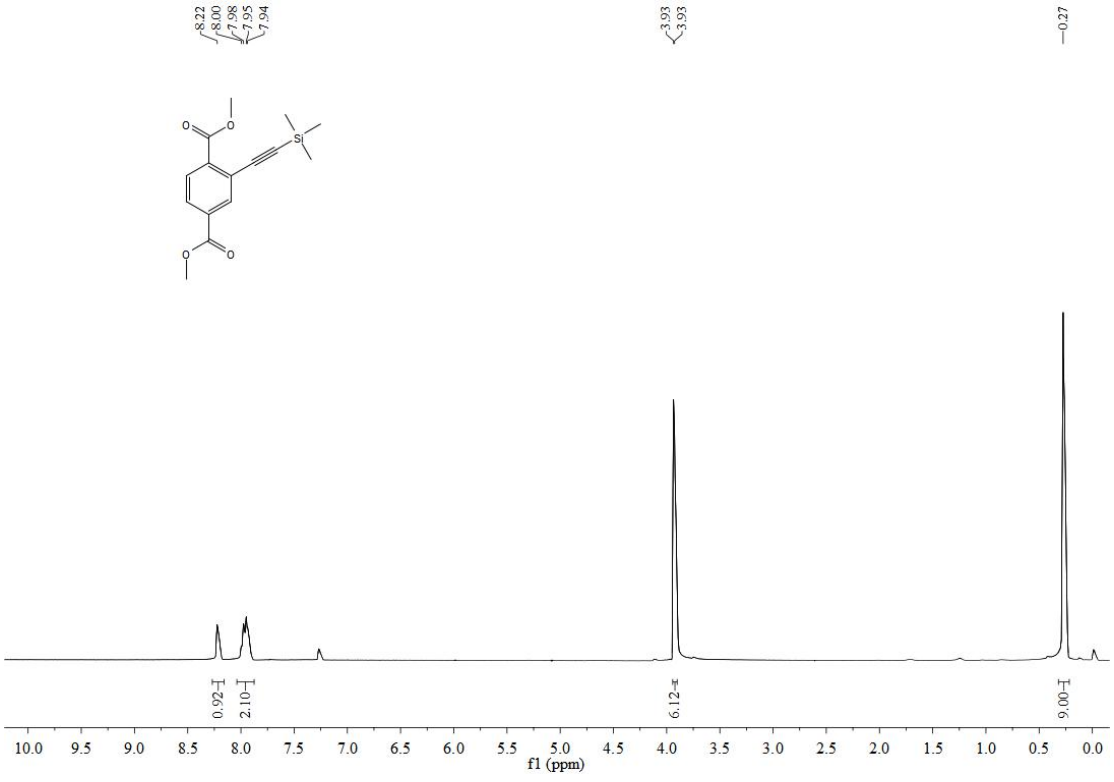


Element	Line Type	k Factor	Absorption Correction	Wt%	Wt% Sigma	Atomic%
C	K series	1.726	1.00	36.26	0.26	59.42
O	K series	1.260	1.00	23.81	0.20	29.29
Cl	K series	0.641	1.00	4.35	0.07	2.42
Co	K series	0.762	1.00	10.02	0.11	3.35
Zr	K series	2.252	1.00	25.56	0.26	5.52
Total:				100.00		100.00

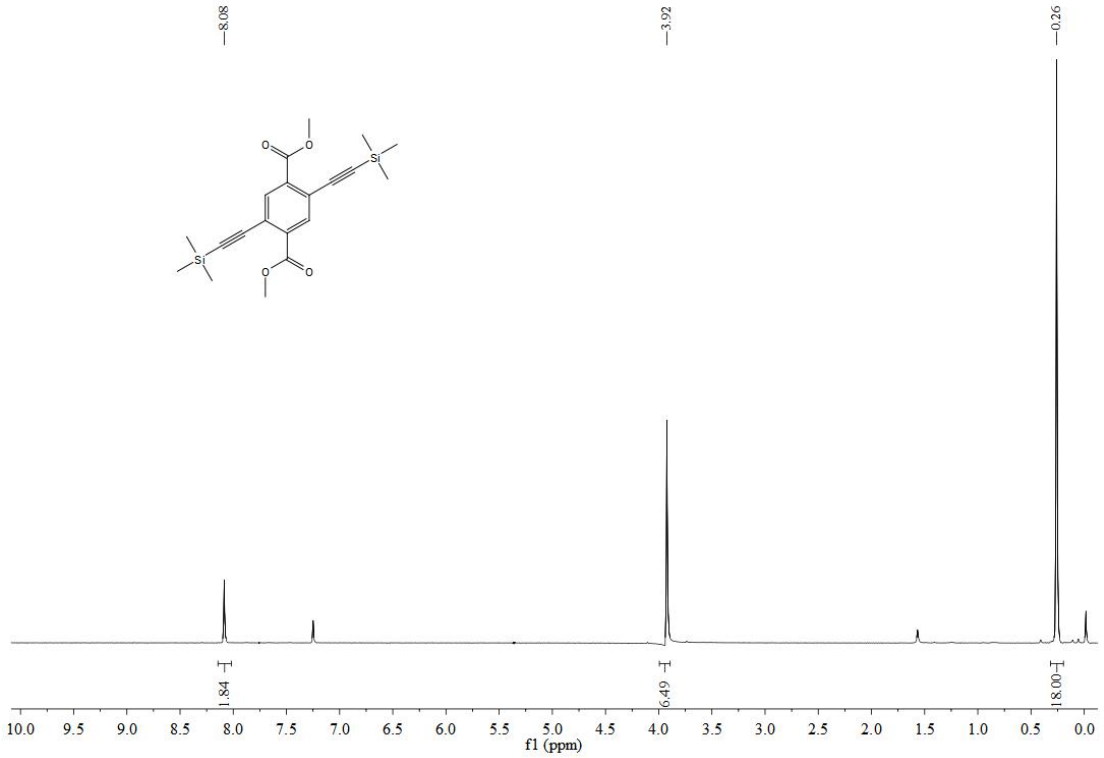


Element	Line Type	k Factor	Absorption Correction	Wt%	Wt% Sigma	Atomic%
C	K series	1.726	1.00	42.94	0.60	64.71
O	K series	1.260	1.00	23.44	0.45	26.52
Cl	K series	0.641	1.00	3.76	0.15	1.92
Co	K series	0.762	1.00	8.45	0.22	2.59
Zr	K series	2.252	1.00	21.42	0.56	4.25
Total:				100.00		100.00

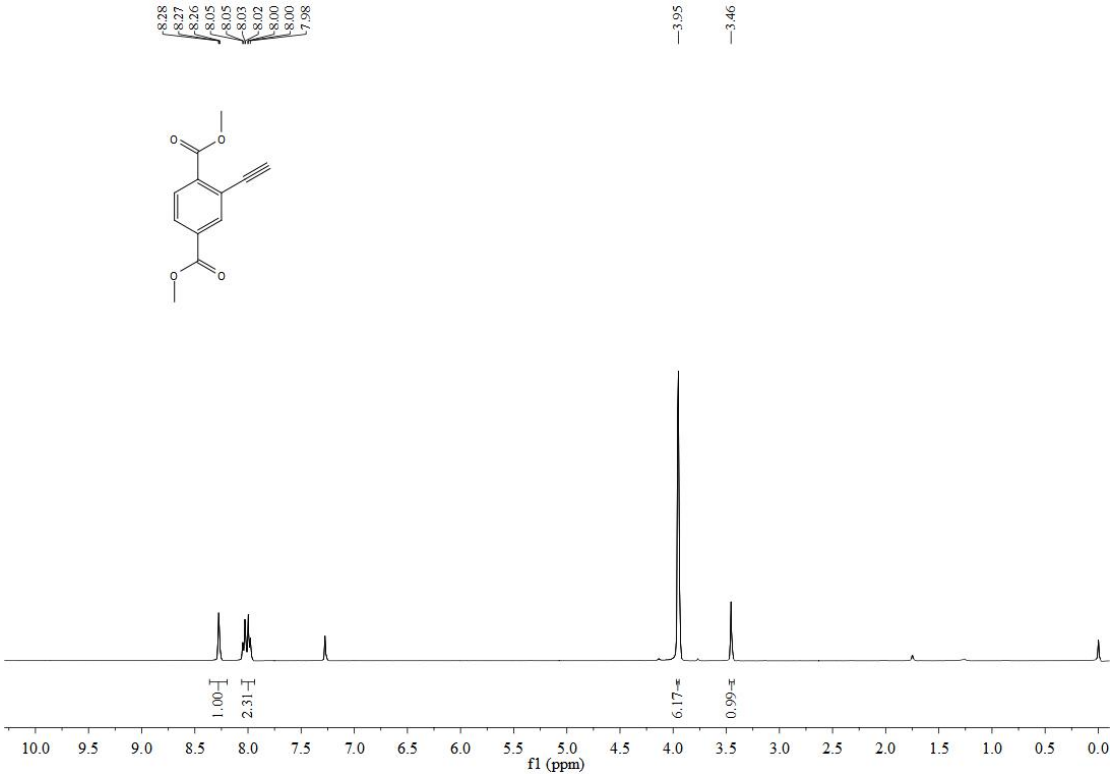
Fig. S4 Energy dispersive X-ray (EDX) analysis of functionalized UiO-66 materials: (a)UiO-66-alkyne-Co; (b) UiO-66-(alkyne-Co)$_2$; (c) UiO-66-(alkyne-Co)$_2$-recycle.



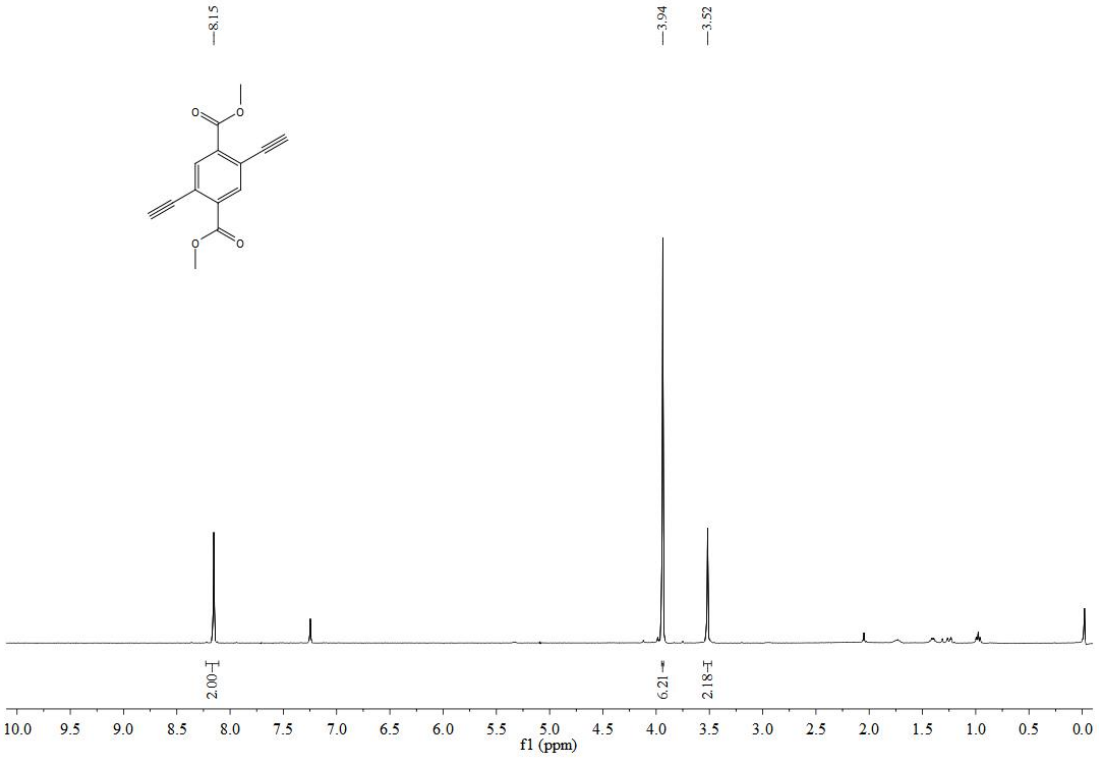
Compound 2a 2-((trimethylsilyl)ethynyl)terephthalic acid ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.22 (d, *J* = 18.1 Hz, 1H), 7.94 (s, 2H), 3.92 (d, *J* = 14.4 Hz, 6H), 0.32 – 0.22 (m, 9H).



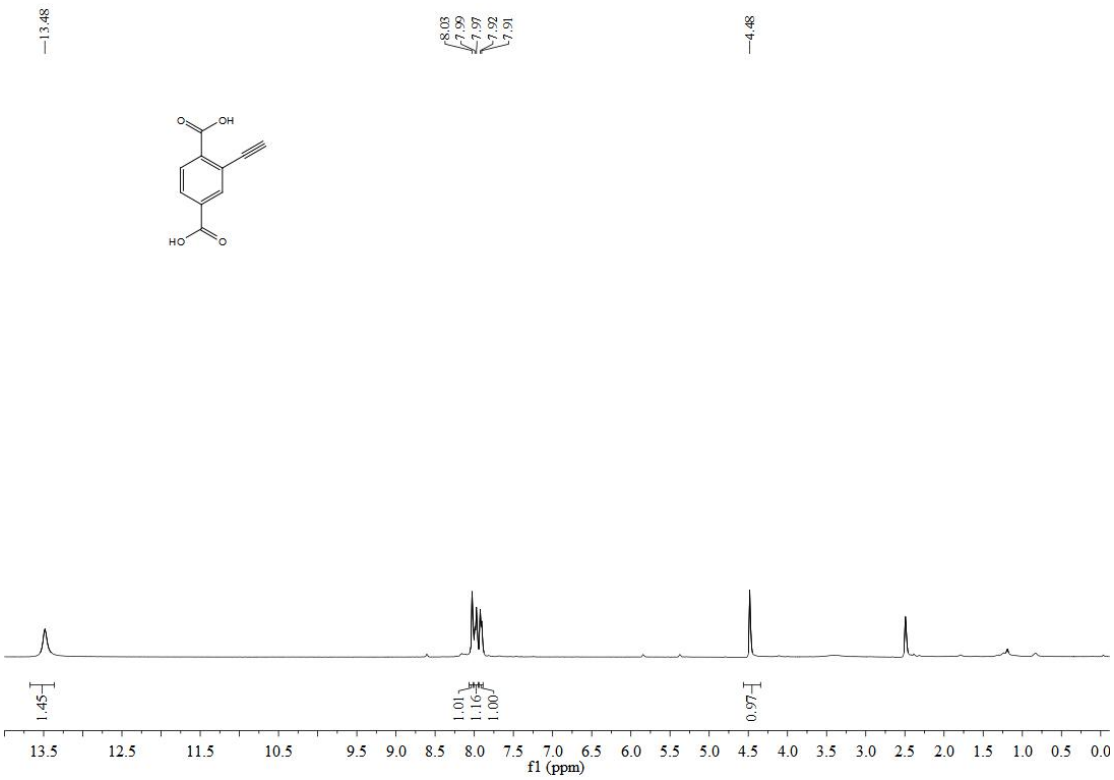
Compound 2b (dimethyl 2,5-bis((trimethylsilyl)ethynyl)terephthalate) ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.08 (s, 2H), 3.92 (s, 6H), 0.26 (s, 18H).



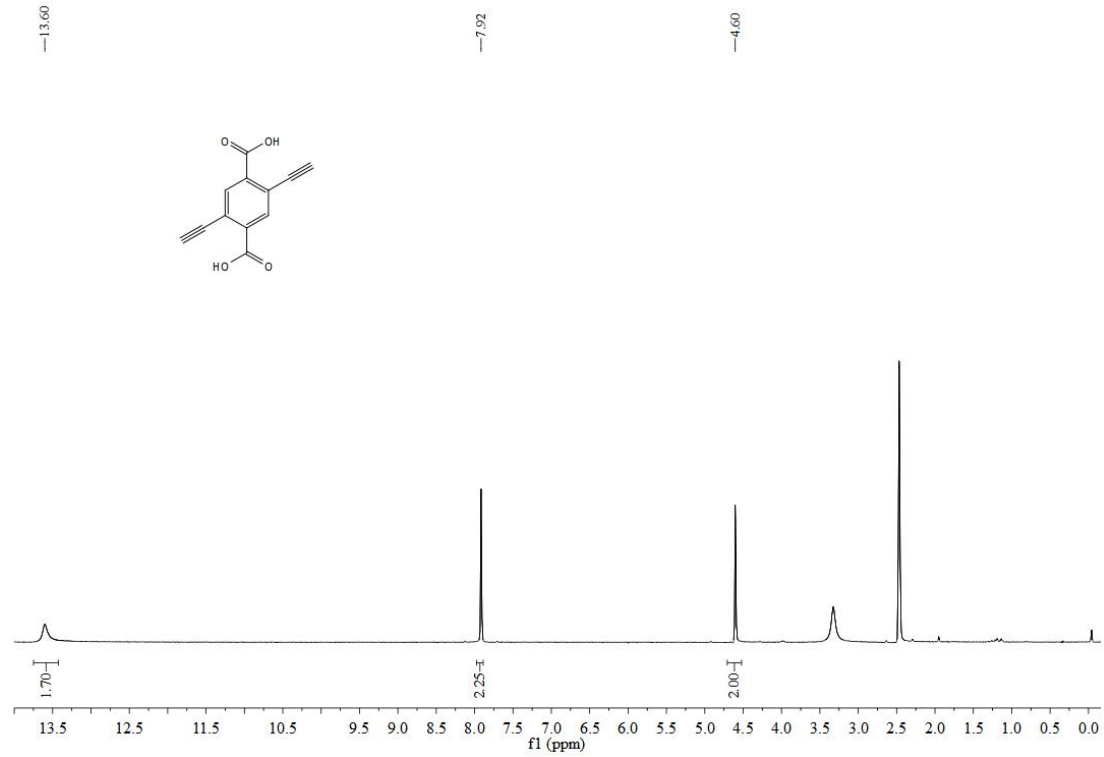
Compound 3a dimethyl 2-ethynylterephthalate ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.26 (d, *J* = 9.5 Hz, 1H), 7.98 (s, 2H), 3.95 (s, 6H), 3.46 (s, 1H).



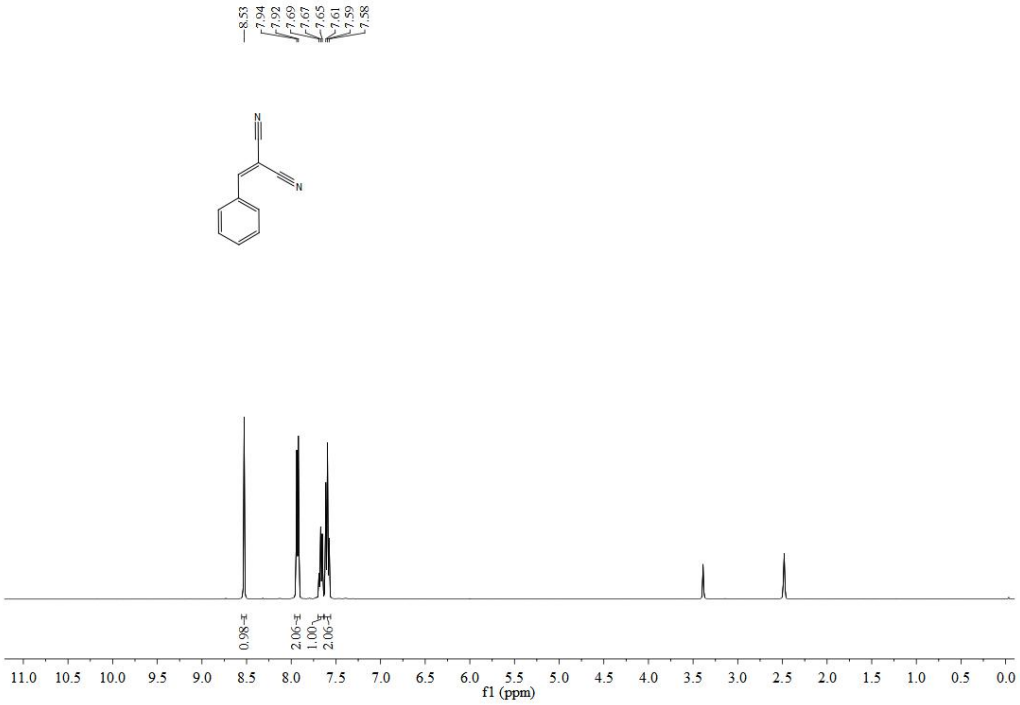
Compound 3b (dimethyl 2,5-diethynylterephthalate) ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.15 (s, 2H), 3.94 (s, 6H), 3.52 (s, 2H).



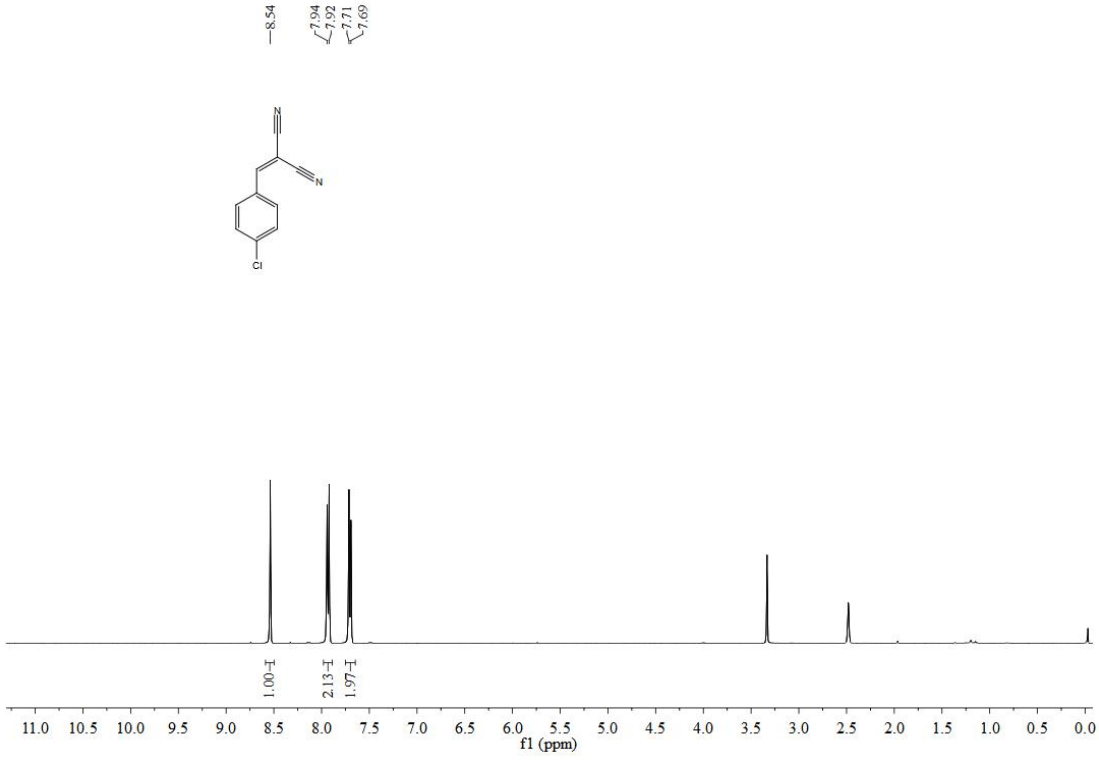
Compound 4a 2-ethynylterephthalic acid ^{1}H NMR (400 MHz, DMSO-d_6)) δ 13.47 (s, 2H), 8.03 (s, 1H), 7.97 (d, J = 8.7 Hz, 1H), 7.94 – 7.89 (d, 1H), 4.48 (s, 1H).



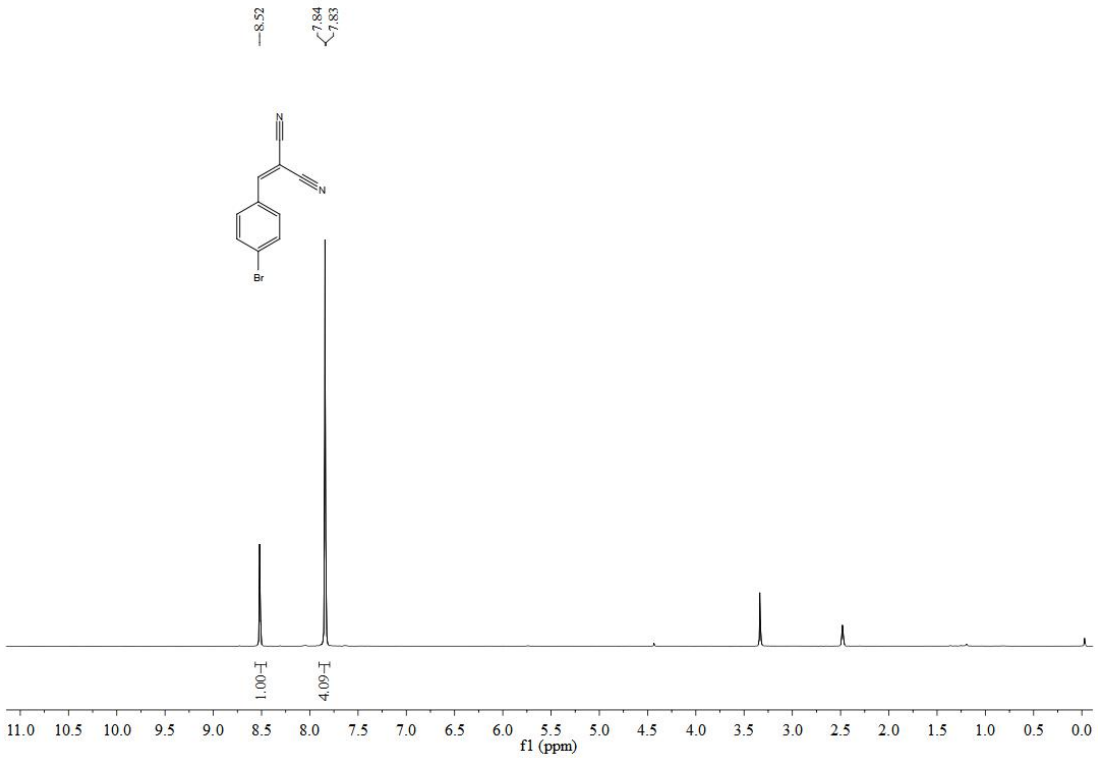
Compound 4b (2,5-diethynylterephthalic acid) ^{1}H NMR (400 MHz, DMSO-d_6) δ 13.60 (s, 2H), 7.92 (s, 2H), 4.60 (s, 2H).



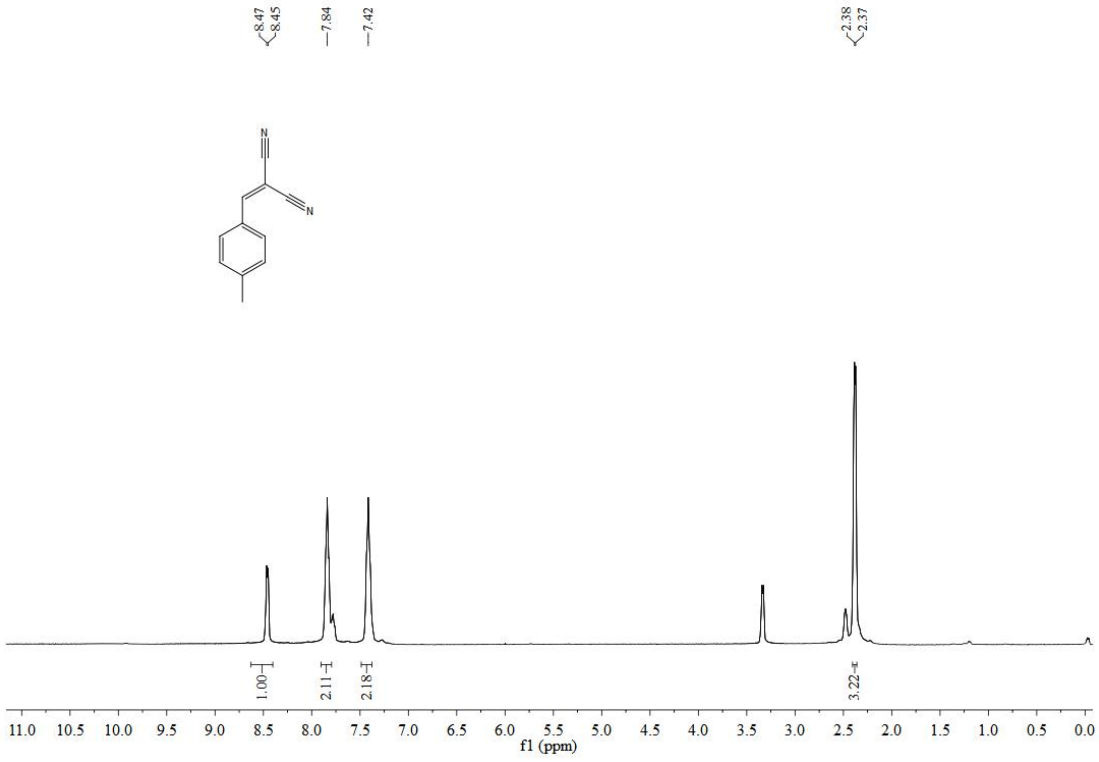
2-benzylidenemalononitrile ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.53 (s, 1H), 7.93 (d, J = 7.4 Hz, 2H), 7.67 (t, J = 7.4 Hz, 1H), 7.59 (t, J = 7.5 Hz, 2H).



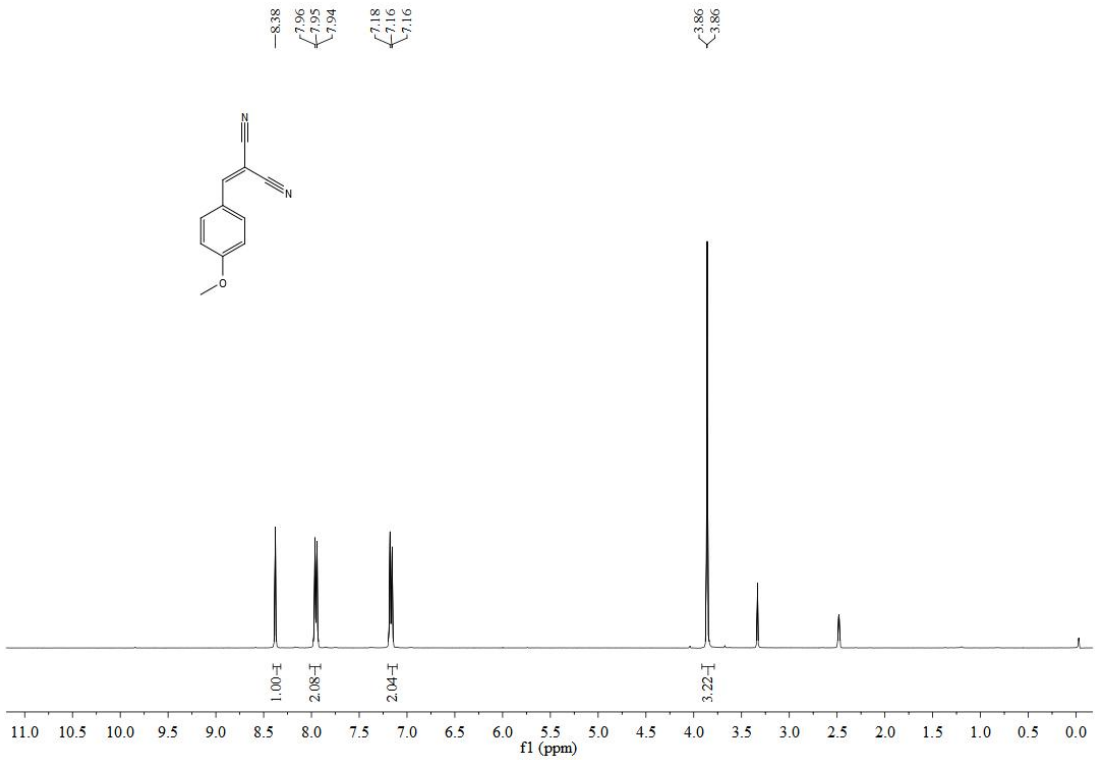
2-(4-chlorobenzylidene)malononitrile ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.54 (s, 1H), 7.93 (d, J = 8.4 Hz, 2H), 7.70 (d, J = 8.1 Hz, 2H).



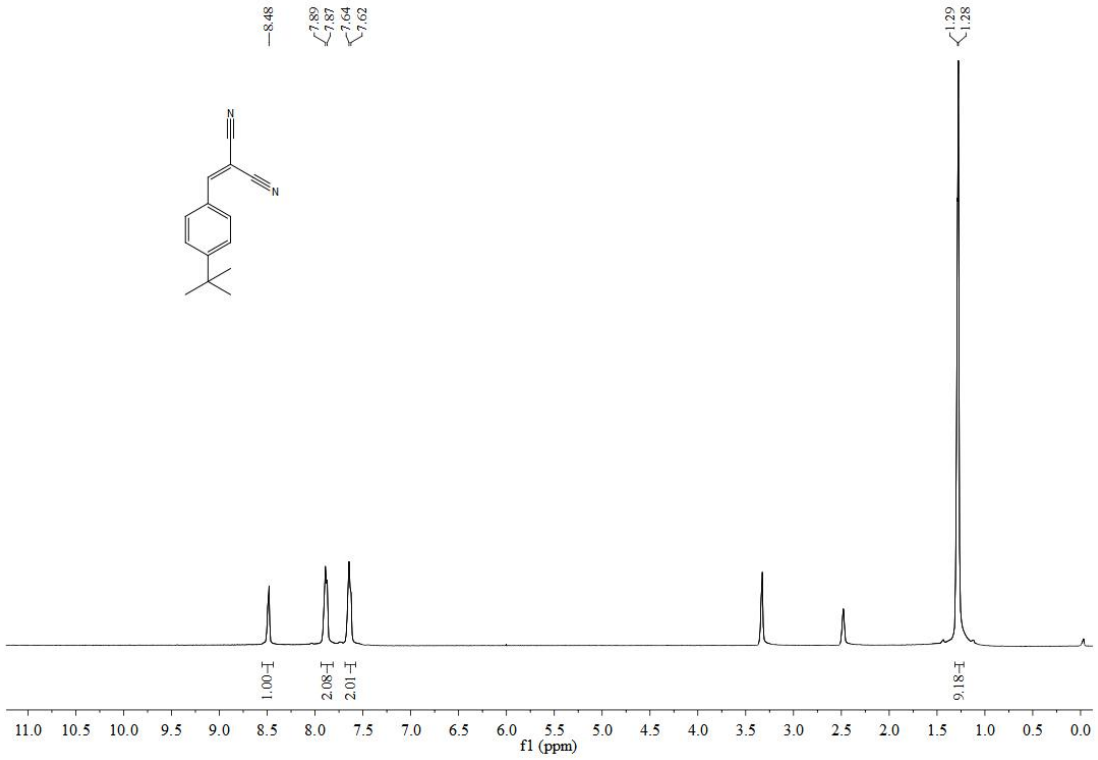
2-(4-bromobenzylidene)malononitrile ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.54 (s, 1H), 7.93 (d, J = 8.4 Hz, 2H), 7.70 (d, J = 8.1 Hz, 2H).



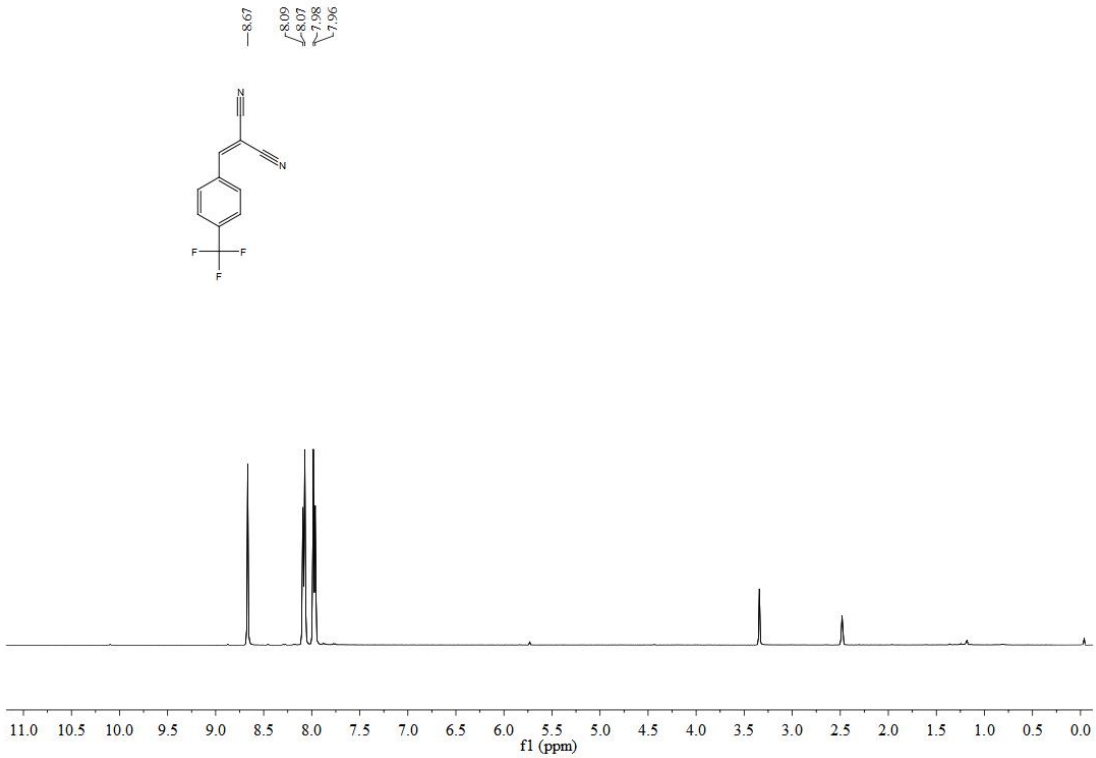
2-(4-methylbenzylidene)malononitrile ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.46 (d, J = 6.4 Hz, 1H), 7.84 (s, 2H), 7.42 (s, 2H), 2.38 (d, J = 4.5 Hz, 3H).



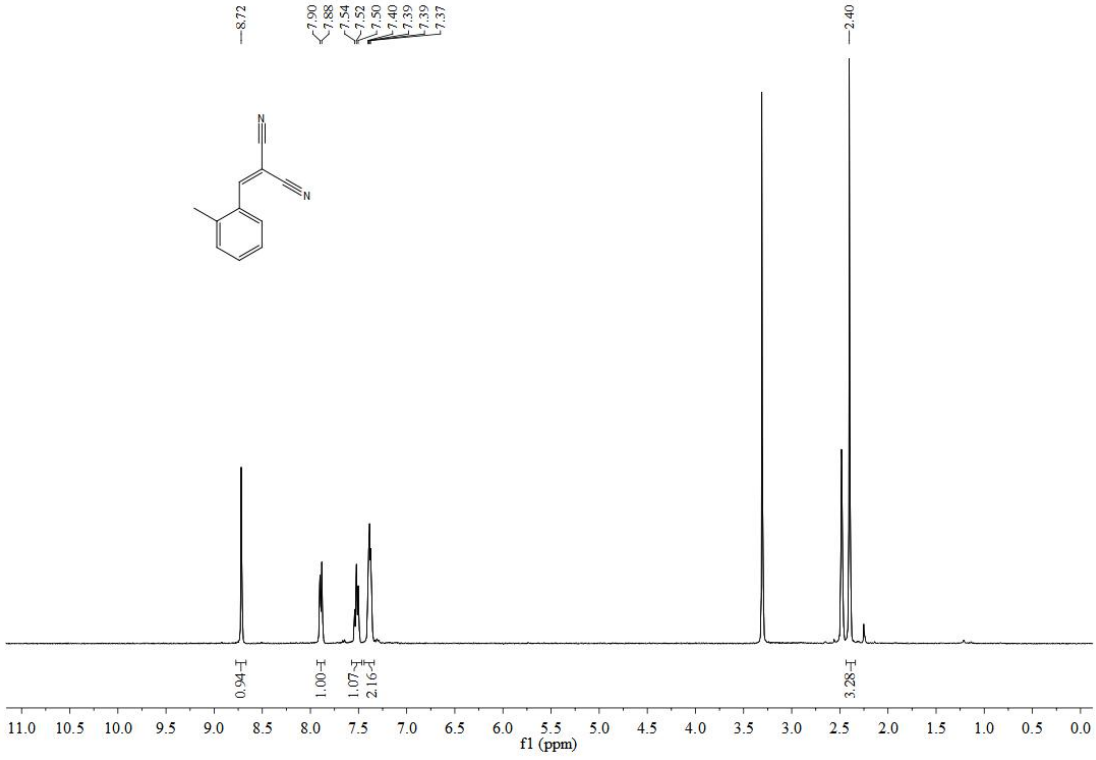
2-(4-methoxybenzylidene)malononitrile ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.38 (s, 1H), 8.02 – 7.90 (m, 2H), 7.20 – 7.10 (m, 2H), 3.86 (d, J = 1.9 Hz, 3H).



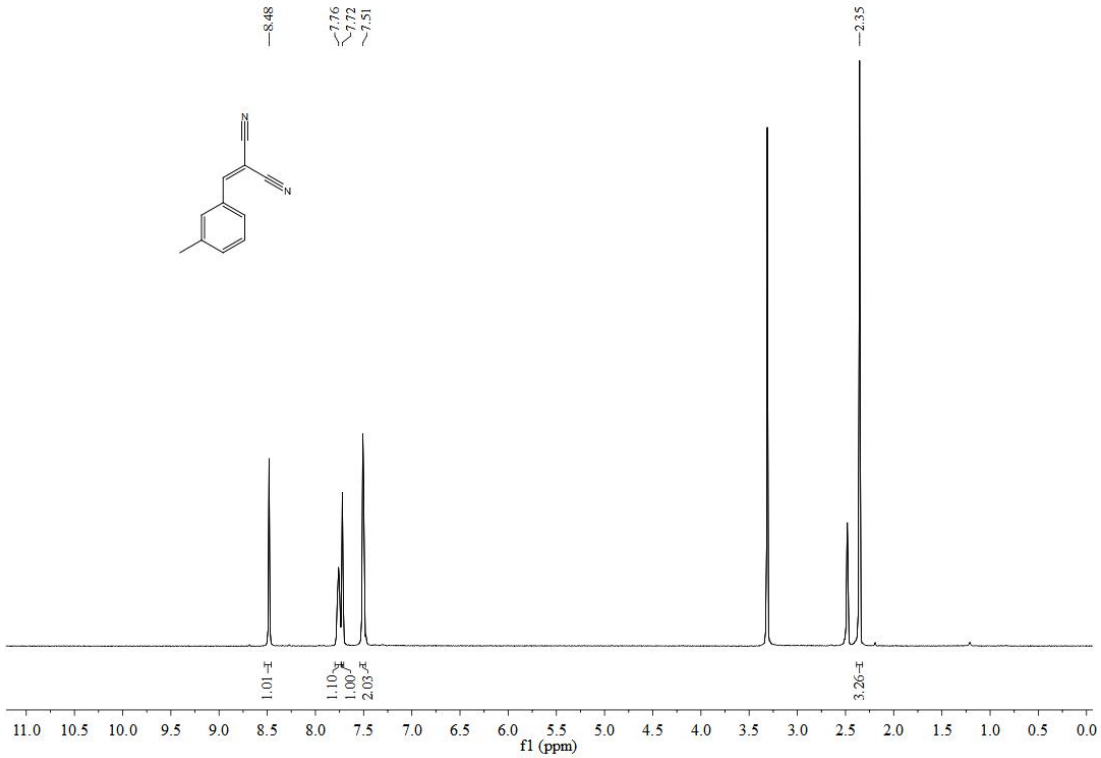
2-(4-(tert-butyl)benzylidene)malononitrile ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.48 (s, 1H), 7.88 (d, J = 7.9 Hz, 2H), 7.63 (d, J = 8.1 Hz, 2H), 1.28 (d, J = 3.7 Hz, 9H).



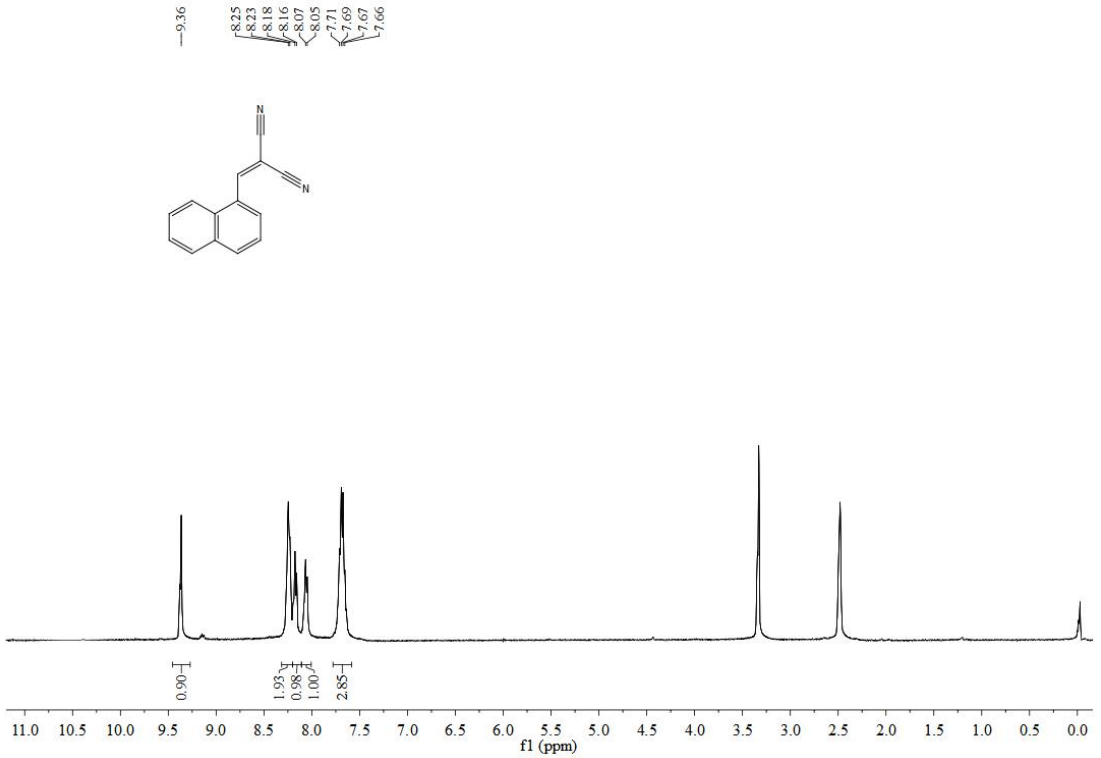
2-(4-(trifluoromethyl)benzylidene)malononitrile ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.67 (s, 1H), 8.08 (d, J = 8.0 Hz, 2H), 7.97 (d, J = 8.0 Hz, 2H).



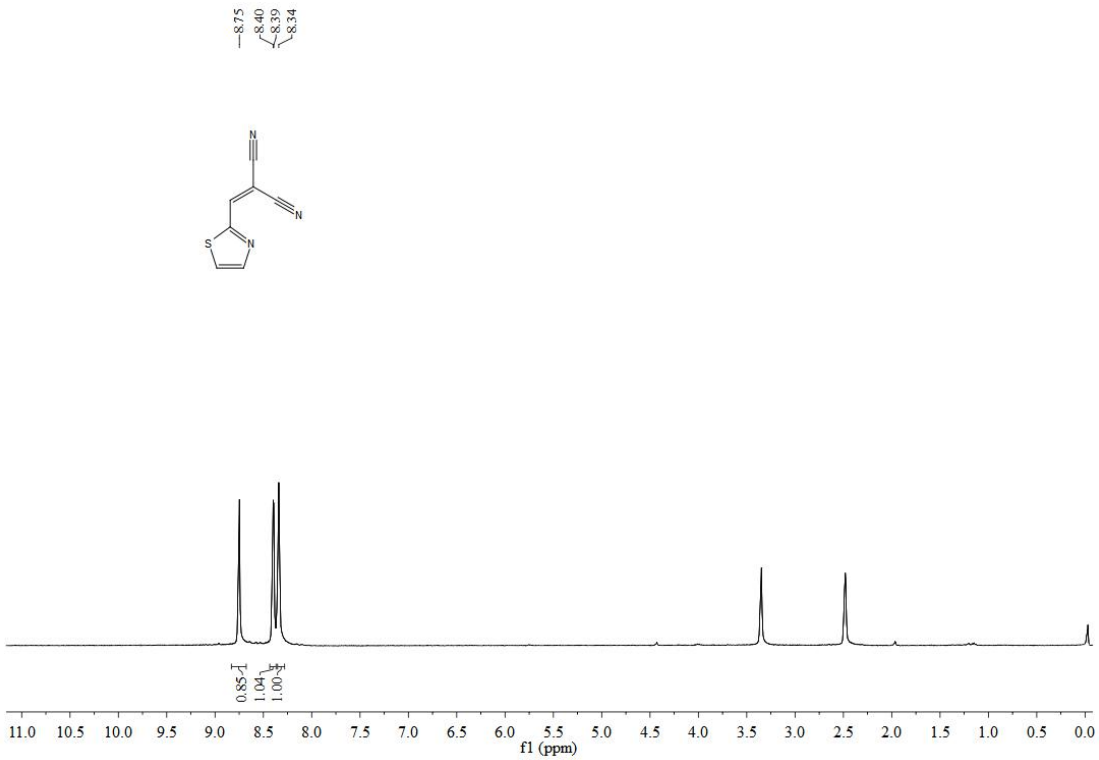
2-(2-methylbenzylidene)malononitrile ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.72 (s, 1H), 7.89 (d, J = 7.7 Hz, 1H), 7.52 (t, J = 7.5 Hz, 1H), 7.39 (dd, J = 7.1, 4.3 Hz, 2H), 2.40 (s, 3H).



2-(3-methylbenzylidene)malononitrile ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.48 (s, 1H), 7.76 (s, 1H), 7.72 (s, 1H), 7.51 (s, 2H), 2.35 (s, 3H).



2-(naphthalen-1-ylmethylene)malononitrile ^{1}H NMR (400 MHz, DMSO-d_6) δ 9.36 (s, 1H), 8.24 (d, J = 6.6 Hz, 2H), 8.17 (d, J = 7.3 Hz, 1H), 8.06 (d, J = 7.0 Hz, 1H), 7.68 (dd, J = 14.7, 7.4 Hz, 3H).



2-(thiazol-2-ylmethylene)malononitrile ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.75 (s, 1H), 8.40 (d, J = 2.6 Hz, 1H), 8.34 (s, 1H).