

Article

Demonstration of Green Solvent Performance on O,S,N-Heterocycles Synthesis: Metal-Free Click Chemistry and Buchwald–Hartwig Coupling

Joana F. Campos ¹, Manon Cailler ¹, Remi Claudel ¹, Benjamin Prot ¹, Thierry Besson ² and Sabine Berteina-Raboin ^{1,*}

¹ Institut de Chimie Organique et Analytique (ICOA), Université d'Orléans UMR-CNRS 7311, BP 6759, rue de Chartres, 45067 Orléans CEDEX 2, France; joana-filomena.mimoso-silva-de-campos@univ-orleans.fr (J.F.C.); manon.cailler@etu.univ-orleans.fr (M.C.); remi.claudel@etu.univ-orleans.fr (R.C.); benjamin.prot@etu.univ-orleans.fr (B.P.)

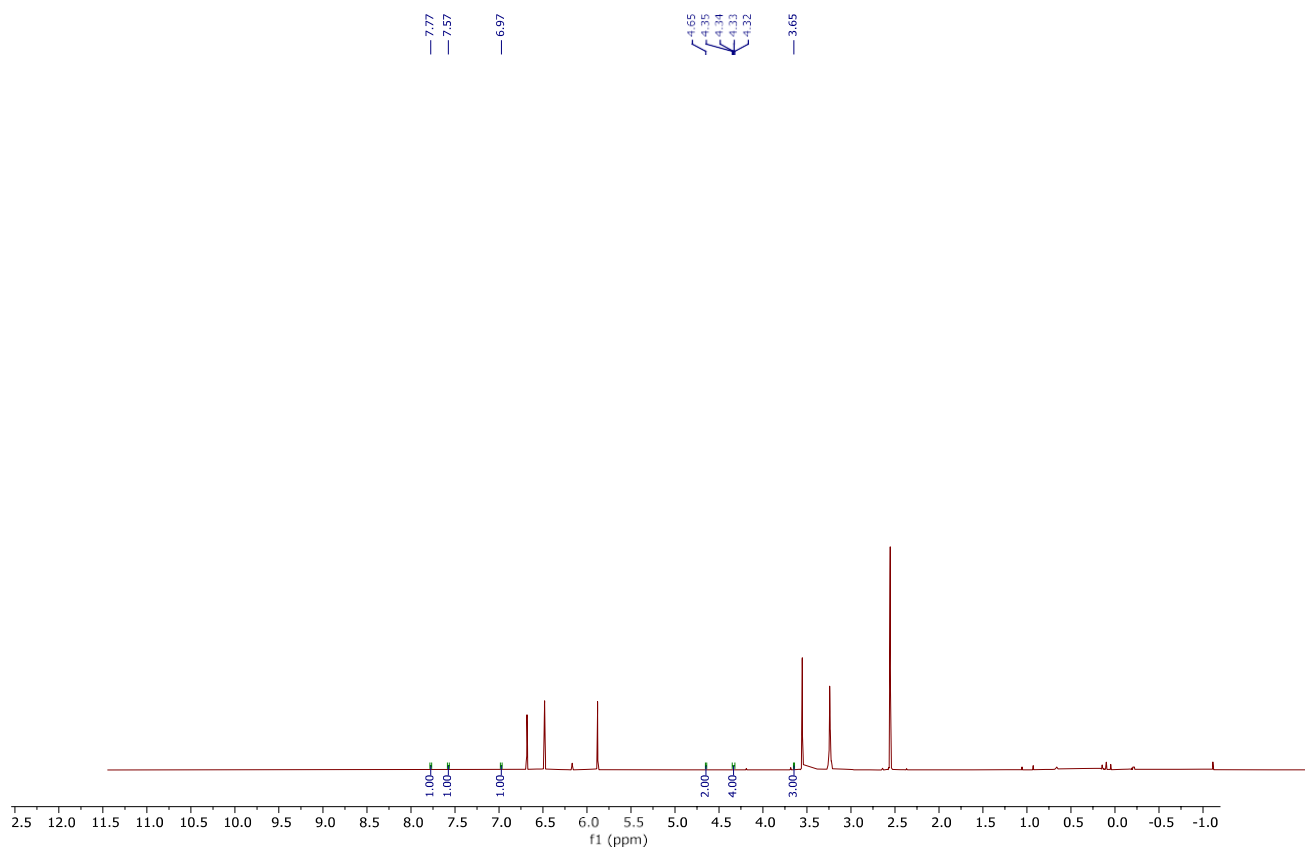
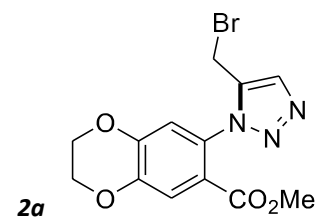
² Normandie Univ, UNIROUEN, INSA Rouen, CNRS, COBRA UMR 6014, 76000 Rouen, France; thierry.besson@univ-rouen.fr (T.B.)

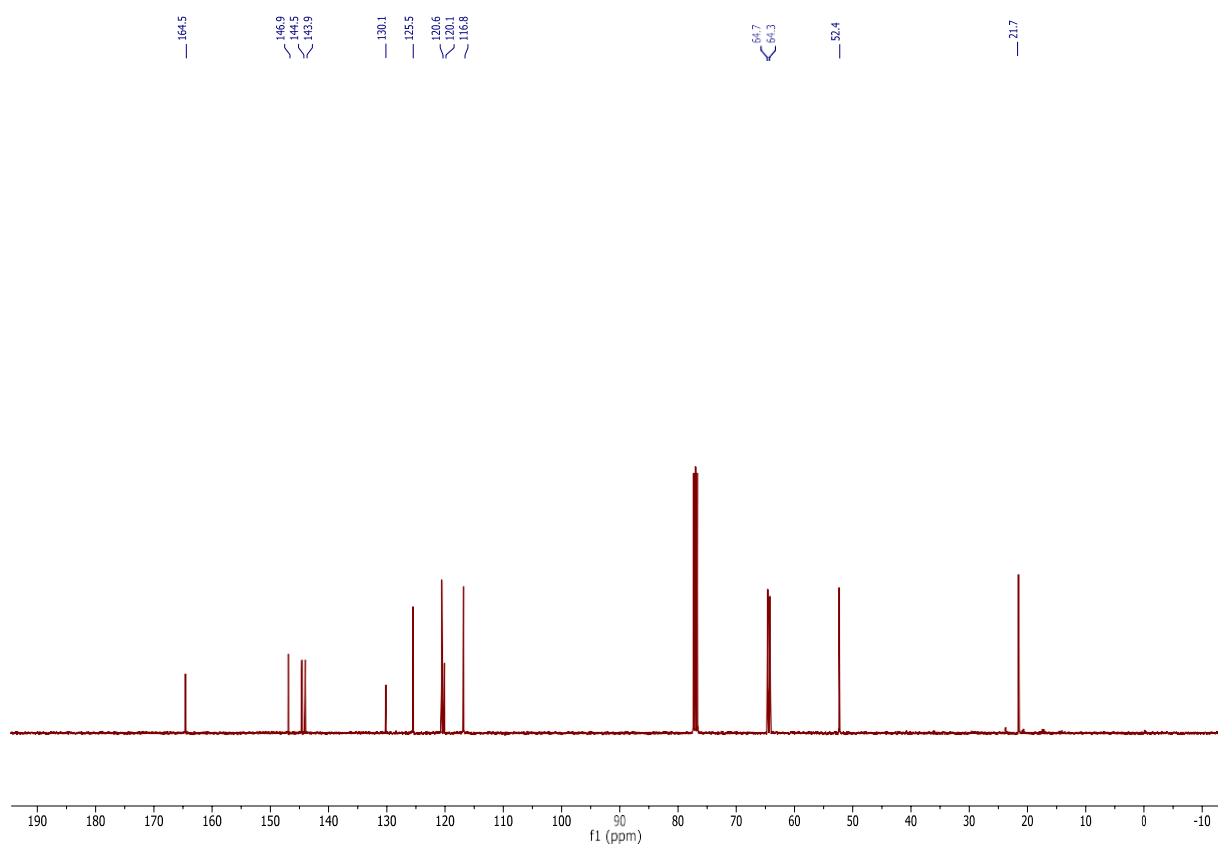
* Correspondence: sabine.berteina-raboin@univ-orleans.fr; Tel.: +33-238-494-856

Supplementary Material

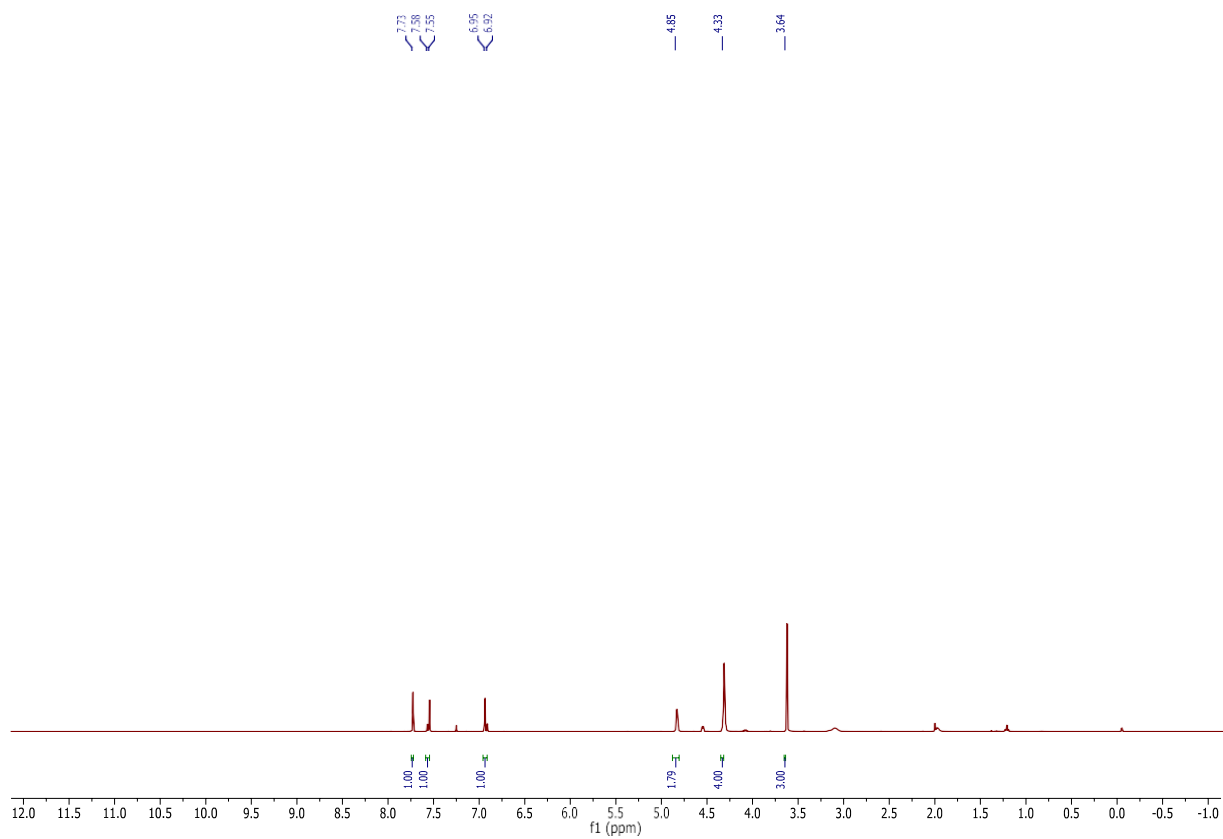
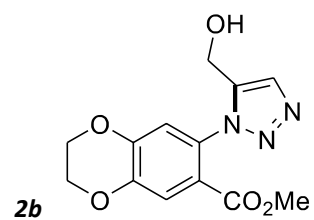
¹H NMR and ¹³C NMR Spectra of all Products

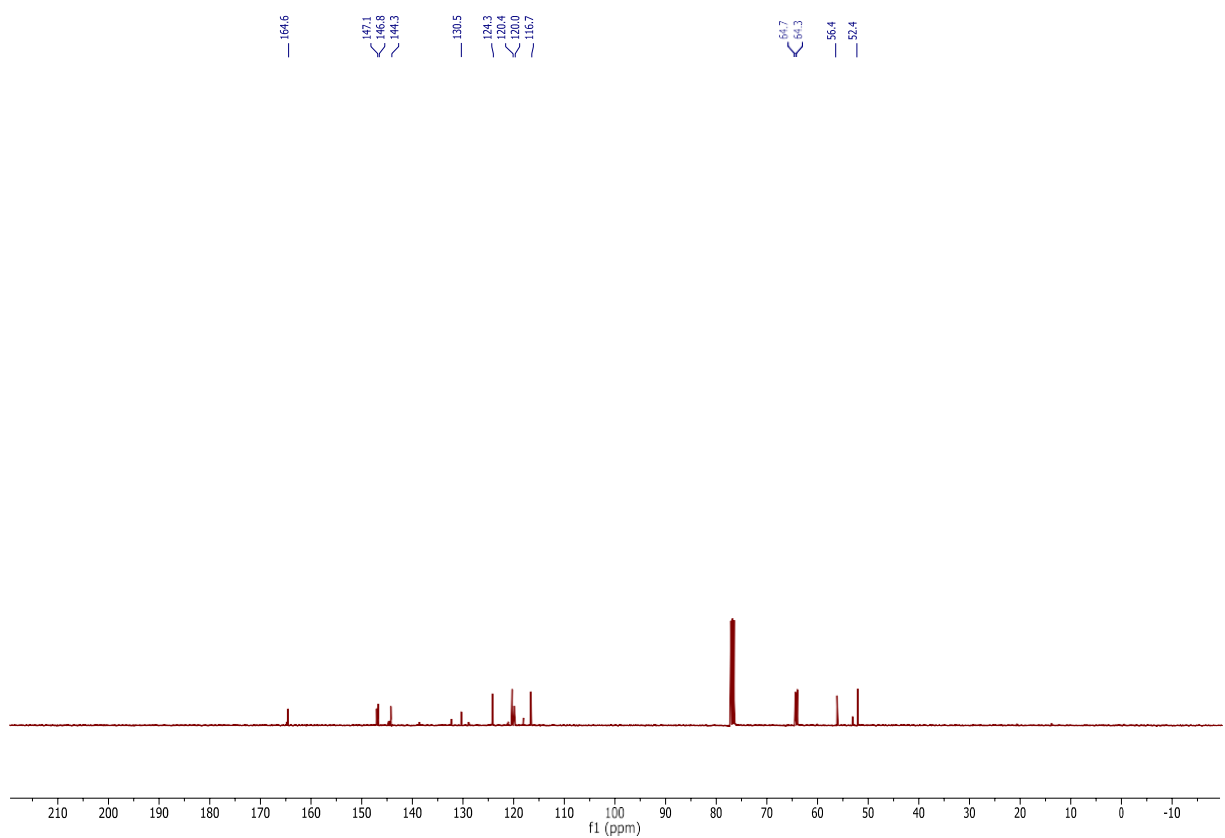
methyl 7-(5-(bromomethyl)-1H-1,2,3-triazol-1-yl)-2,3-dihydrobenzo[b][1,4]dioxine-6-carboxylate





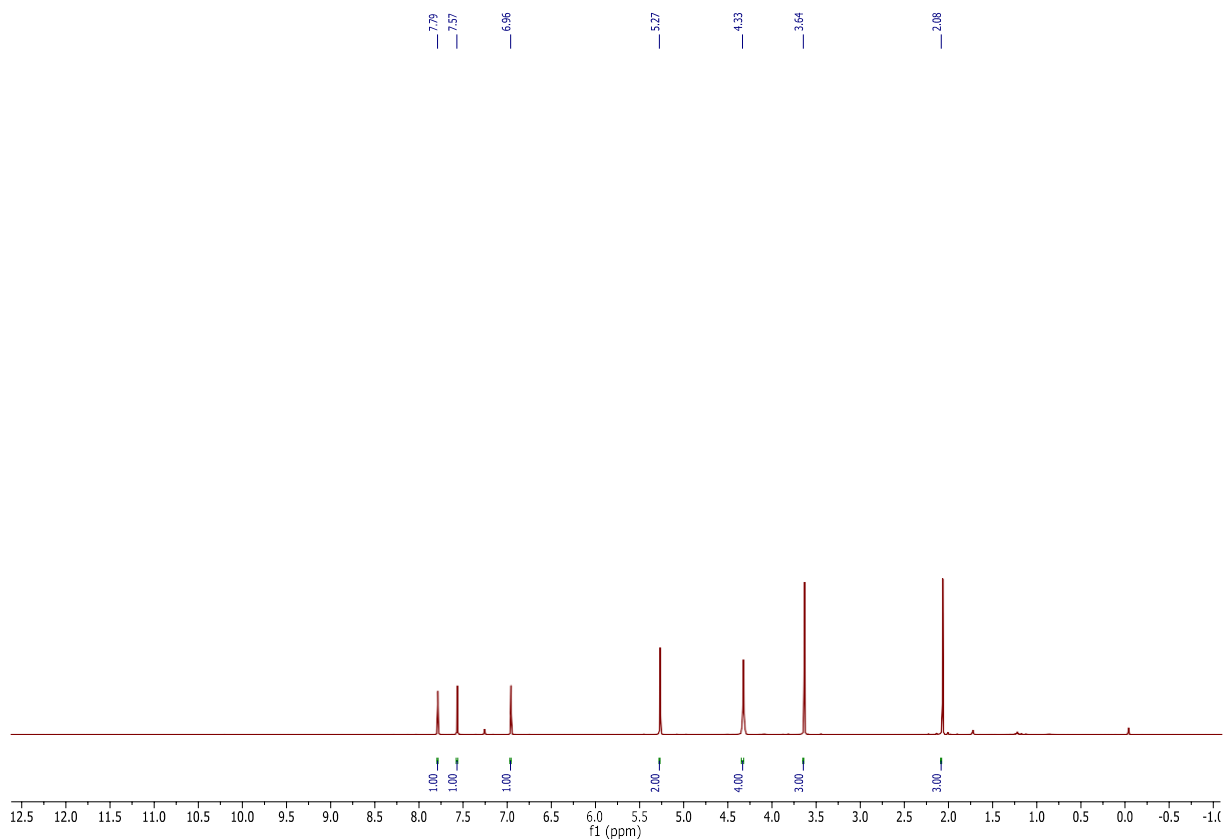
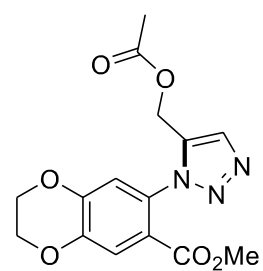
methyl 7-(5-(hydroxymethyl)-1H-1,2,3-triazol-1-yl)-2,3-dihydrobenzo[b][1,4]dioxine-6-carboxylate

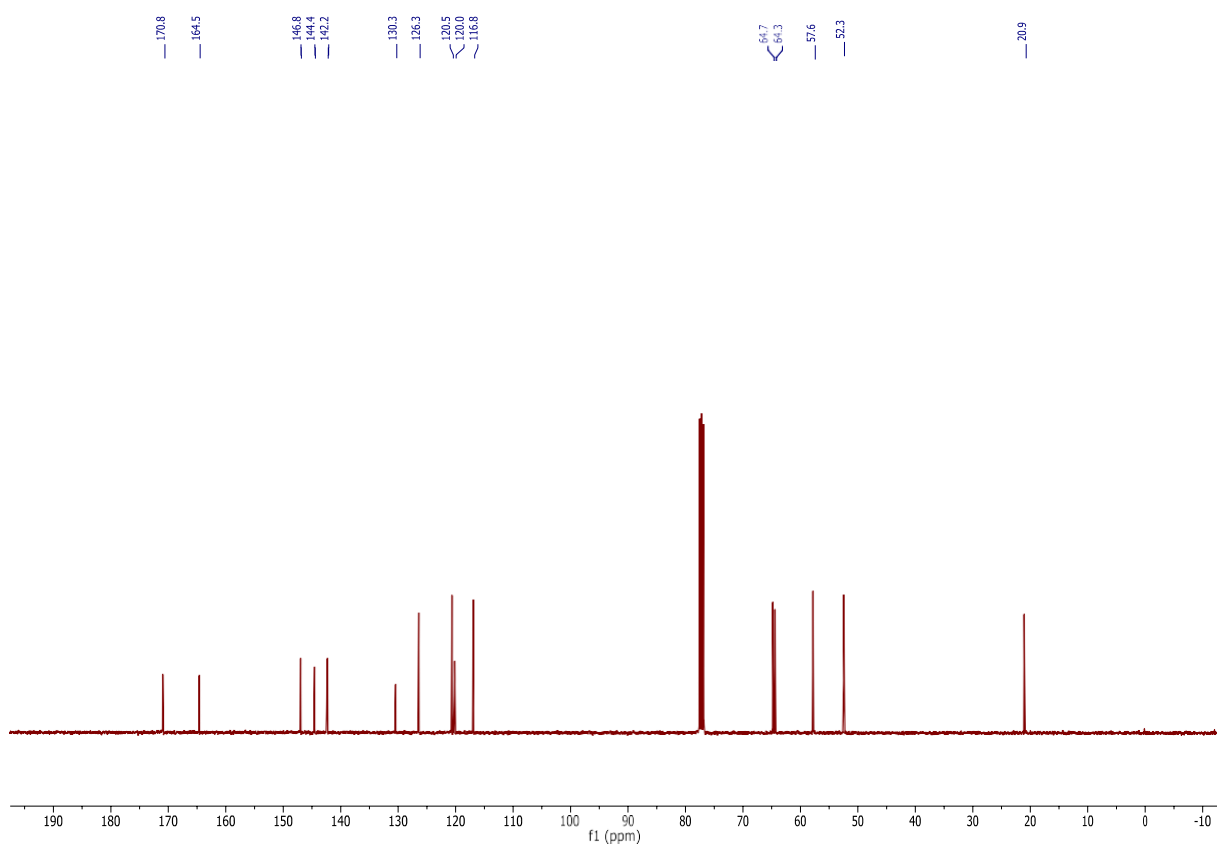




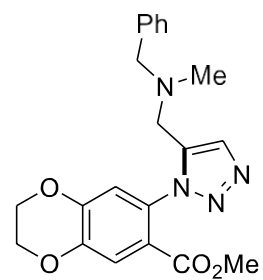
methyl 7-(5-(acetoxymethyl)-1H-1,2,3-triazol-1-yl)-2,3-dihydrobenzo[b][1,4]dioxine-6-carboxylate

2c

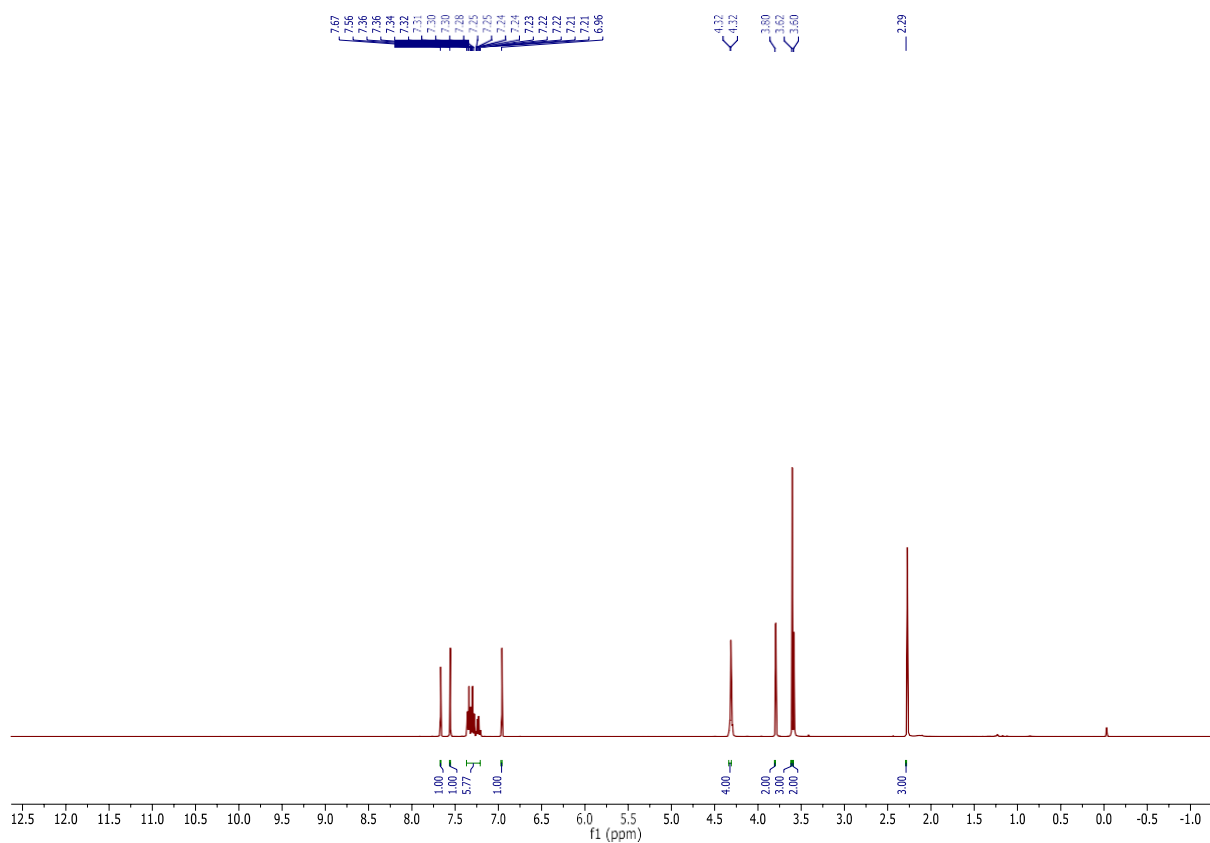


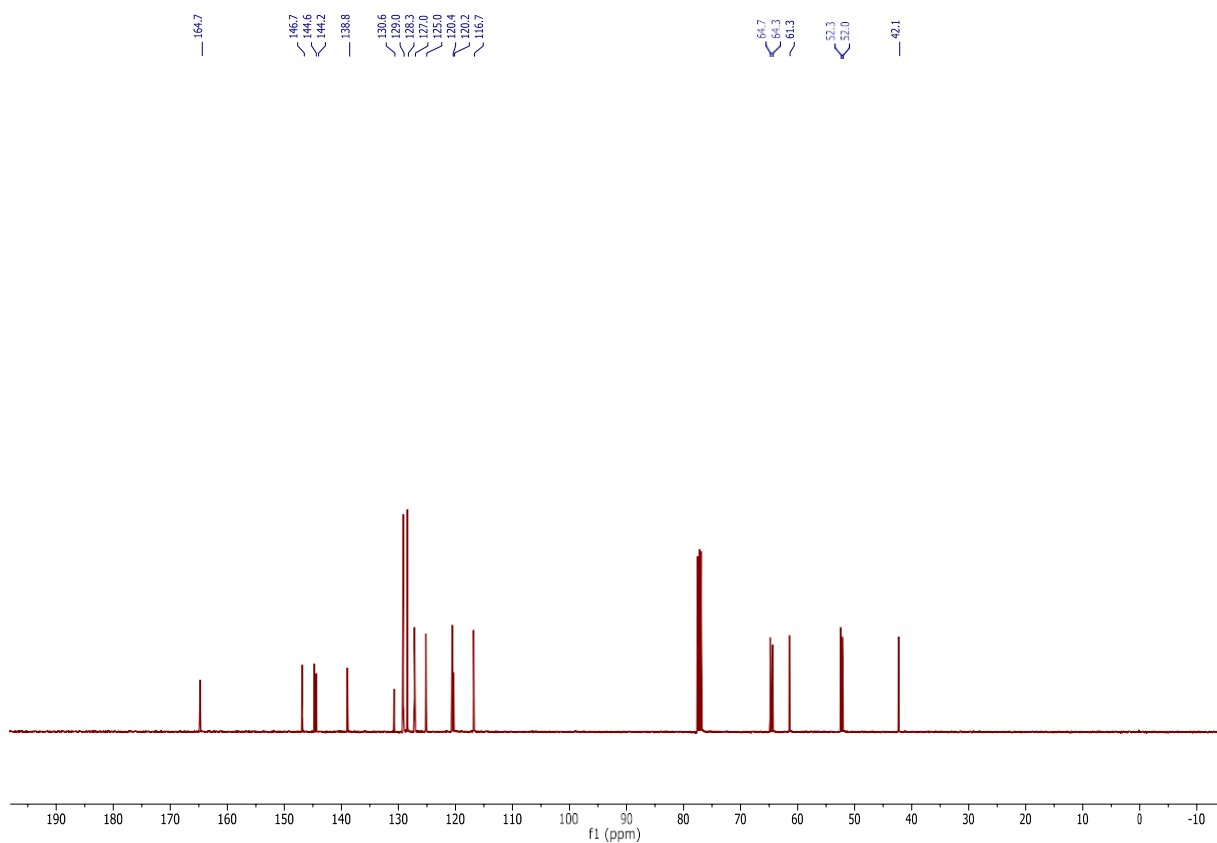


methyl 7-((5-((benzyl(methyl)amino)methyl)-1H-1,2,3-triazol-1-yl)-2,3-dihydrobenzo[b][1,4]dioxine-6-carboxylate

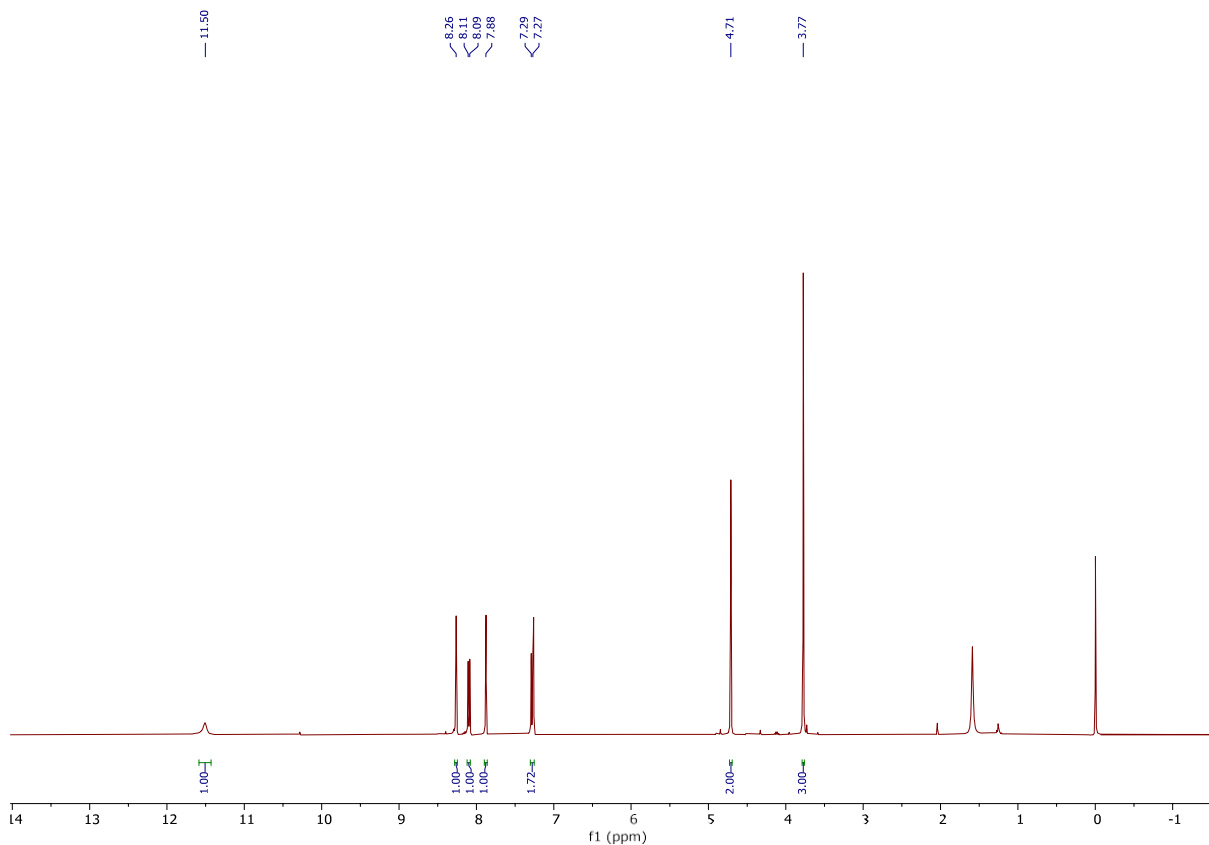
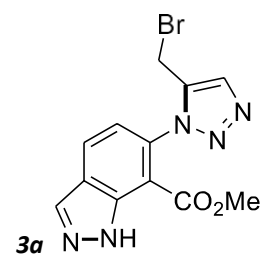


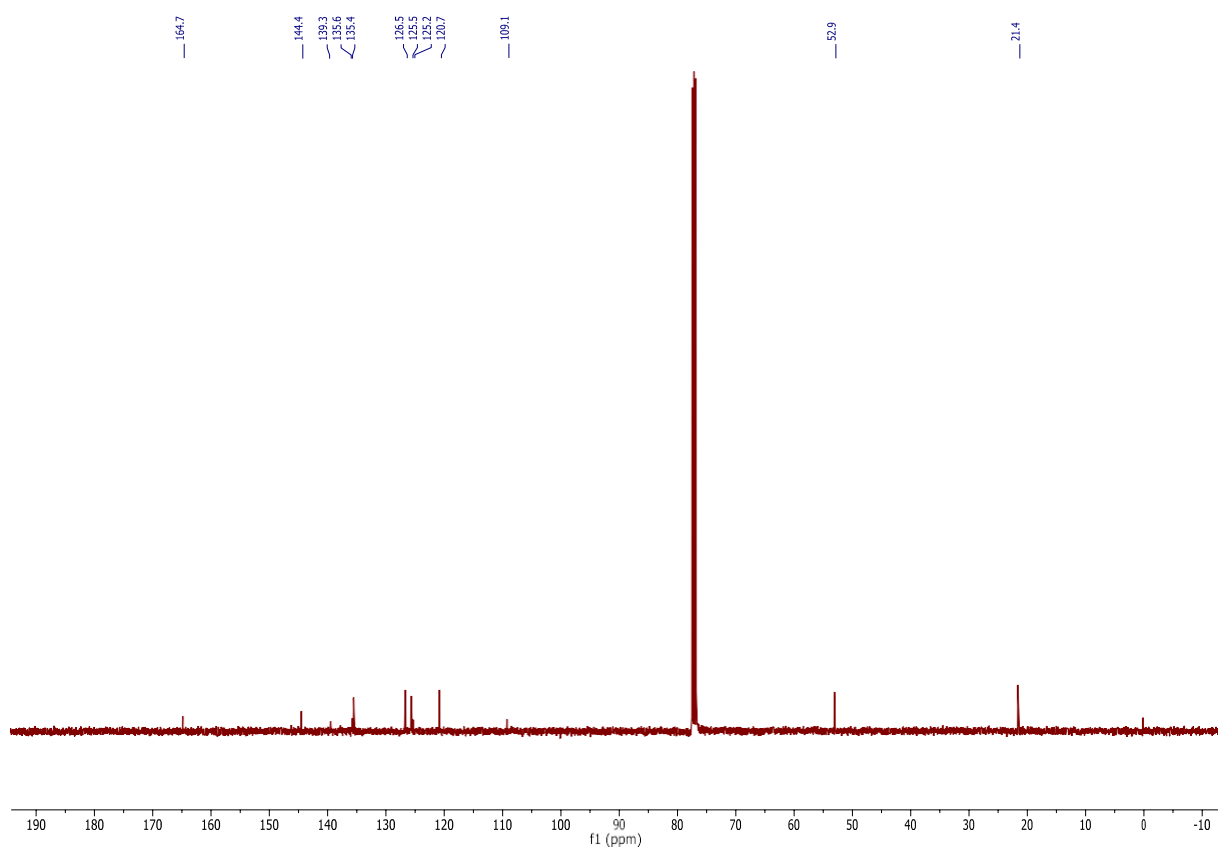
2d



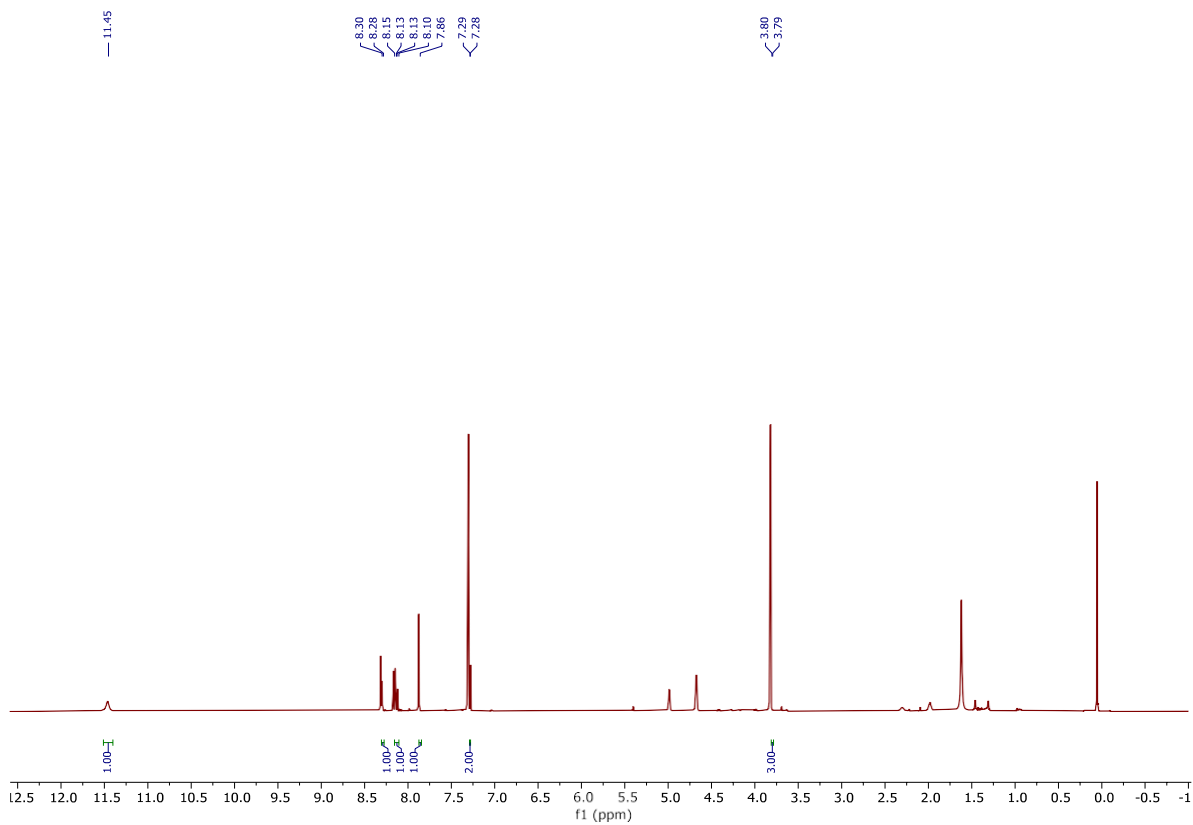
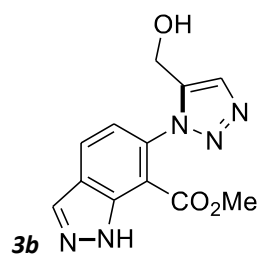


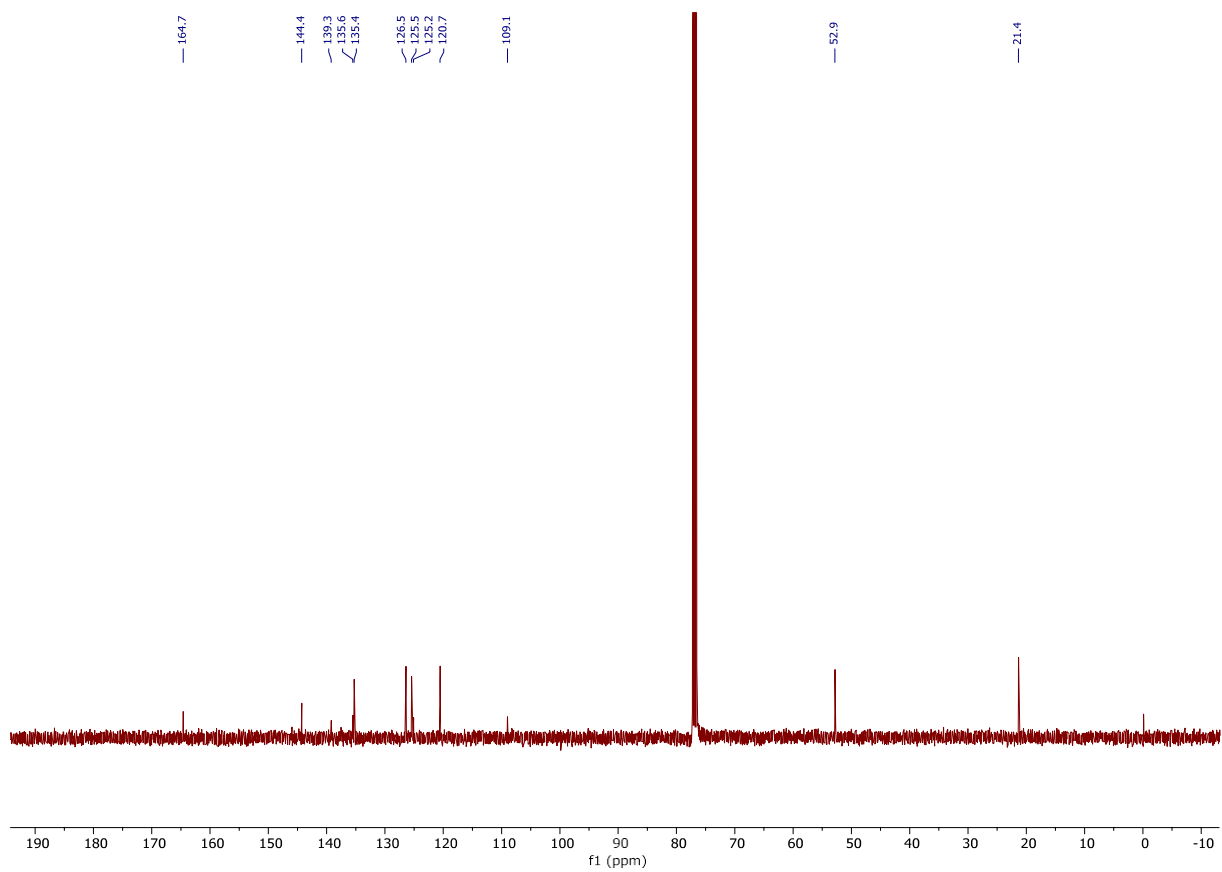
methyl 6-(5-(bromomethyl)-1H-1,2,3-triazol-1-yl)-1H-indazole-7-carboxylate



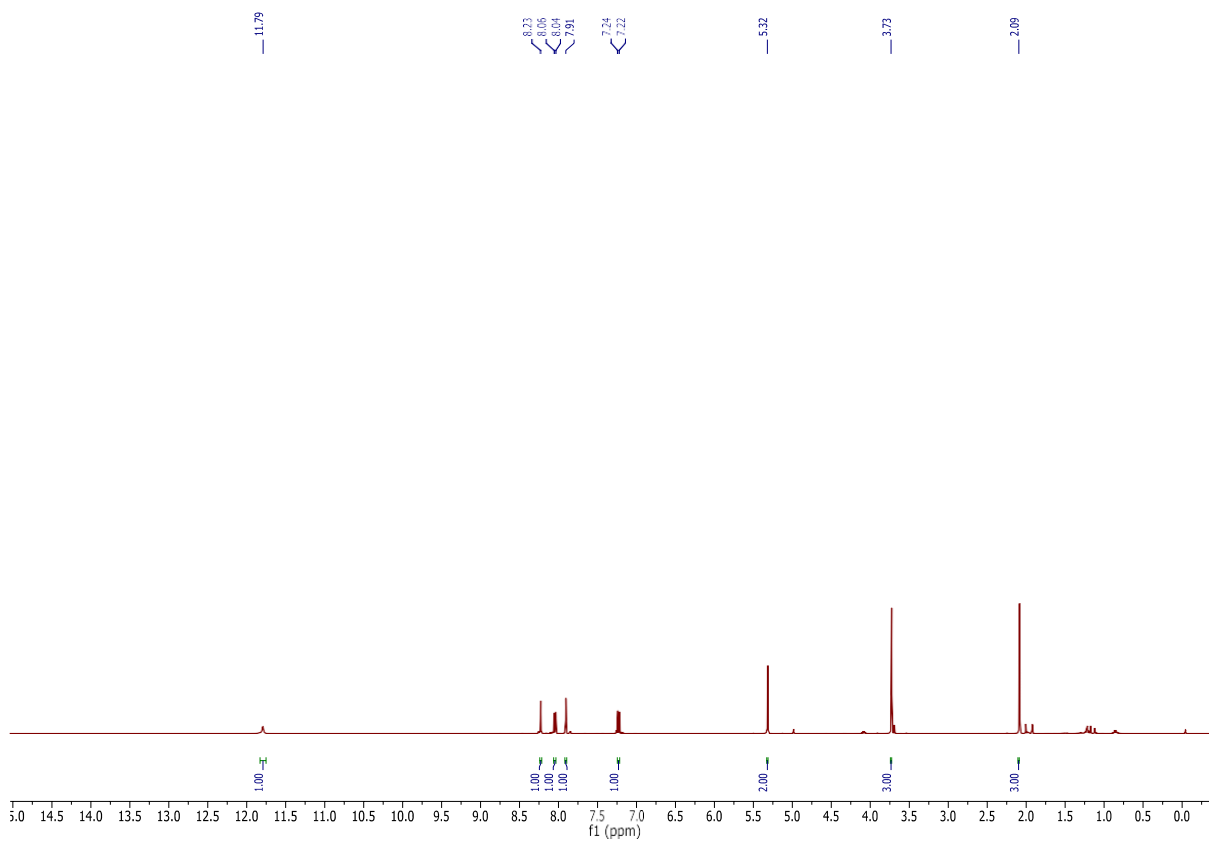
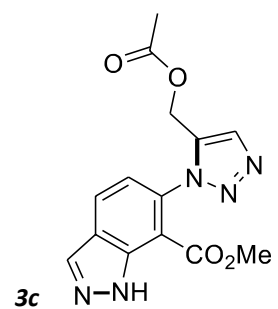


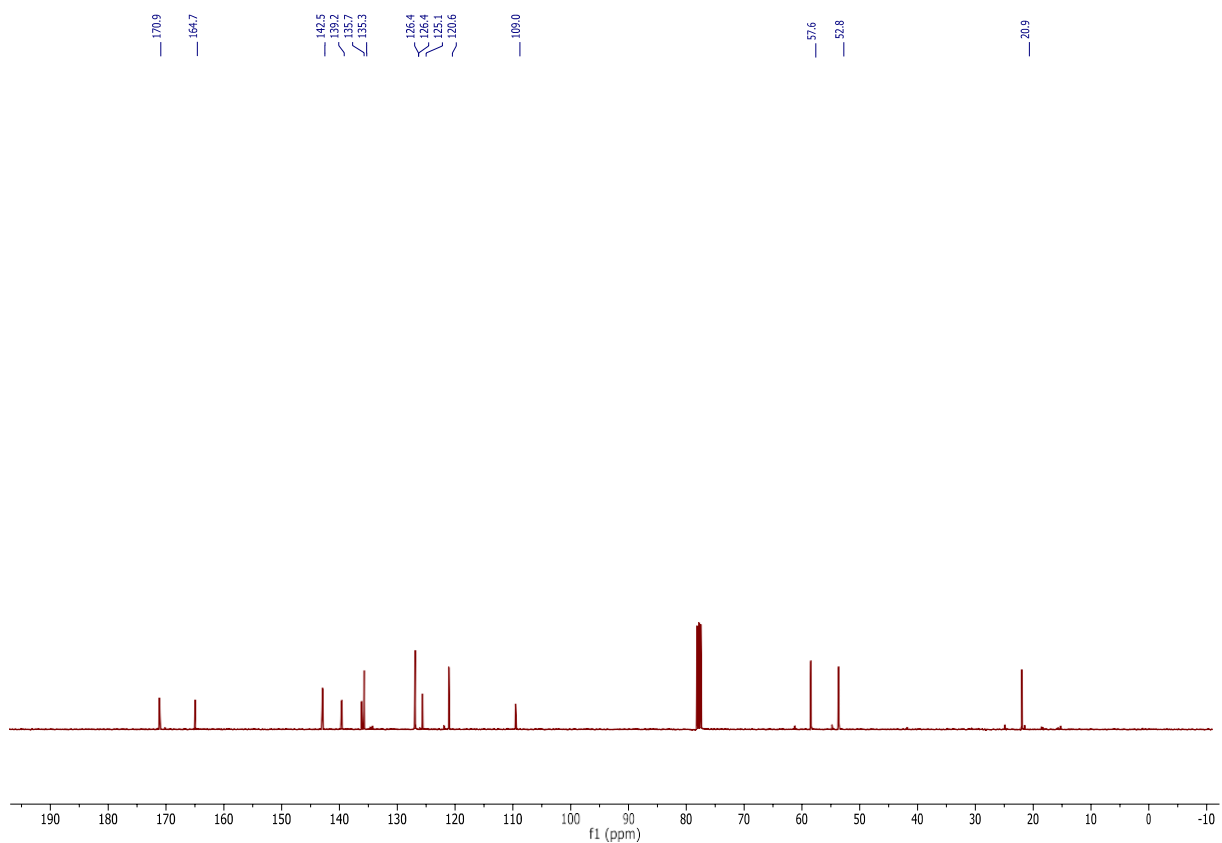
methyl 6-(5-(hydroxymethyl)-1H-1,2,3-triazol-1-yl)-1H-indazole-7-carboxylate



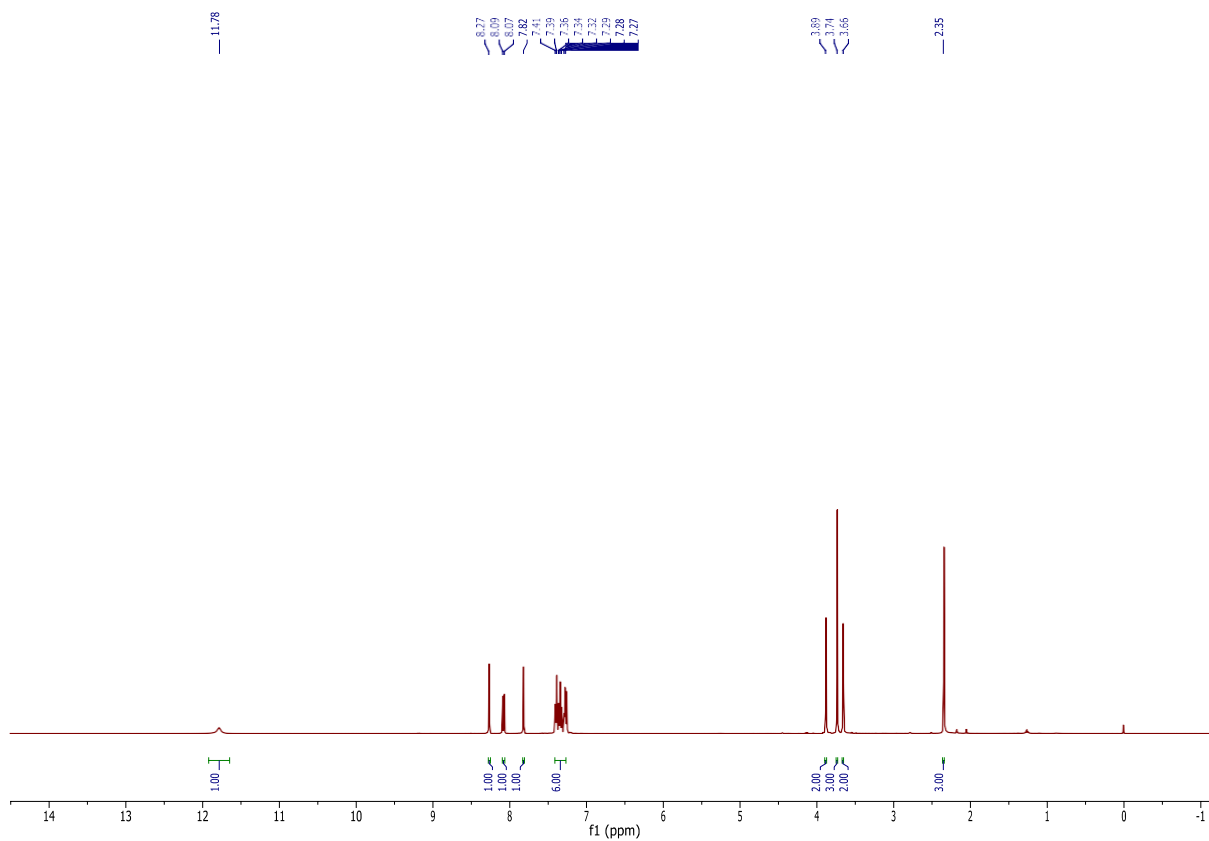
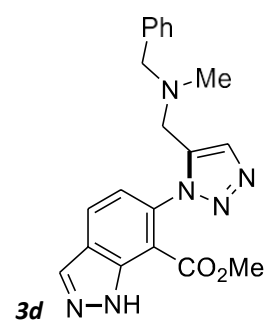


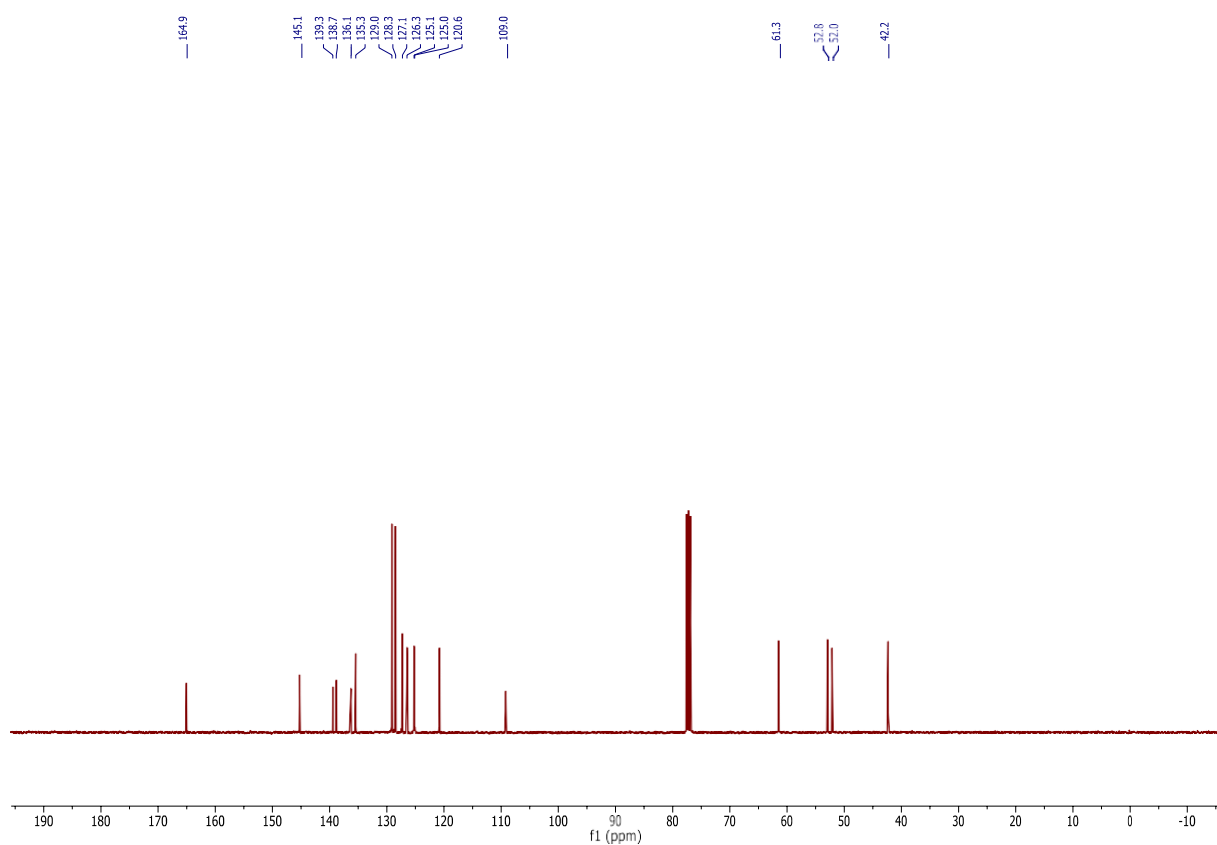
methyl 6-(5-(acetoxymethyl)-1H-1,2,3-triazol-1-yl)-1H-indazole-7-carboxylate



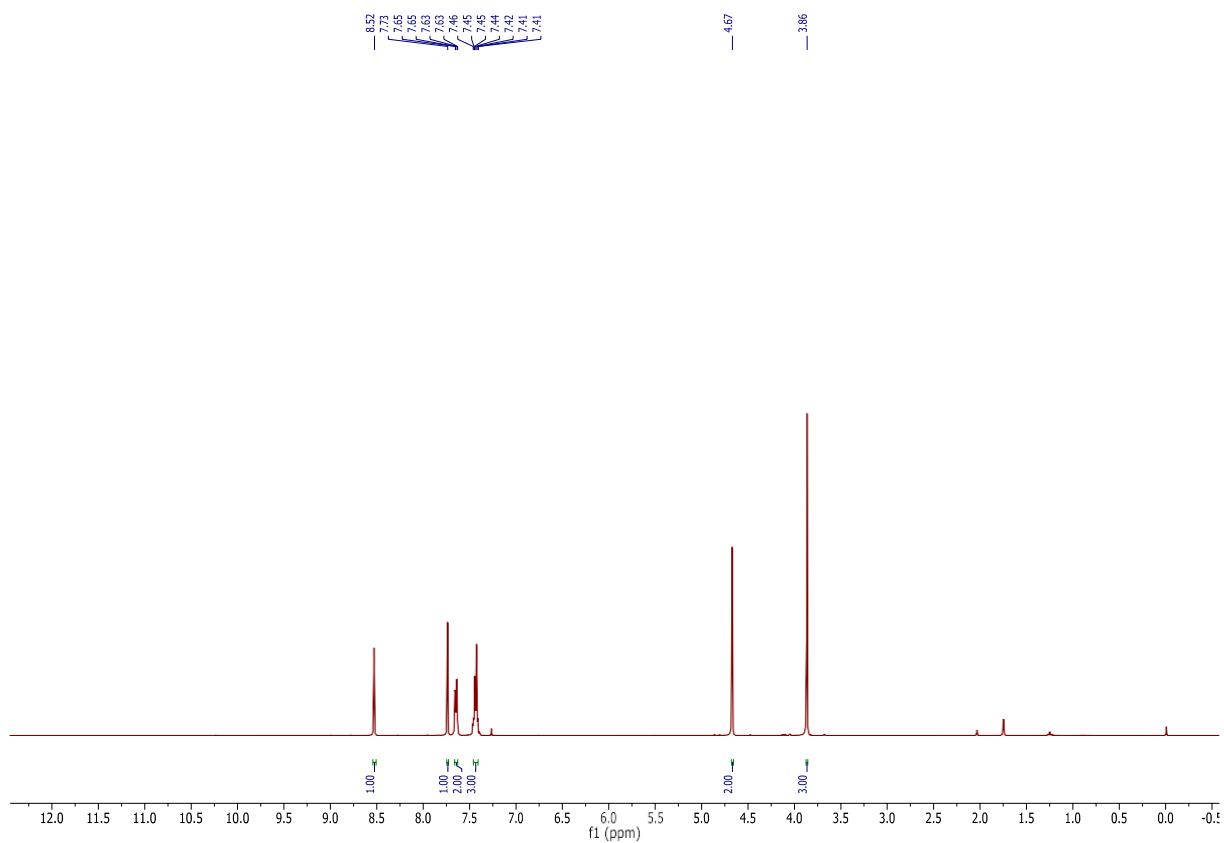
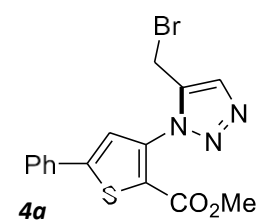


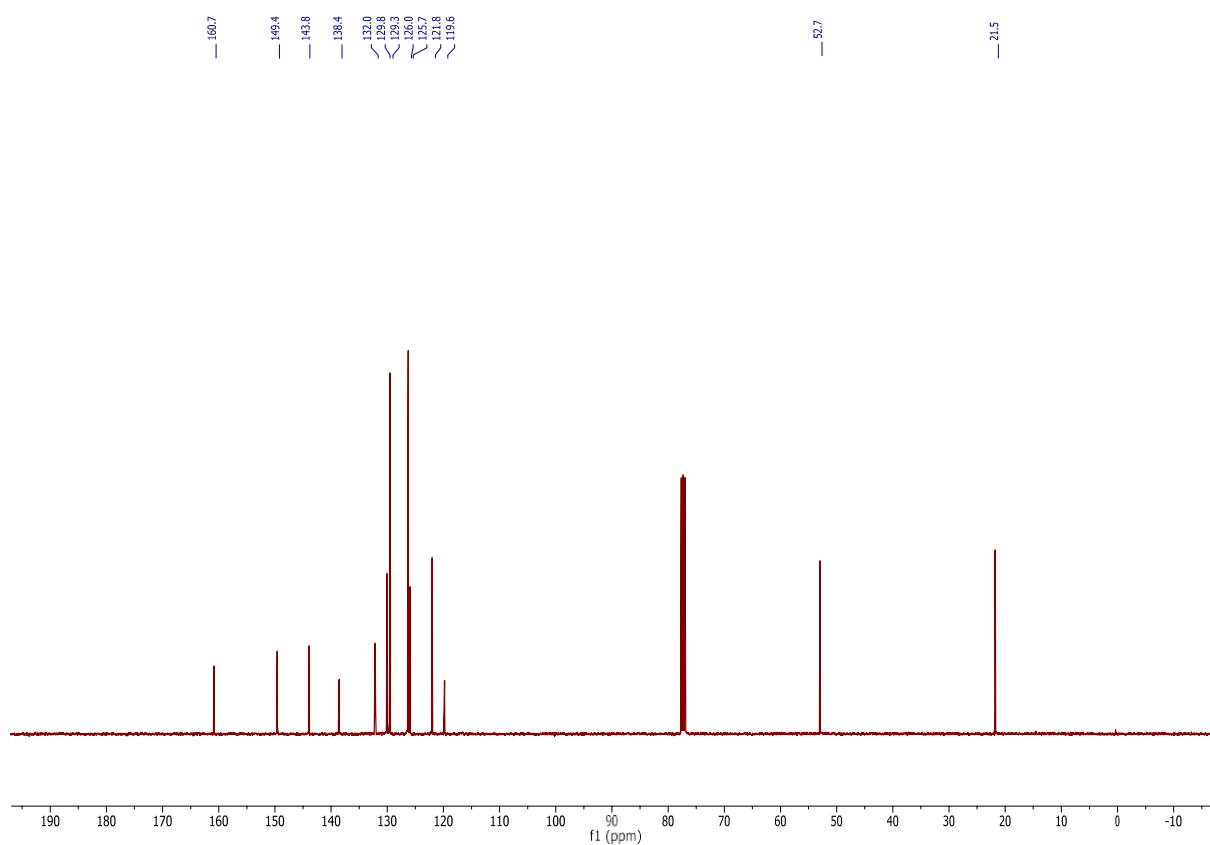
methyl 6-((benzyl(methyl)amino)methyl)-1H-1,2,3-triazol-1-yl)-1H-indazole-7-carboxylate



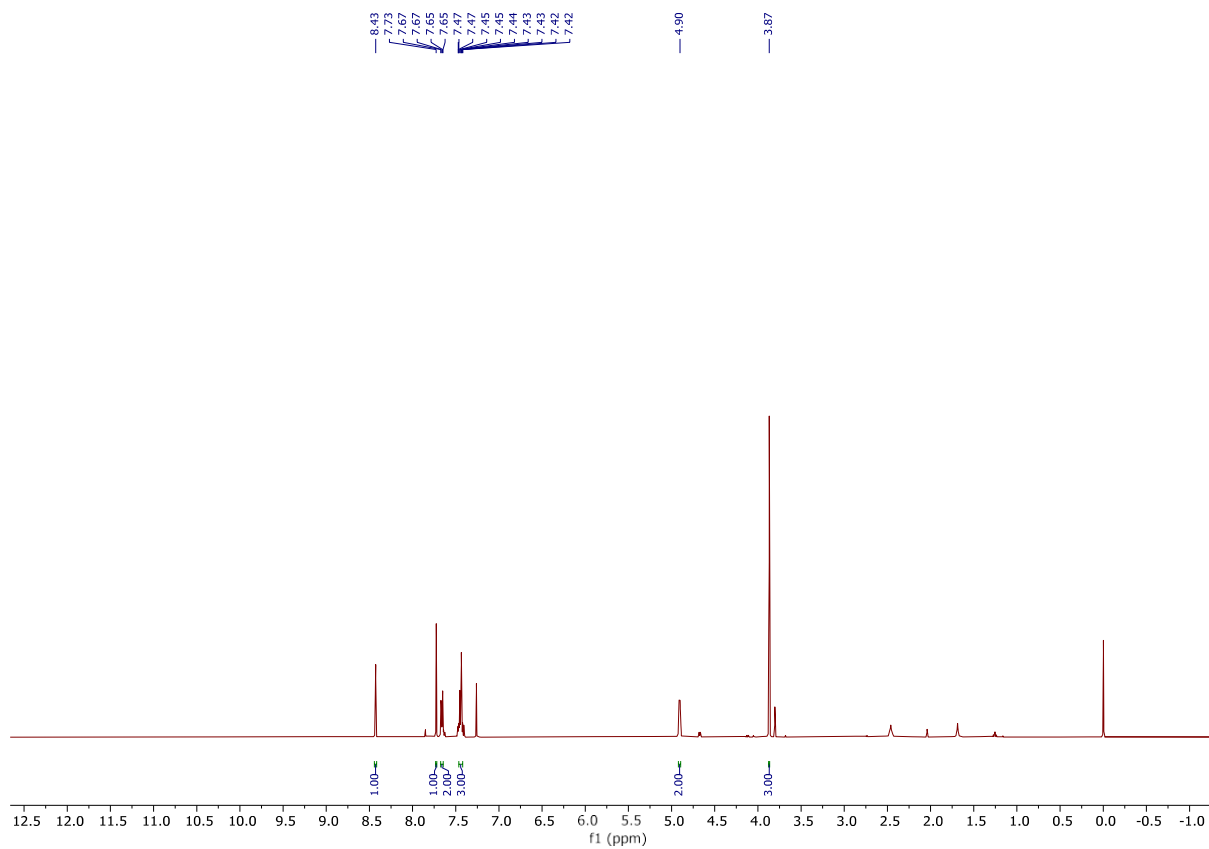
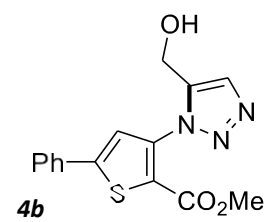


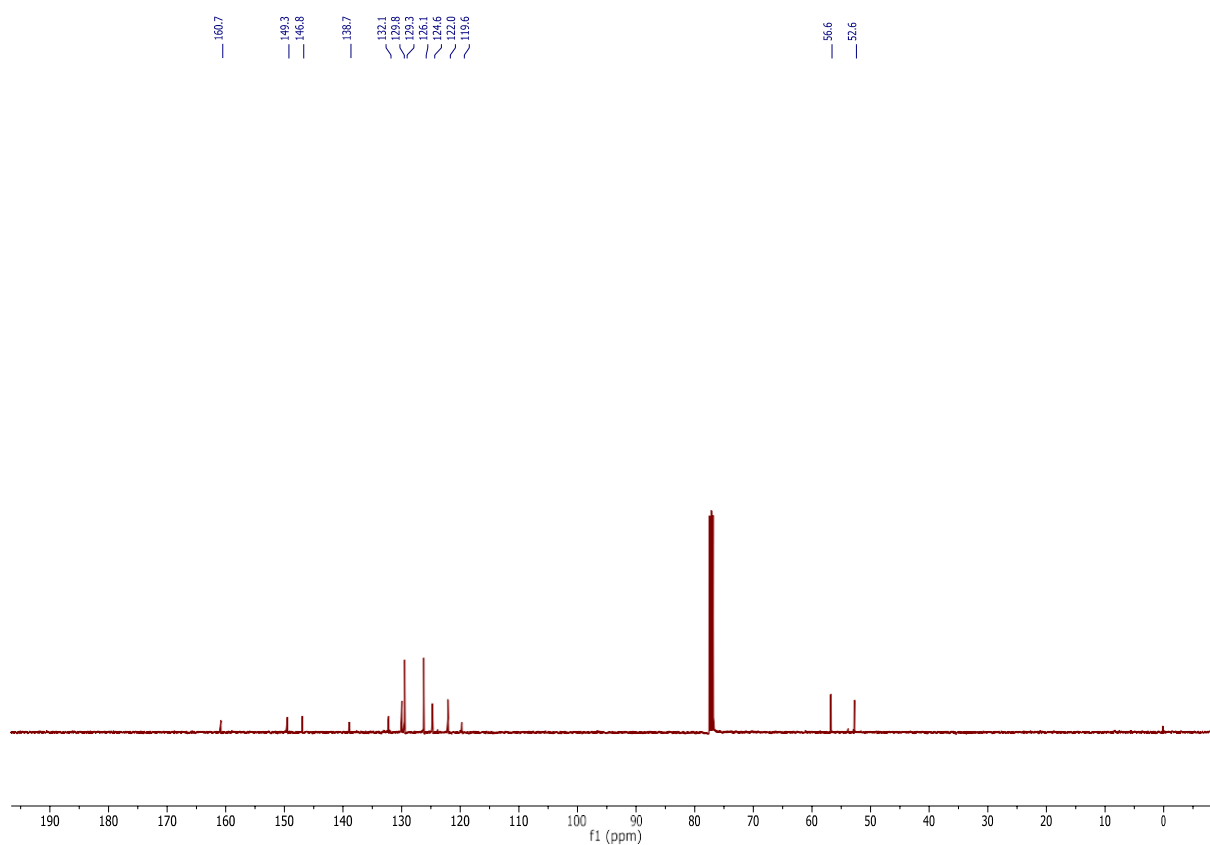
methyl 3-(5-(bromomethyl)-1H-1,2,3-triazol-1-yl)-5-phenylthiophene-2-carboxylate



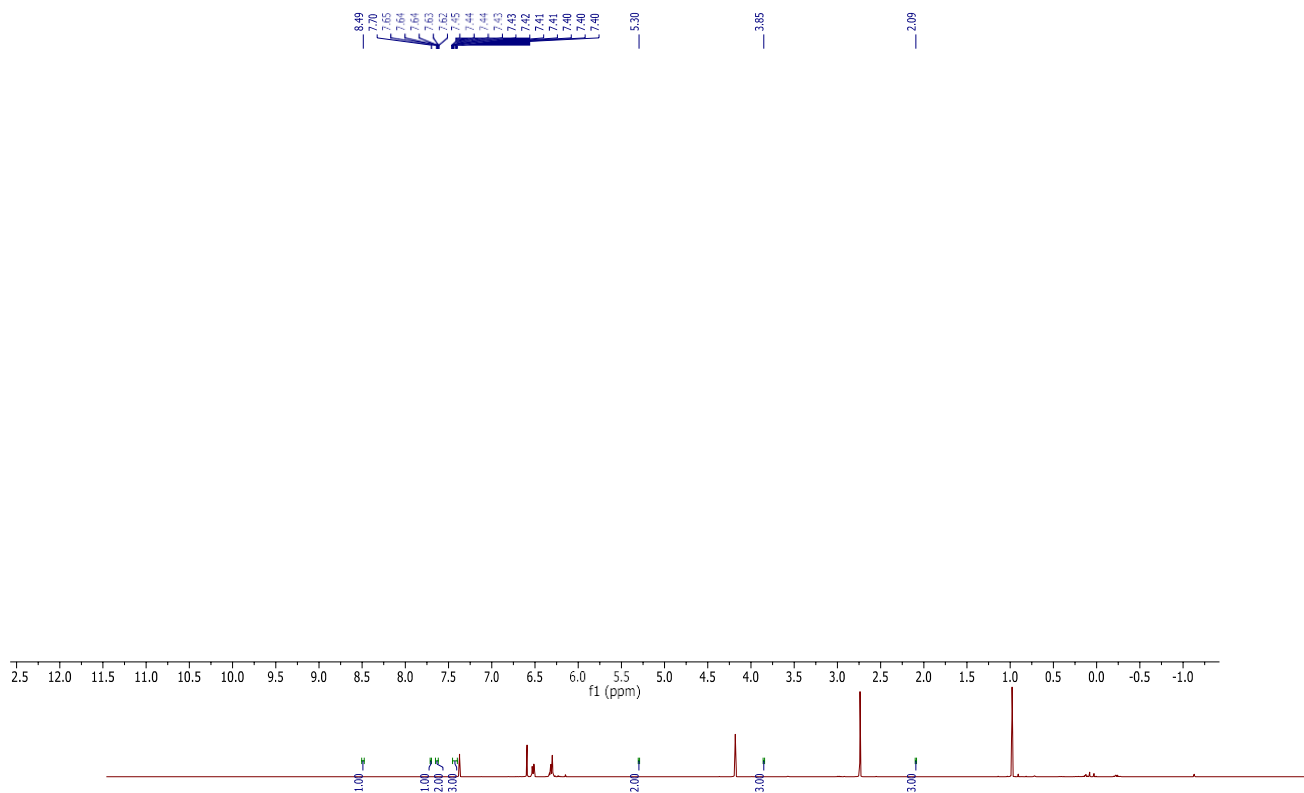
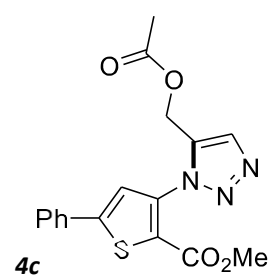


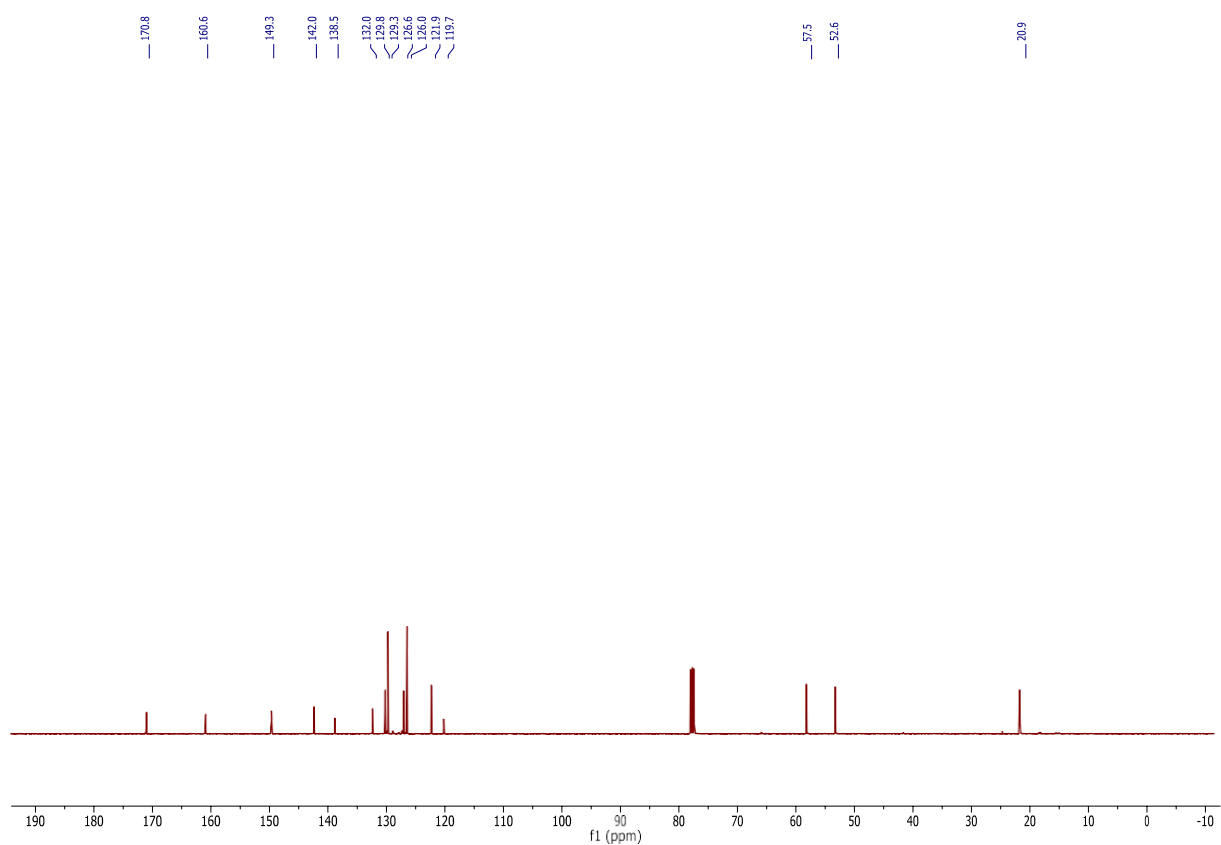
methyl 3-(5-(hydroxymethyl)-1H-1,2,3-triazol-1-yl)-5-phenylthiophene-2-carboxylate



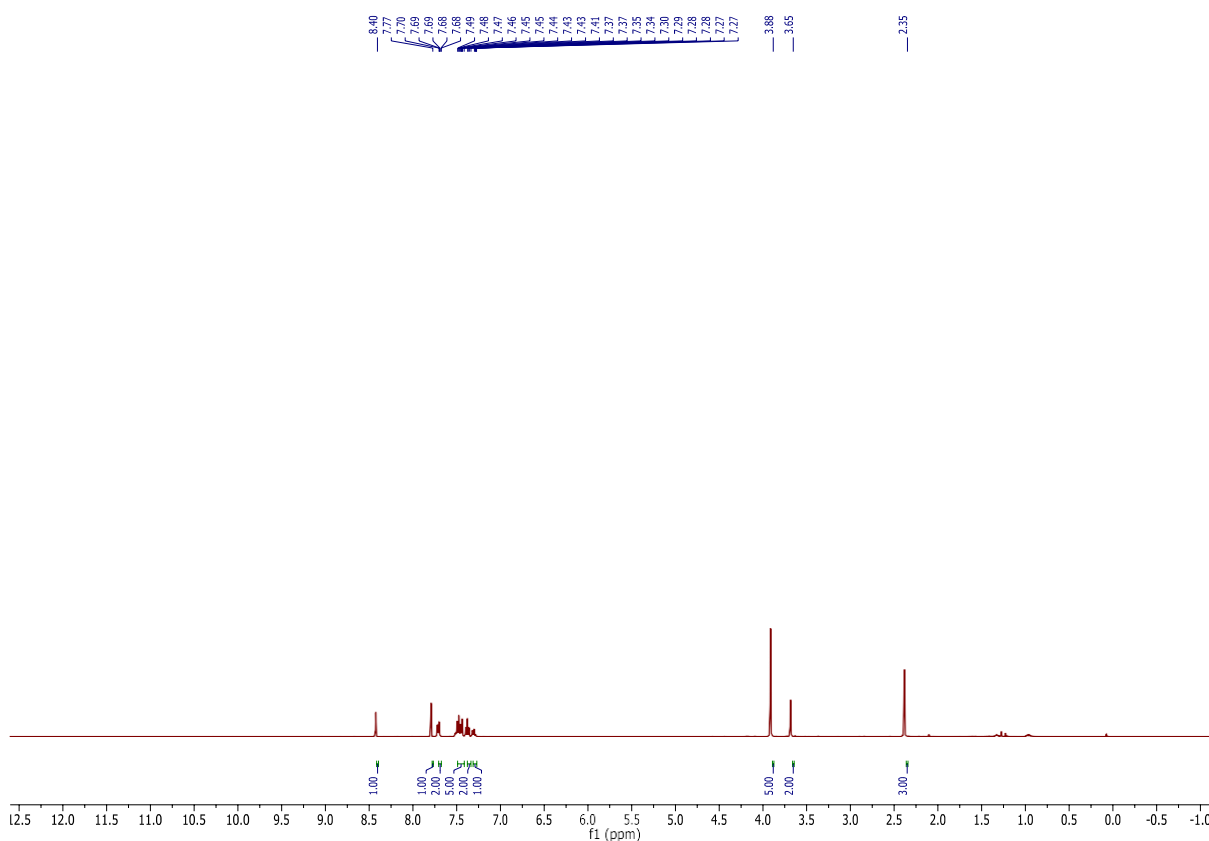
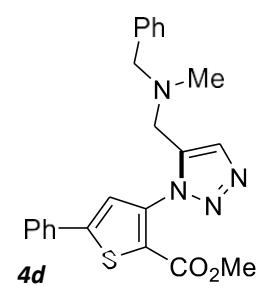


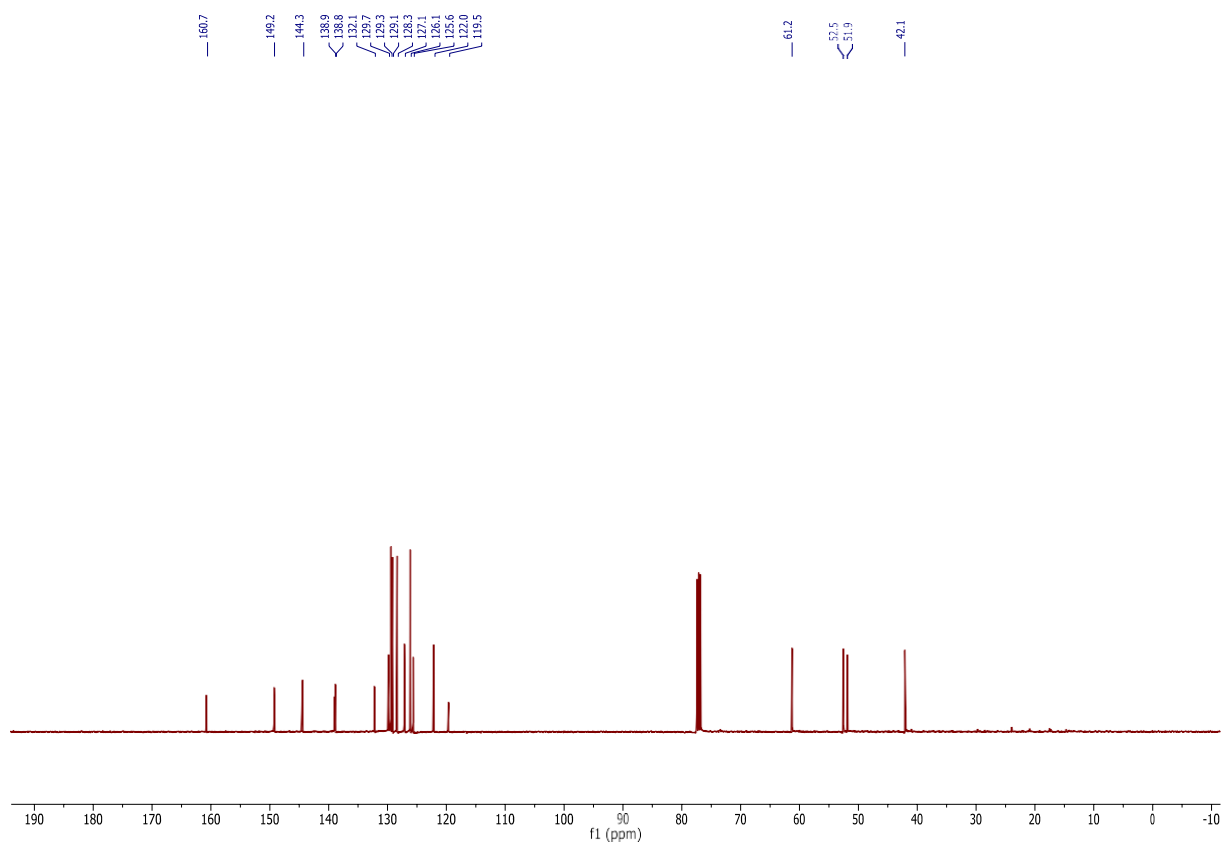
methyl 3-(5-(acetoxymethyl)-1H-1,2,3-triazol-1-yl)-5-phenylthiophene-2-carboxylate



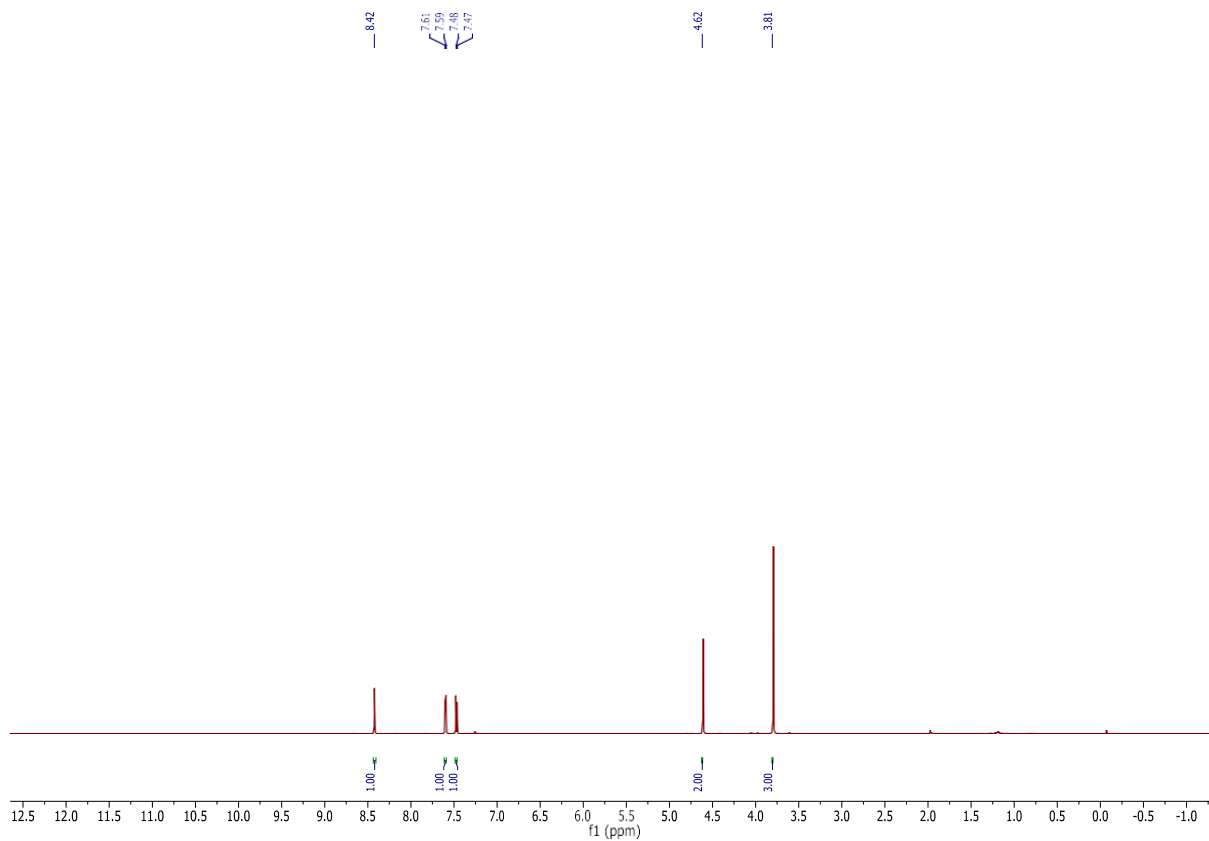
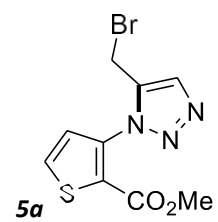


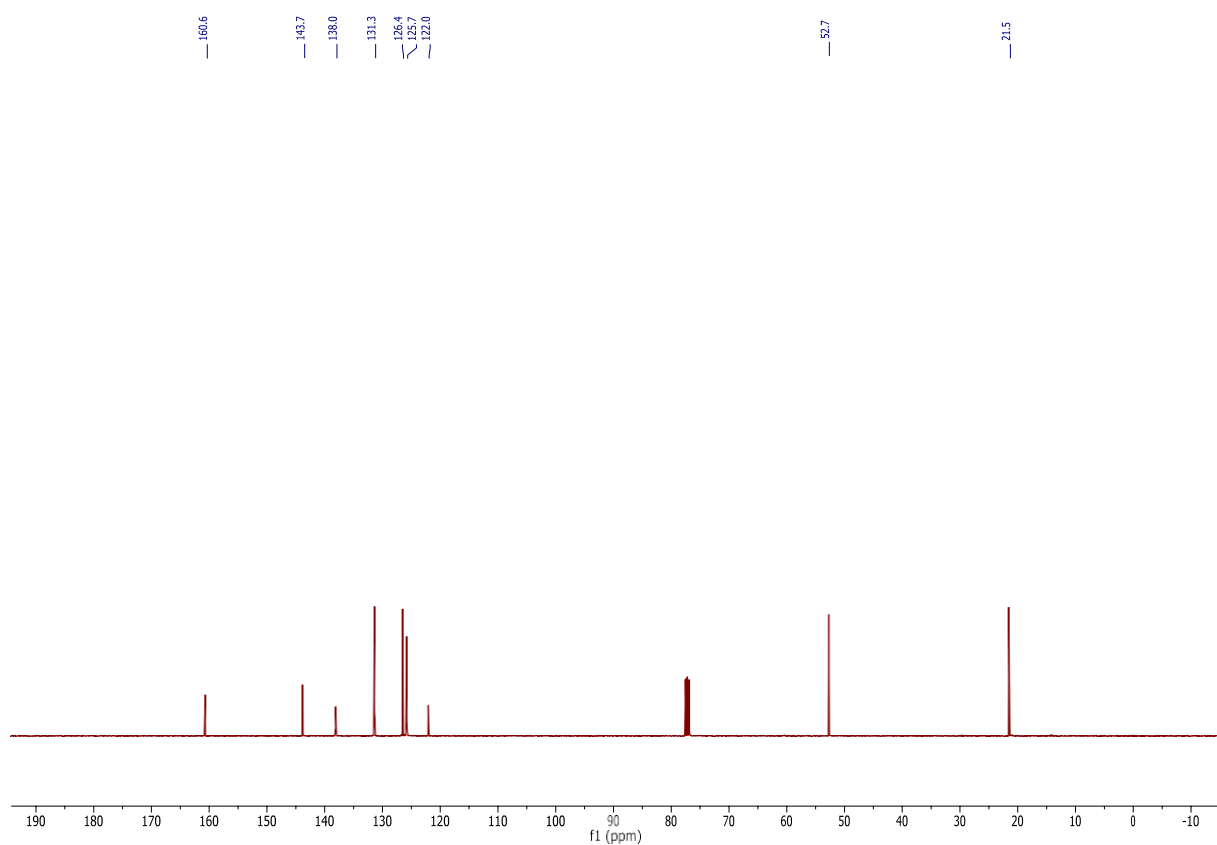
methyl 3-((5-((benzyl(methyl)amino)methyl)-1H-1,2,3-triazol-1-yl)-5-phenylthiophene-2-carboxylate



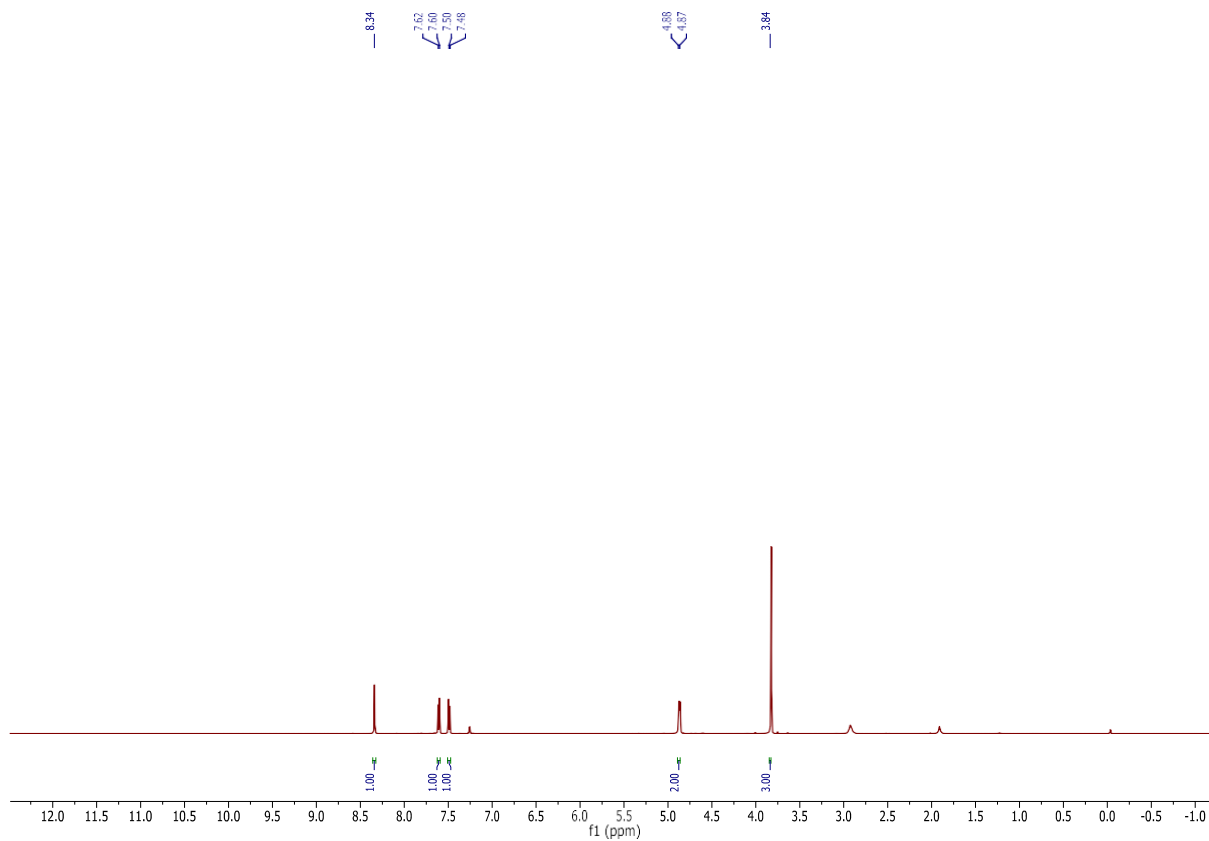
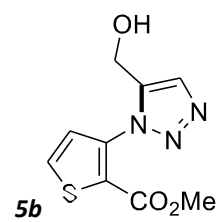


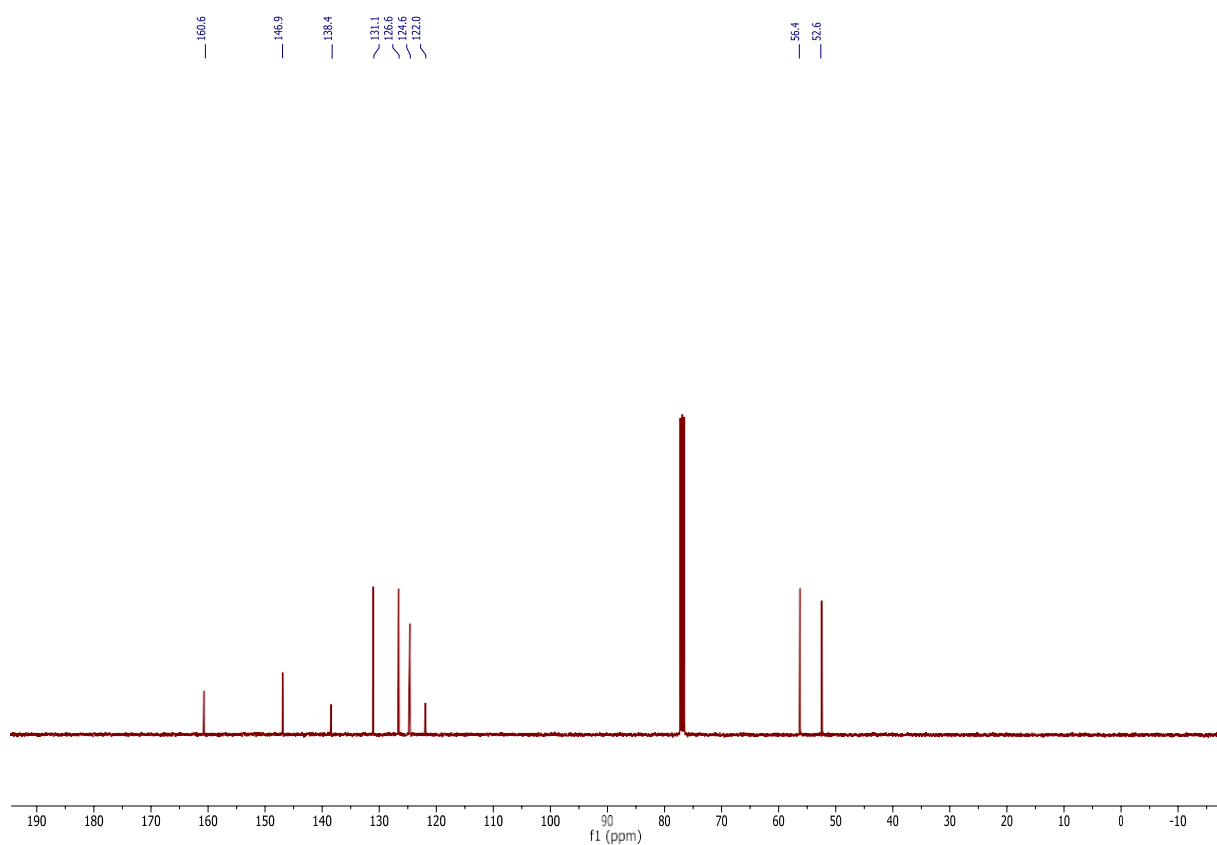
methy 3-(5-(bromomethyl)-1H-1,2,3-triazol-1-yl)thiophene-2-carboxylate



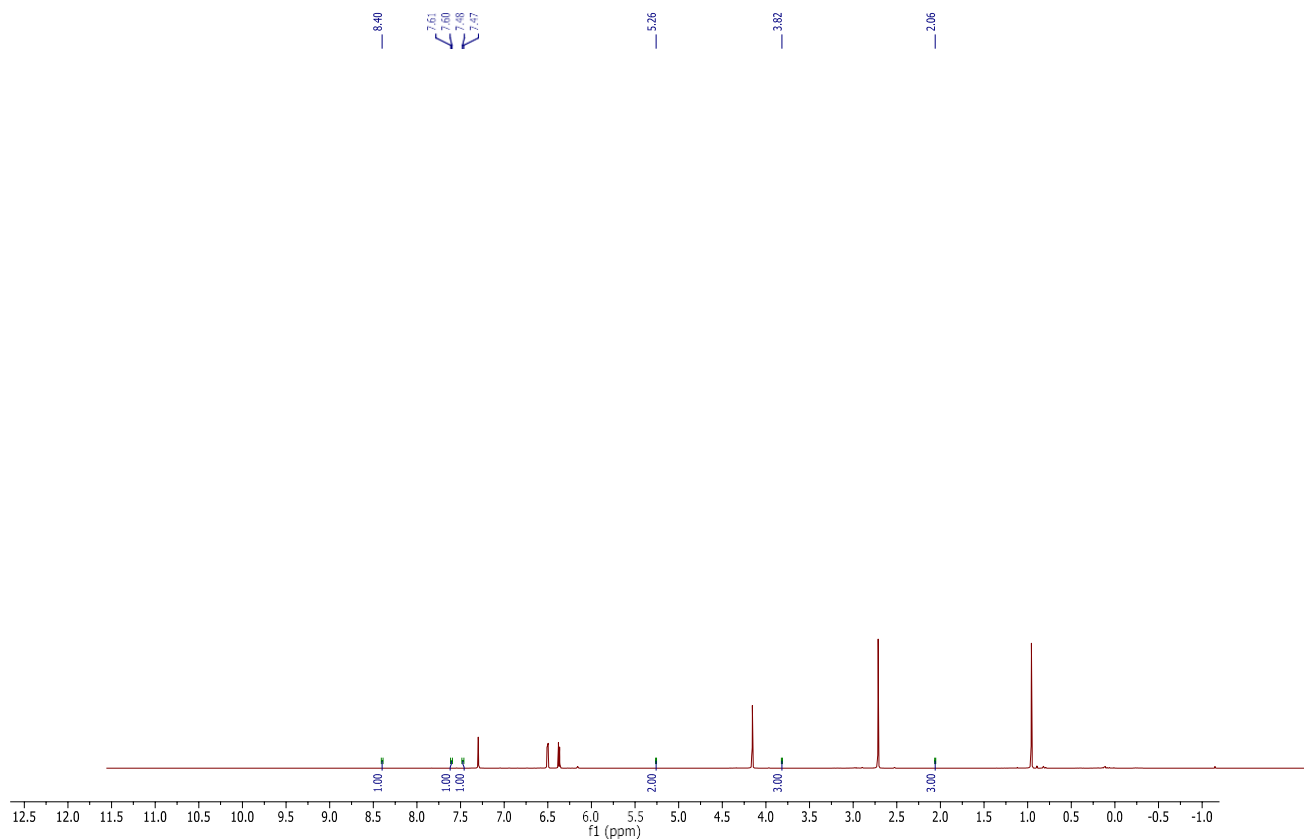
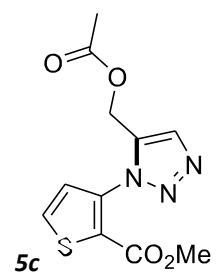


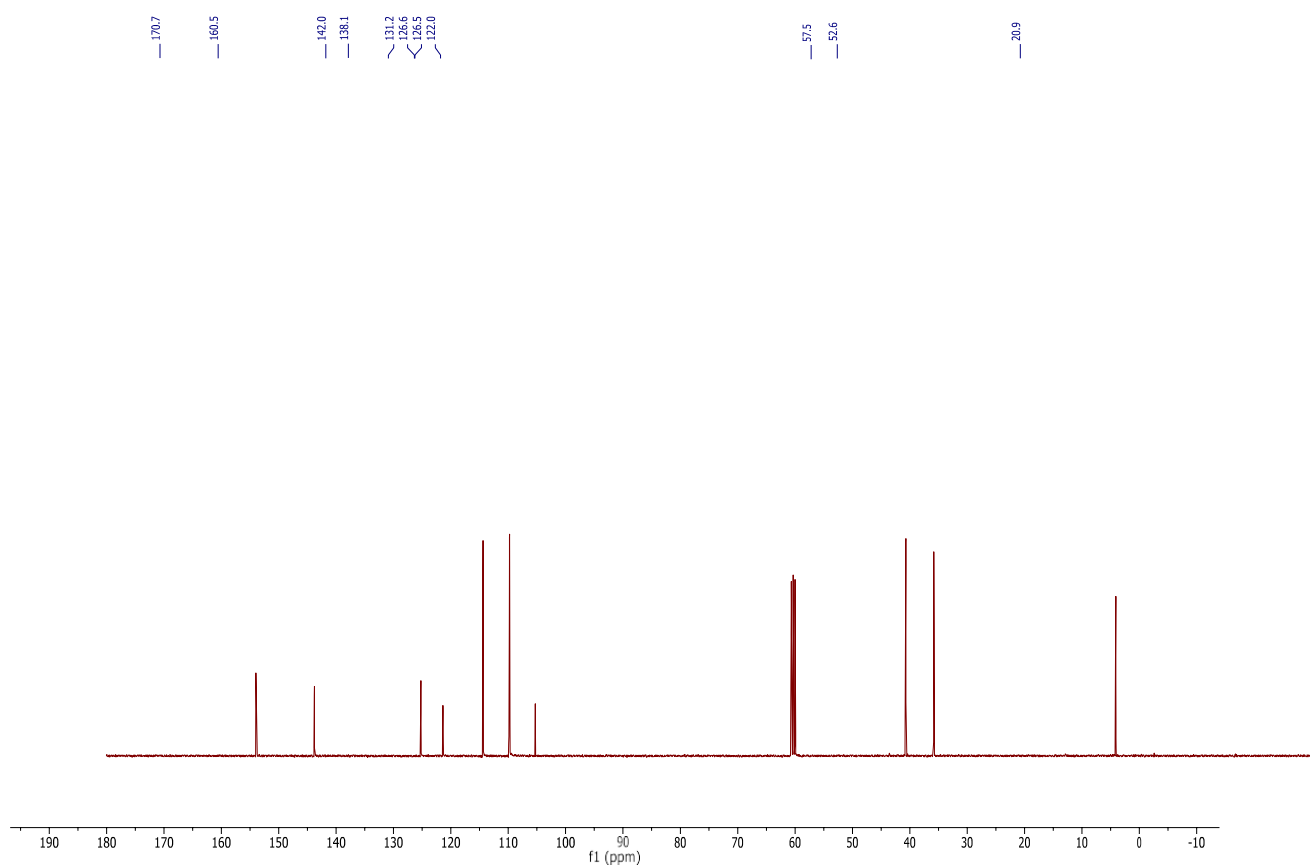
methyl 3-(5-(hydroxymethyl)-1H-1,2,3-triazol-1-yl)thiophene-2-carboxylate



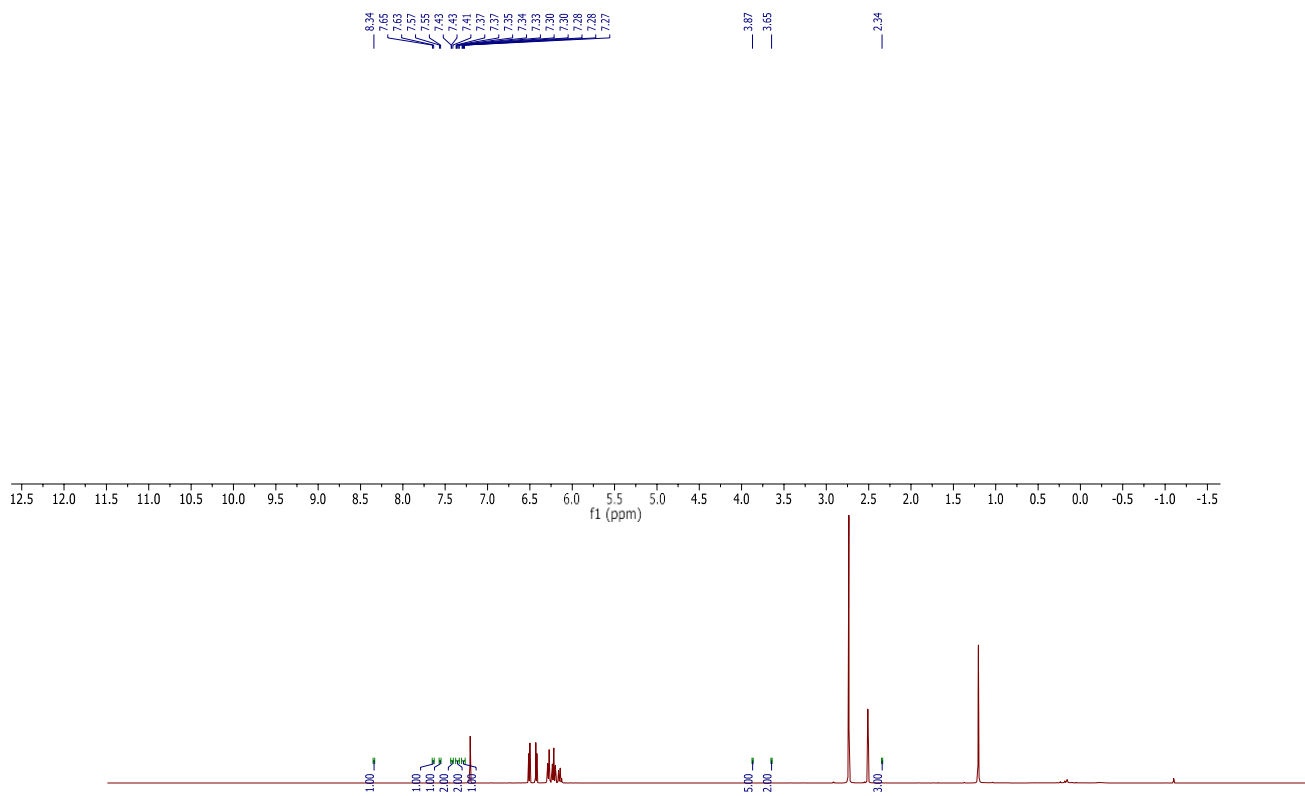
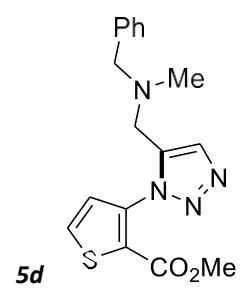


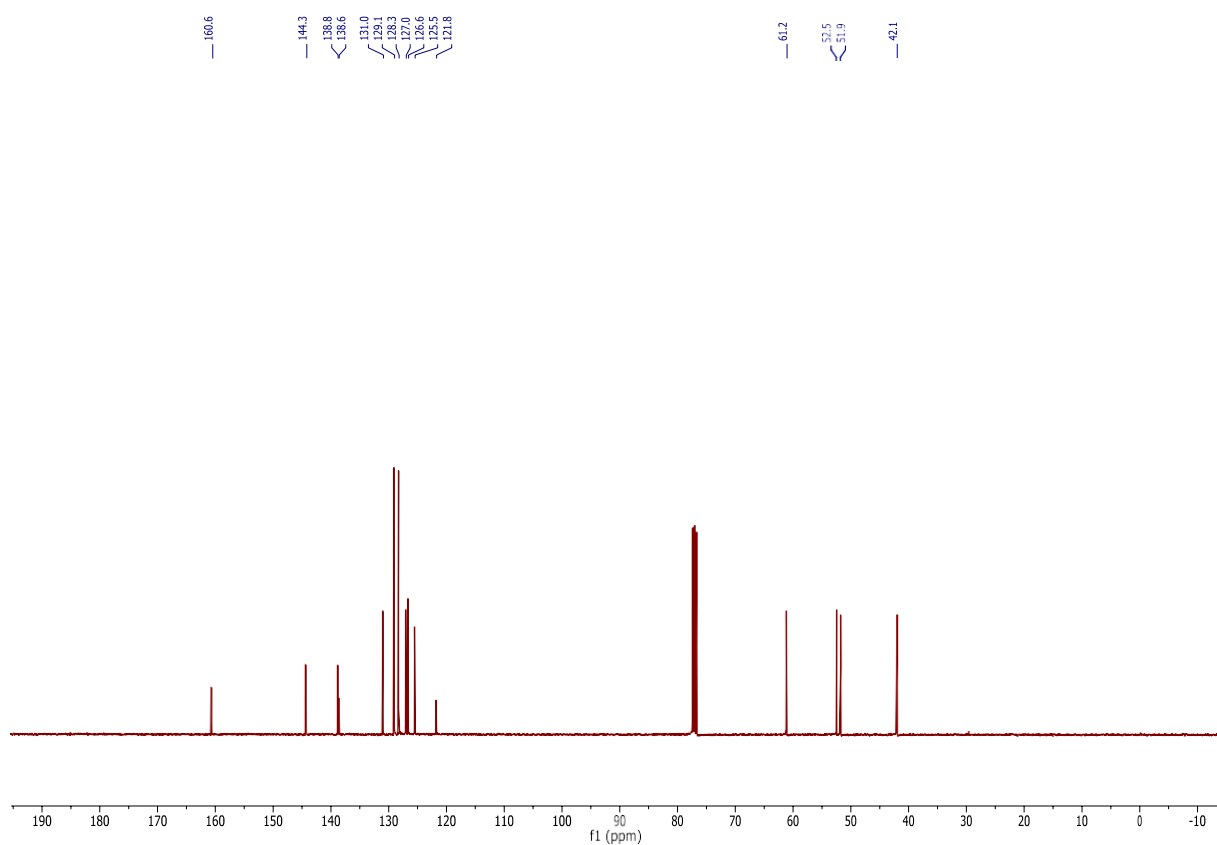
methyl 3-(5-(acetoxymethyl)-1H-1,2,3-triazol-1-yl)thiophene-2-carboxylate



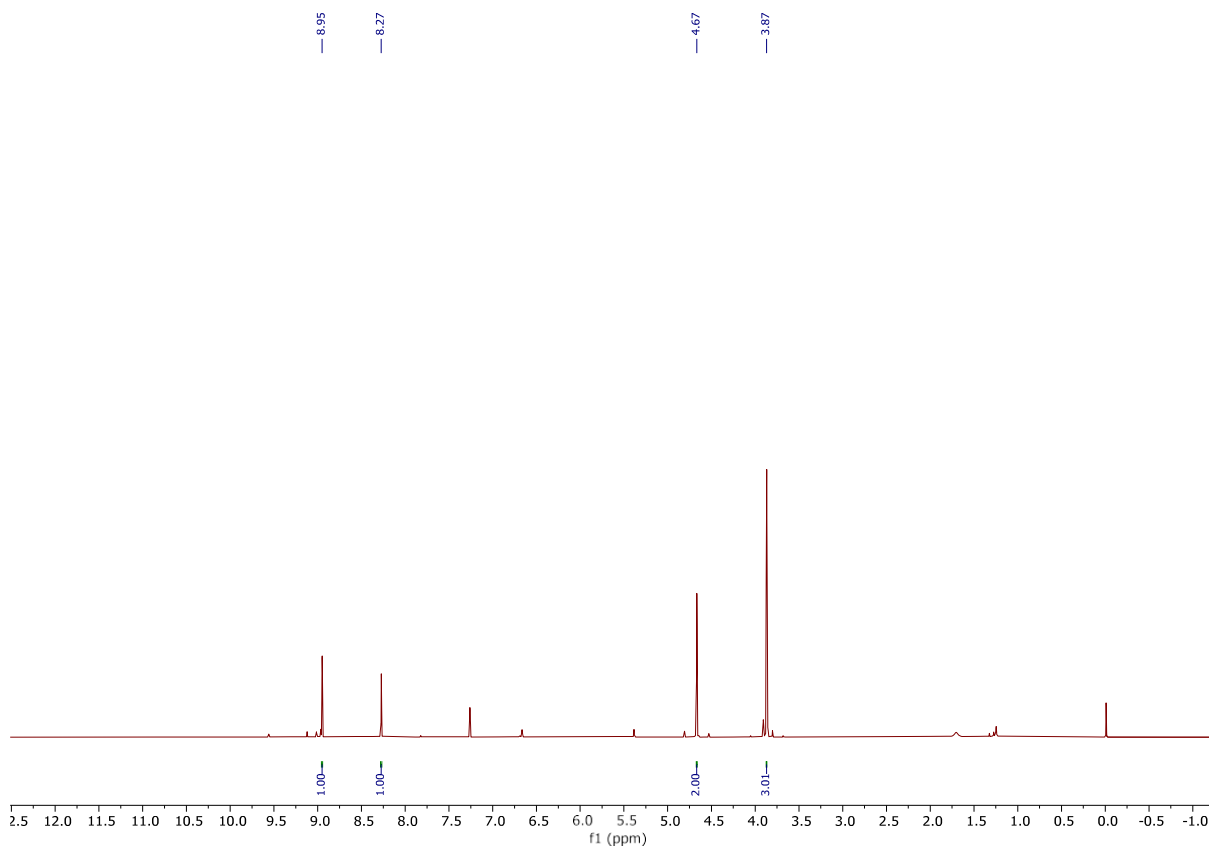
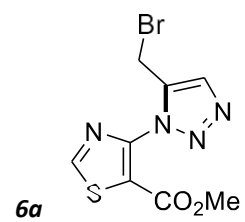


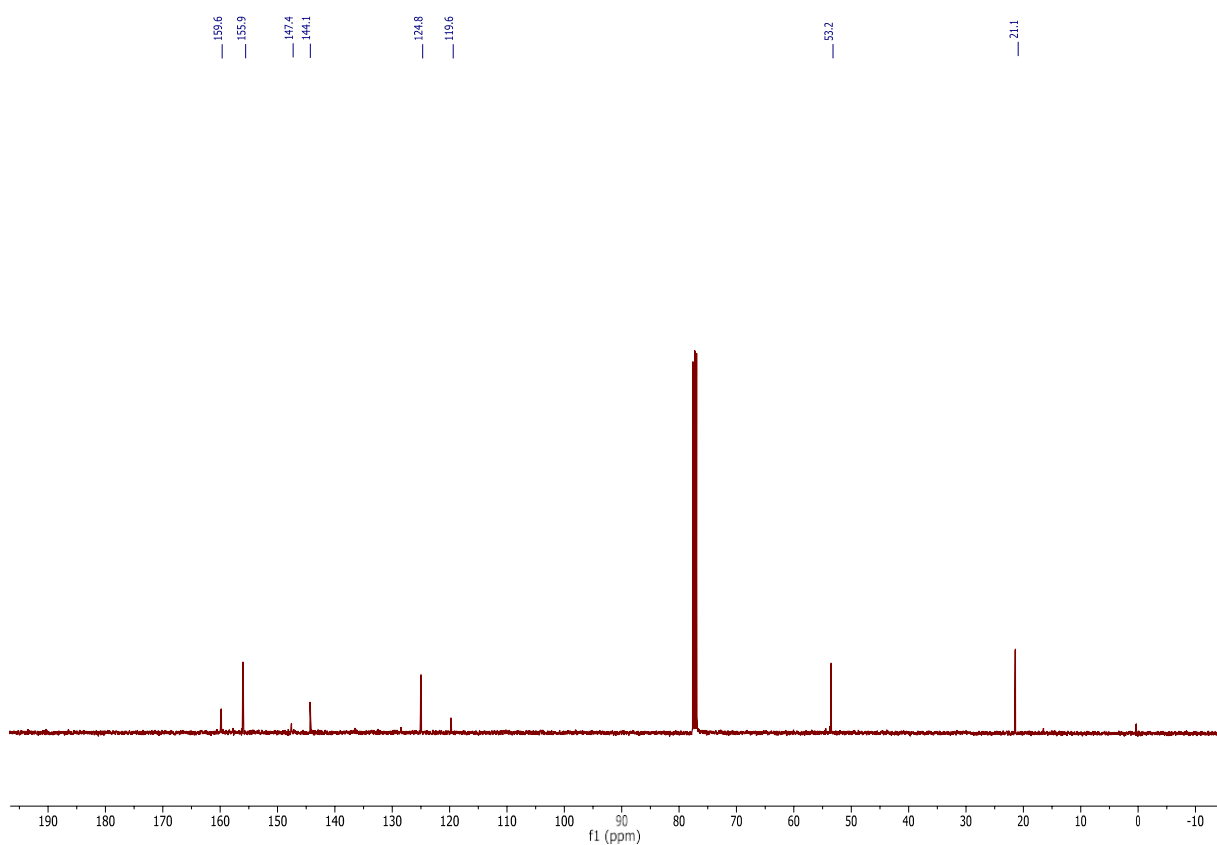
methyl 3-((benzyl(methyl)amino)methyl)-1H-1,2,3-triazol-1-yl)thiophene-2-carboxylate

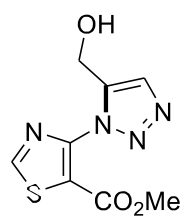




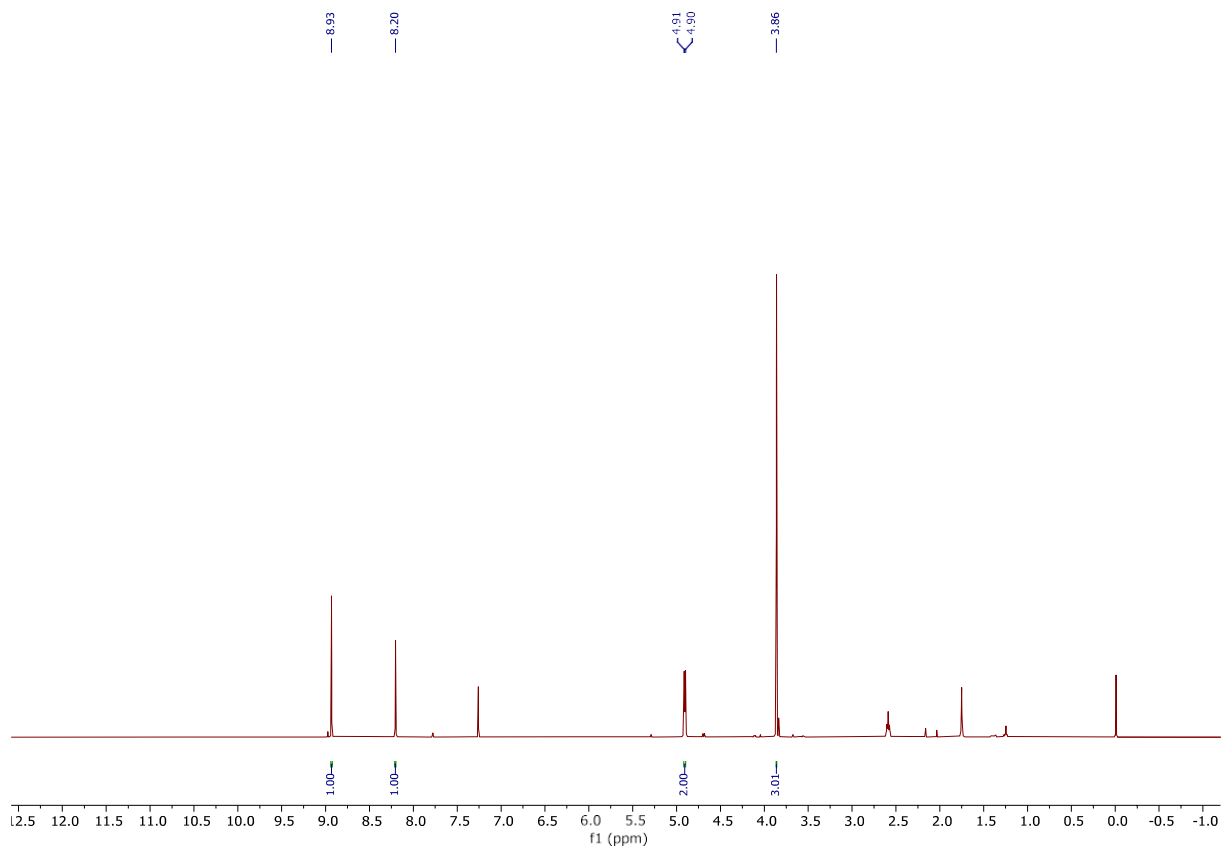
methyl 4-(5-(bromomethyl)-1H-1,2,3-triazol-1-yl)thiazole-5-carboxylate

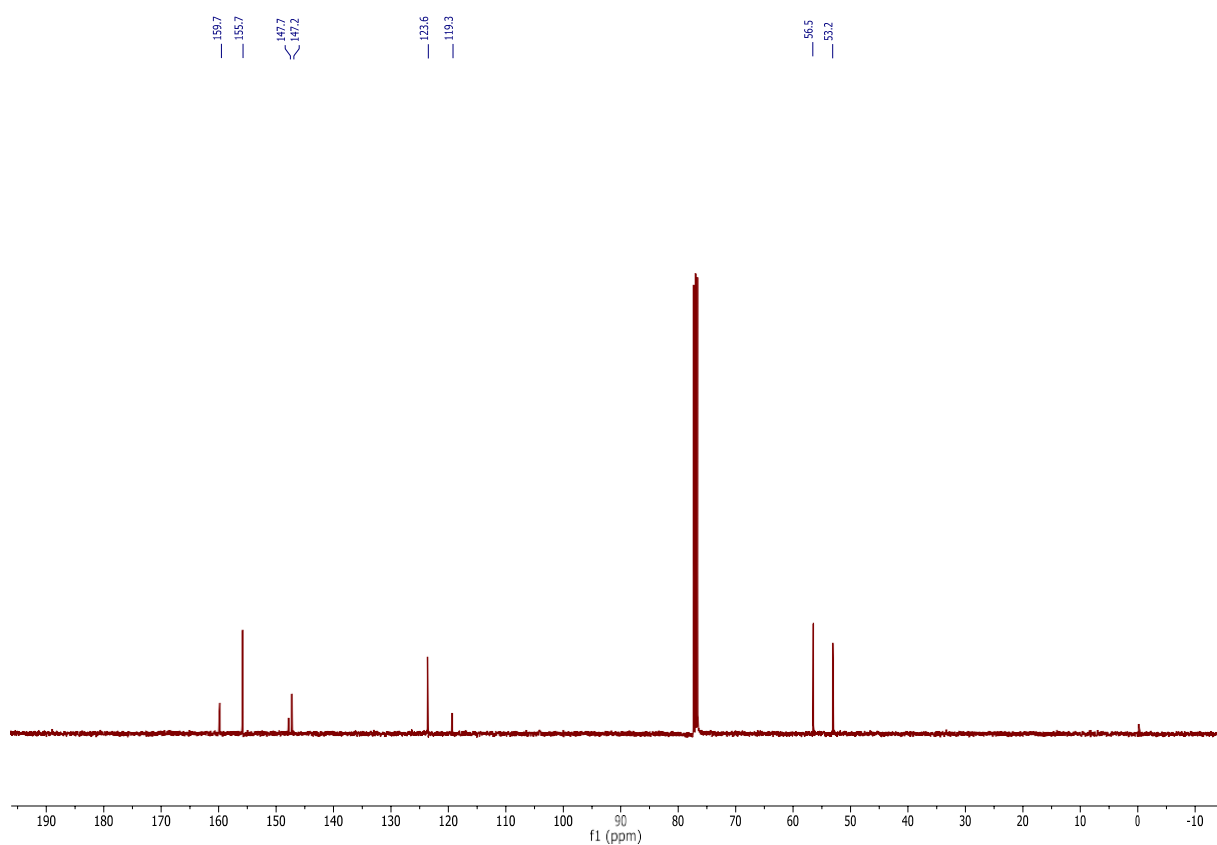


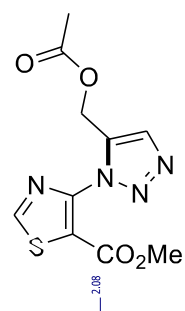




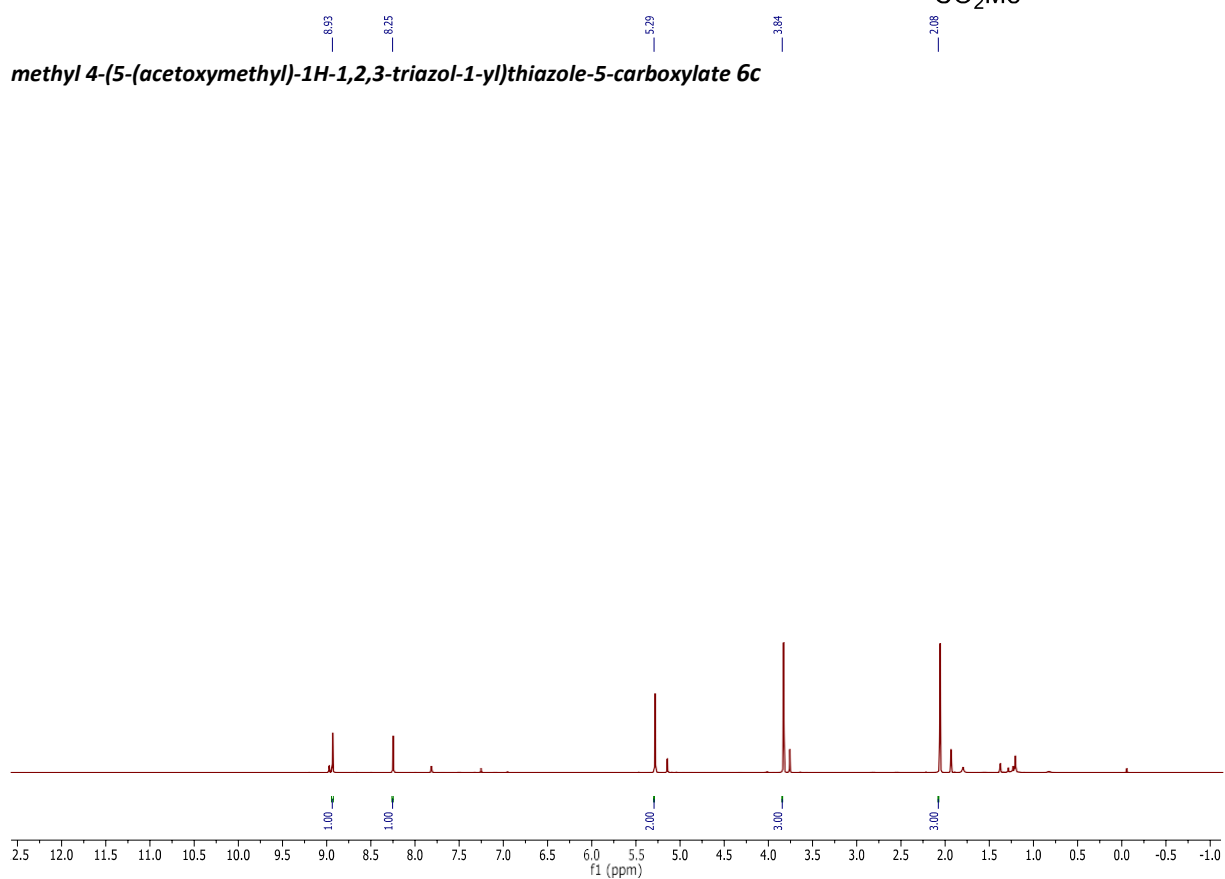
methyl 4-(5-(hydroxymethyl)-1H-1,2,3-triazol-1-yl)thiazole-5-carboxylate 6b

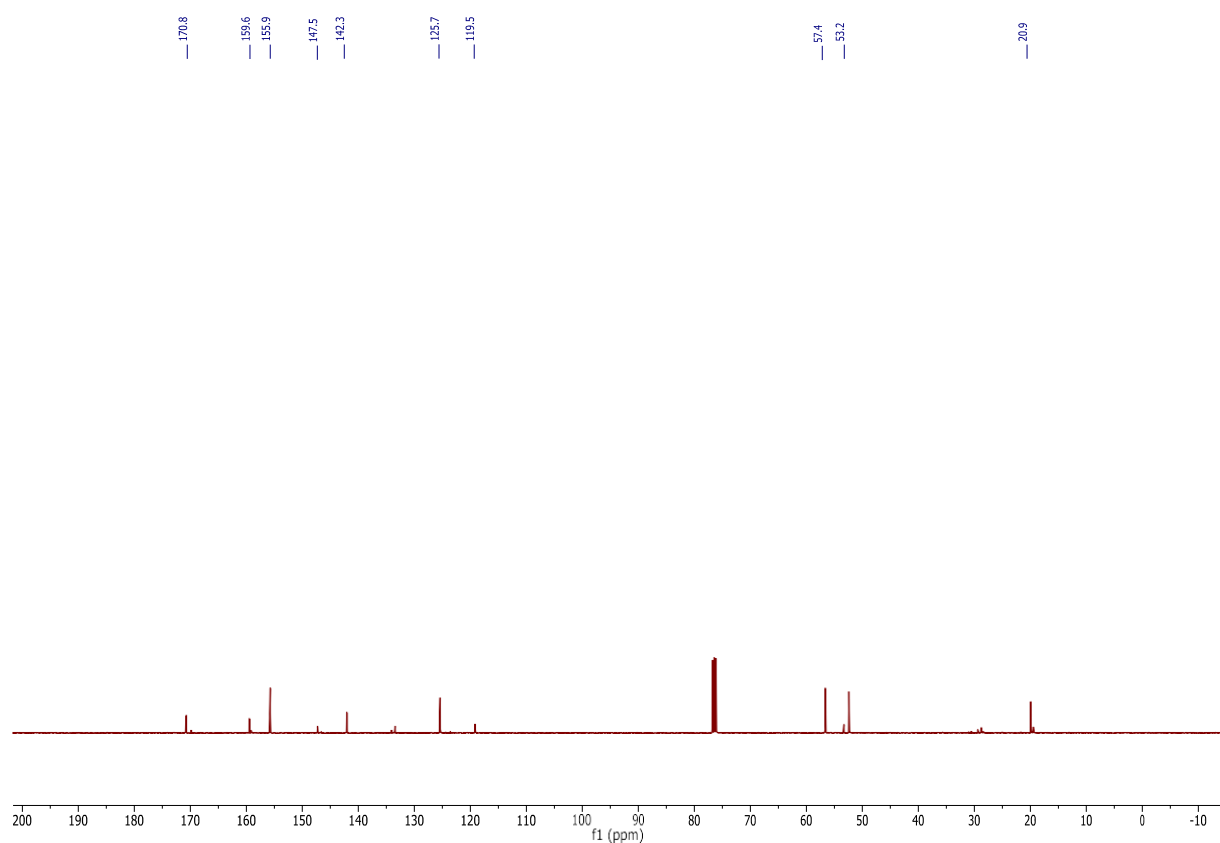






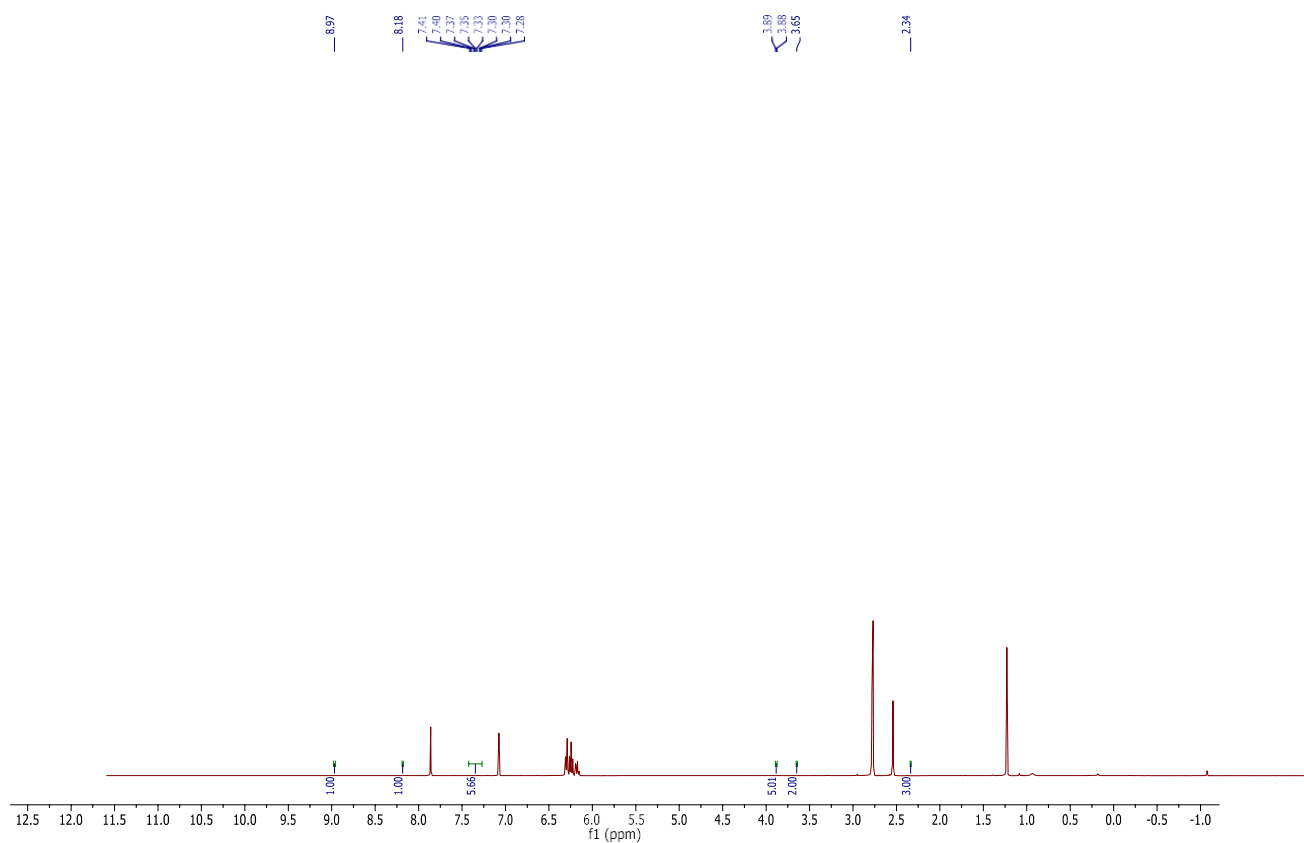
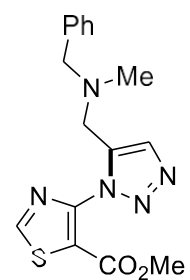
methyl 4-(5-(acetoxymethyl)-1H-1,2,3-triazol-1-yl)thiazole-5-carboxylate 6c

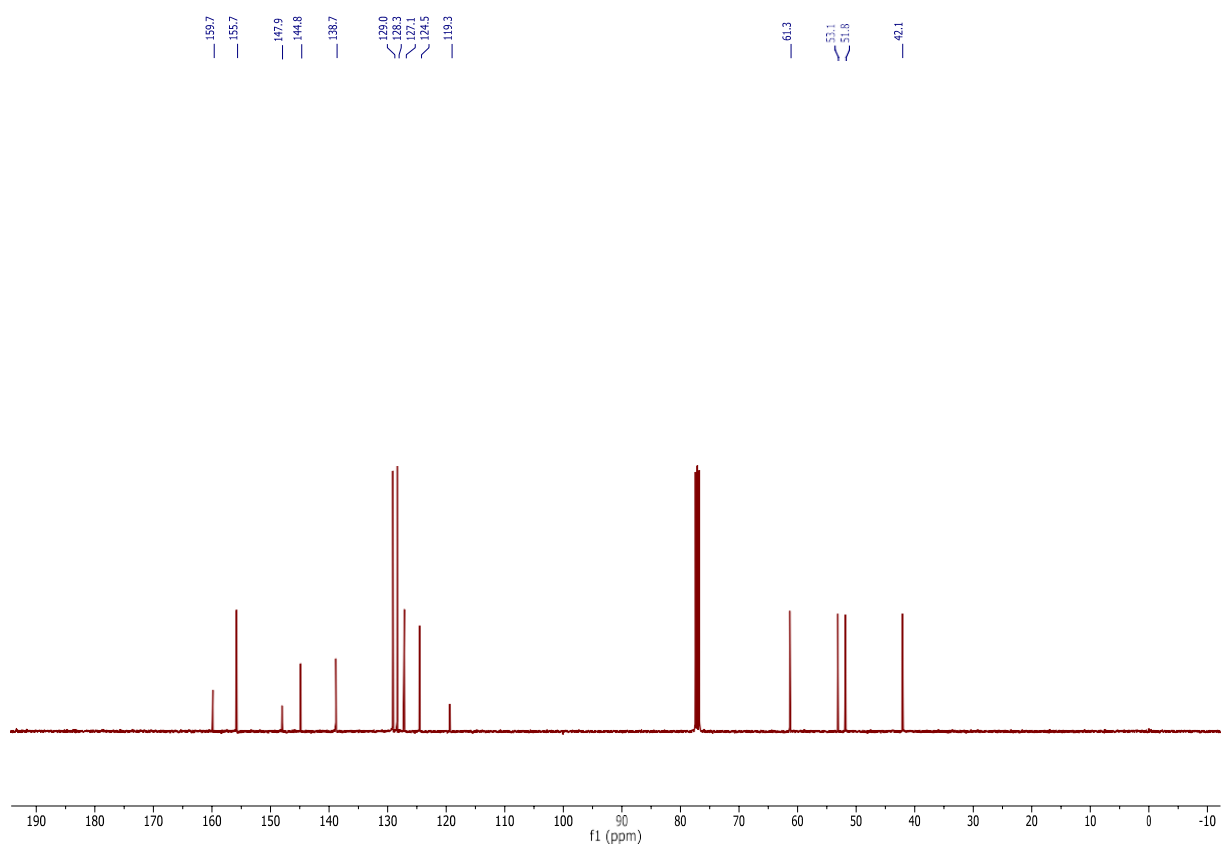




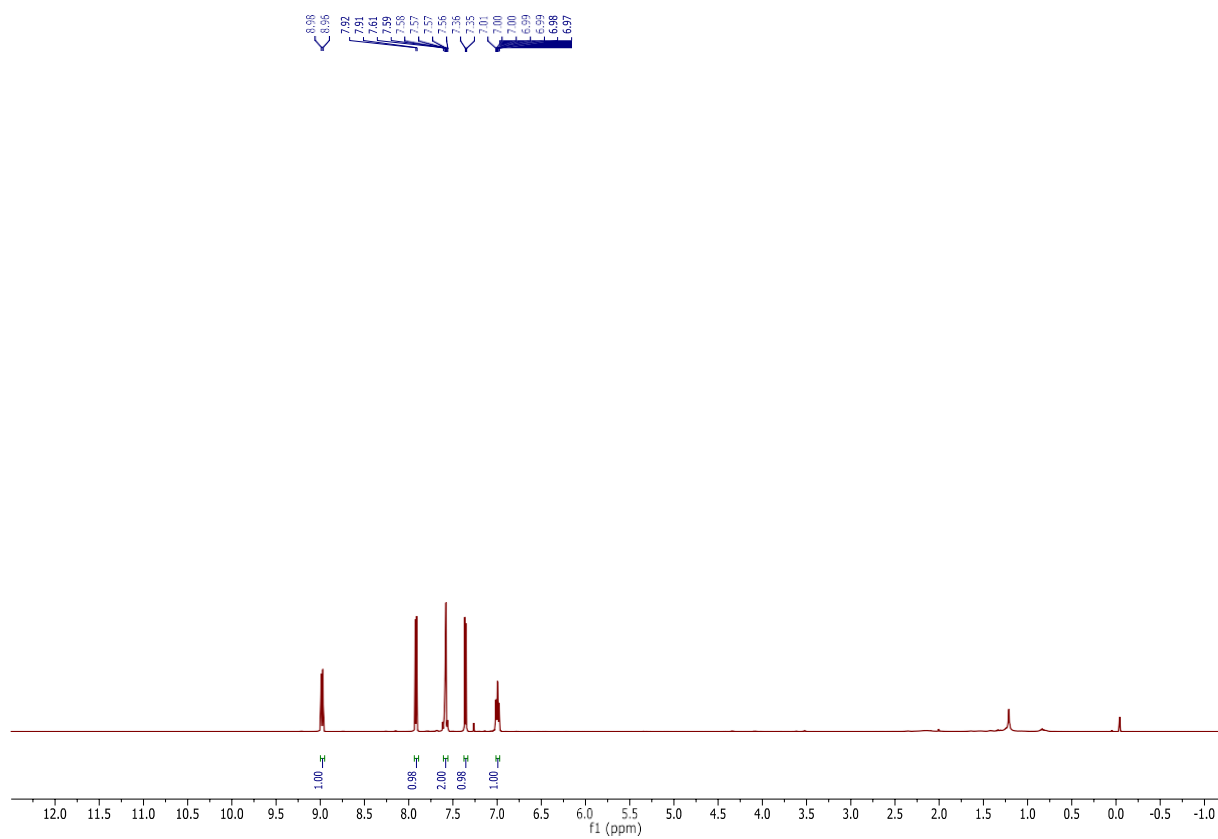
methyl 4-(5-((benzyl(methyl)amino)methyl)-1H-1,2,3-triazol-1-yl)thiazole-5-carboxylate

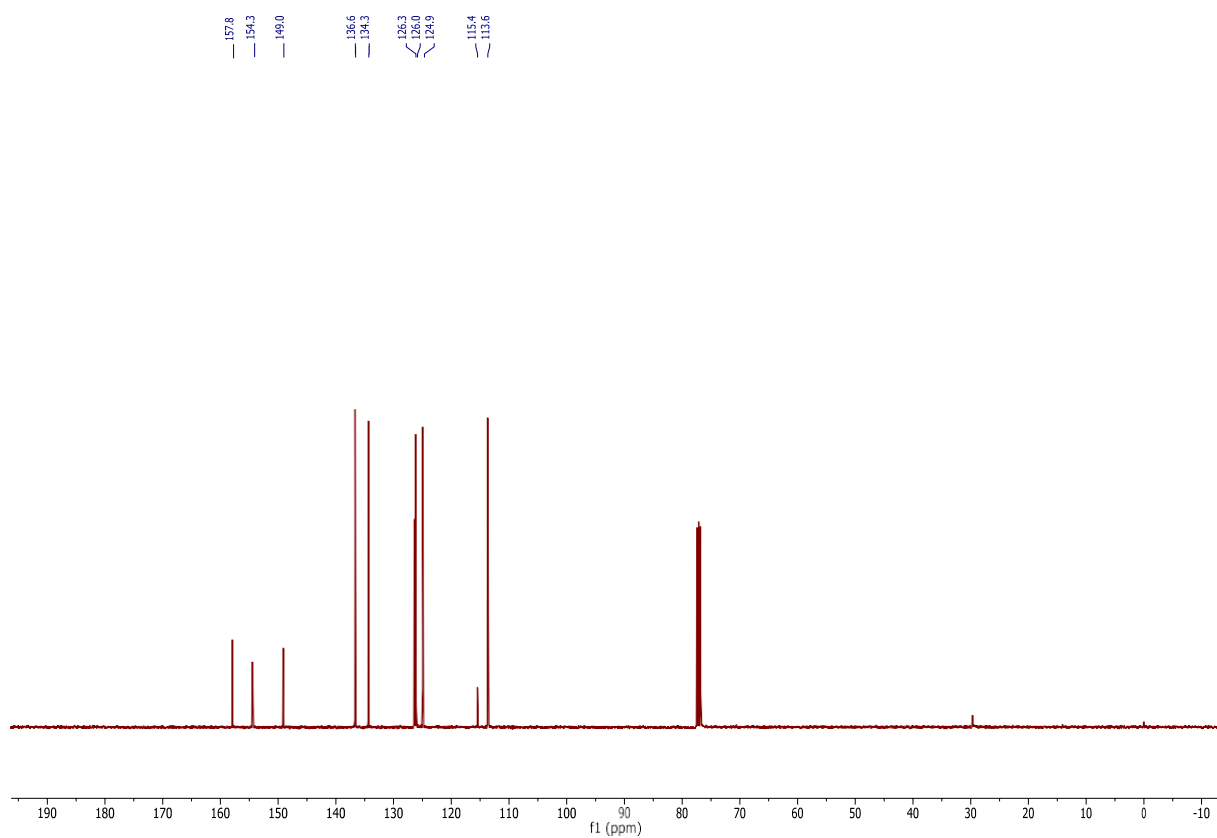
6d



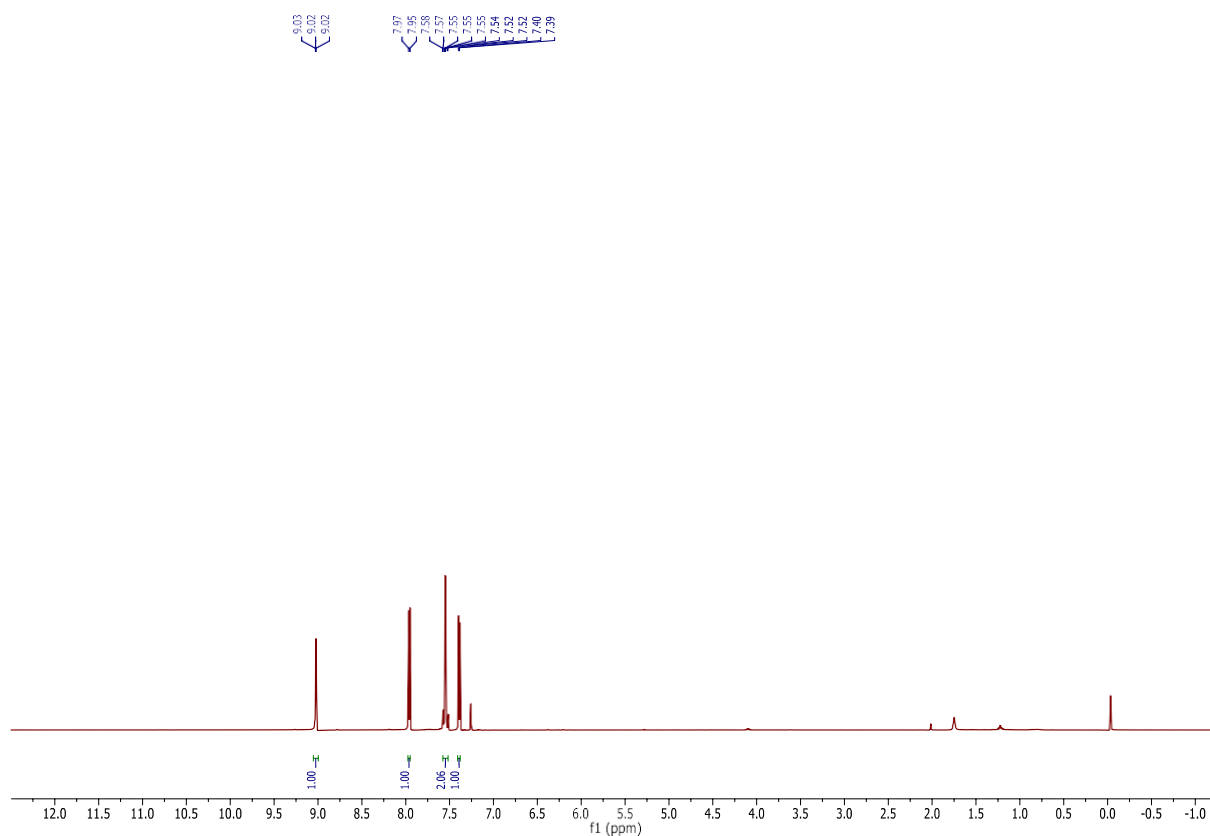
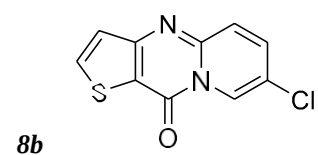


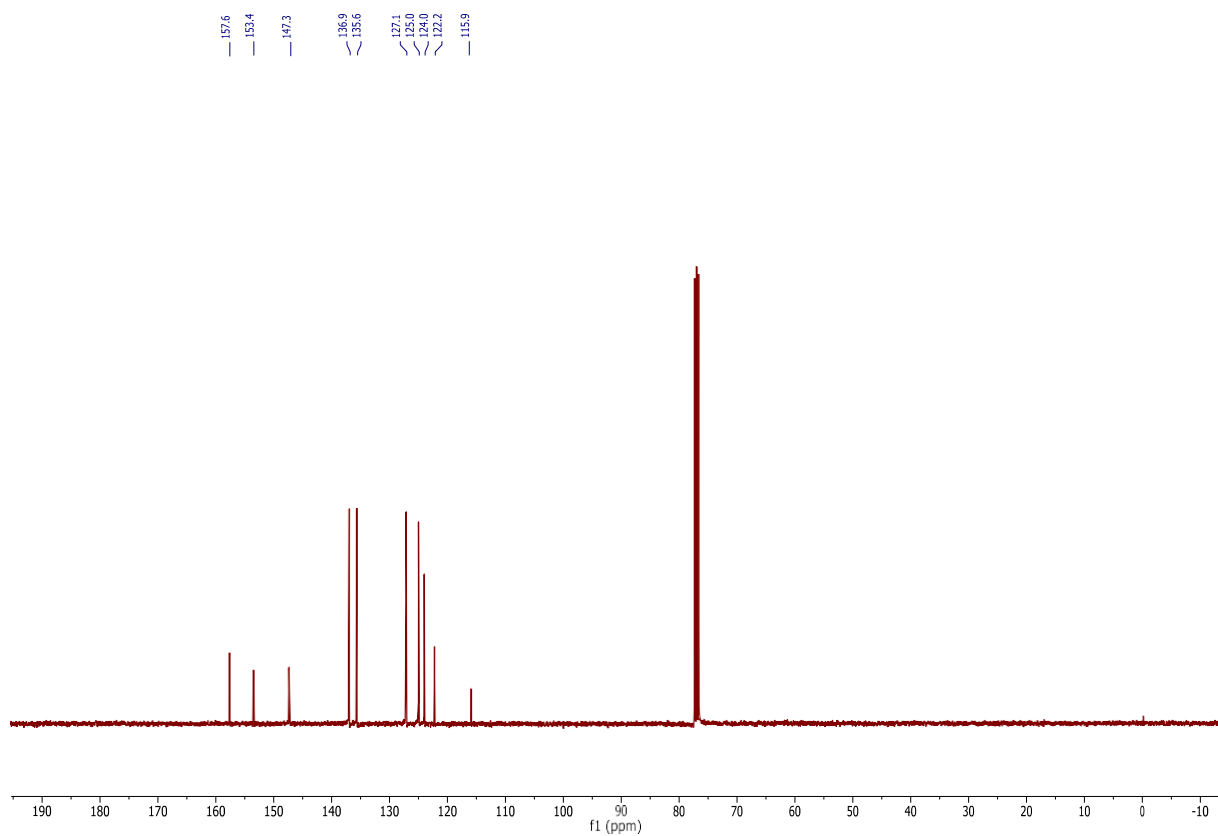
10H-pyrido[1,2-a]thieno[3,2-d]pyrimidin-10-one





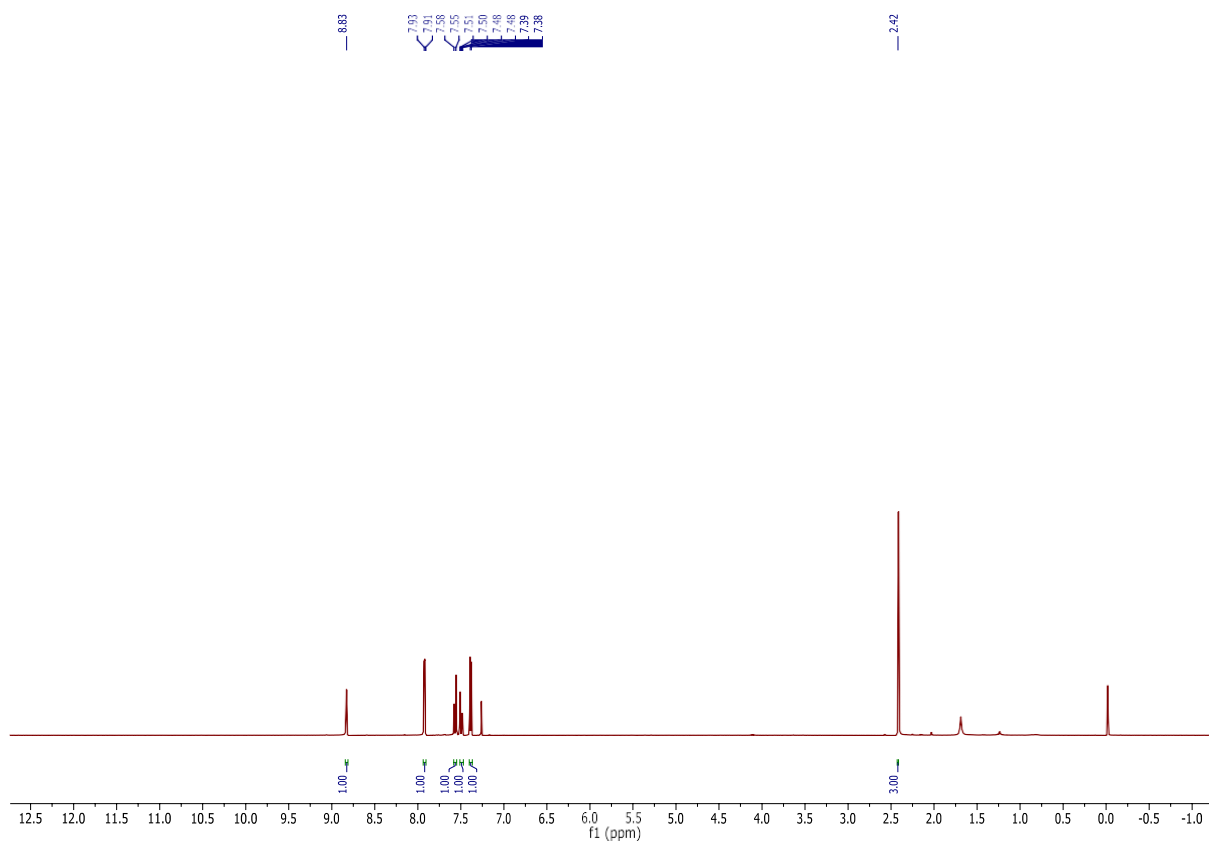
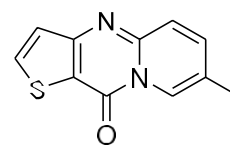
7-chloro-10H-pyrido[1,2-a]thieno[3,2-d]pyrimidin-10-one

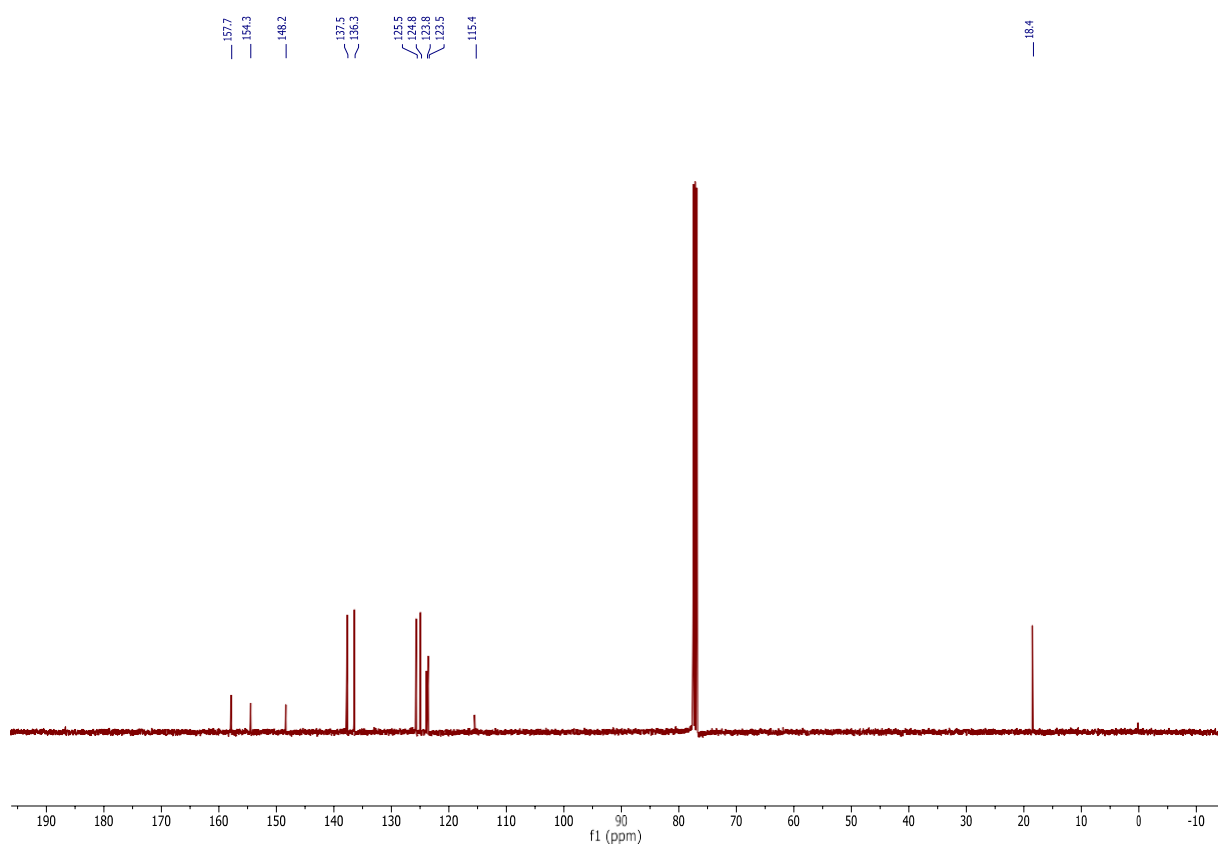




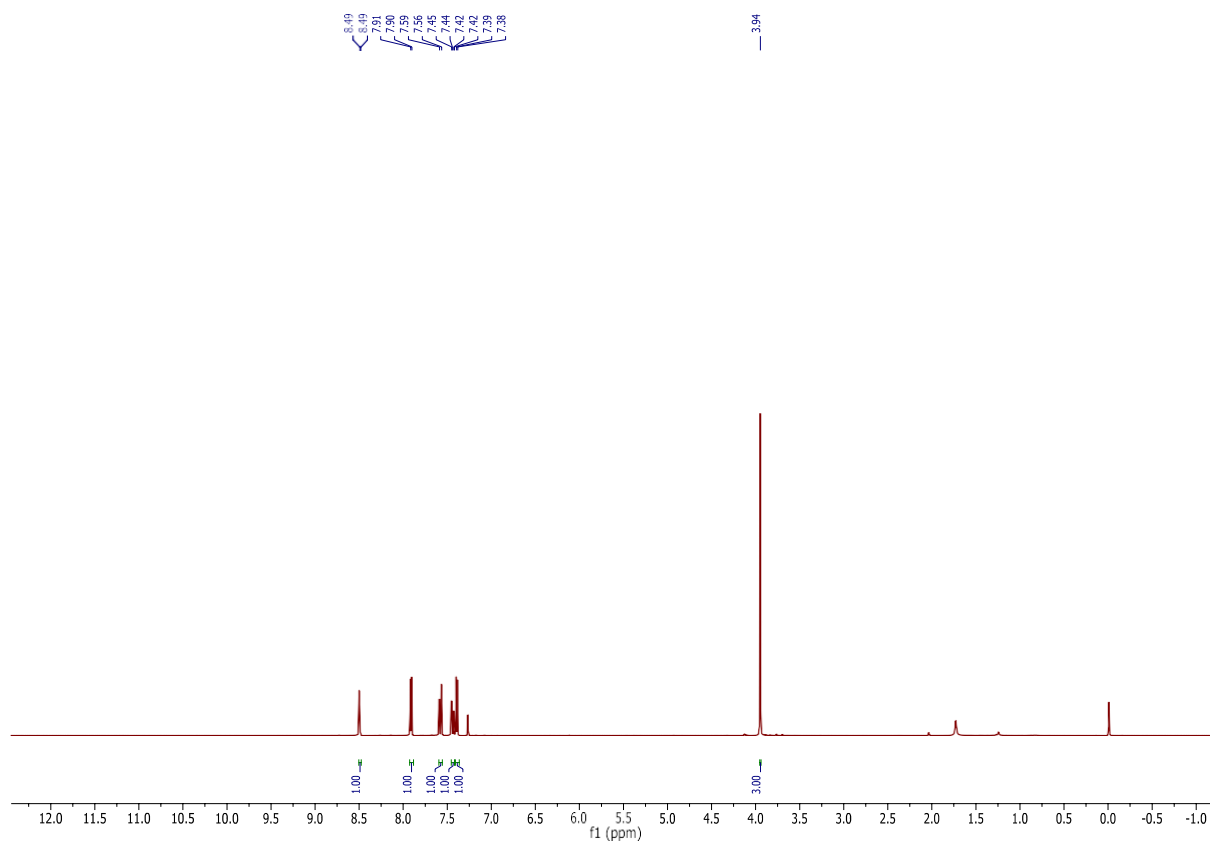
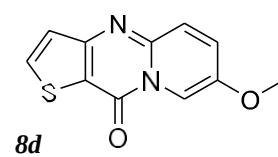
7-methyl-10H-pyrido[1,2-a]thieno[3,2-d]pyrimidin-10-one

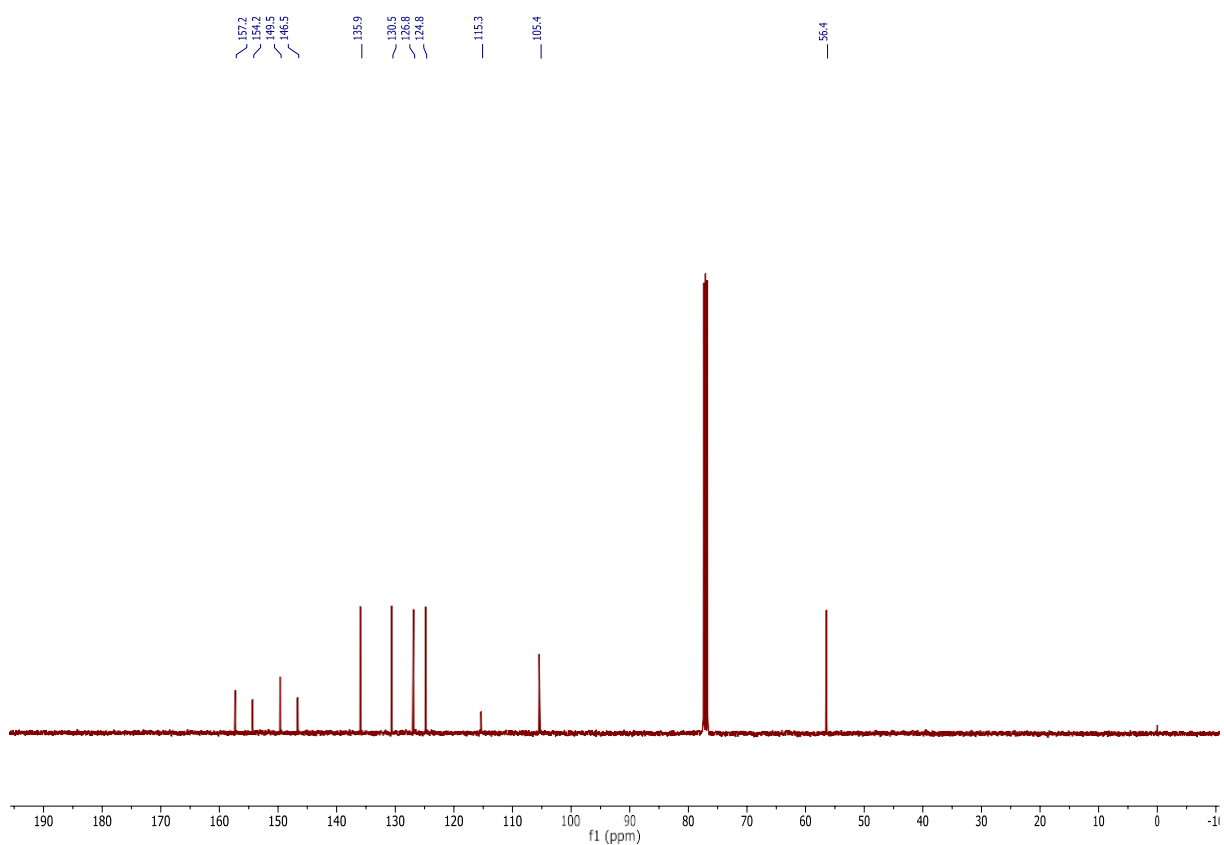
8c





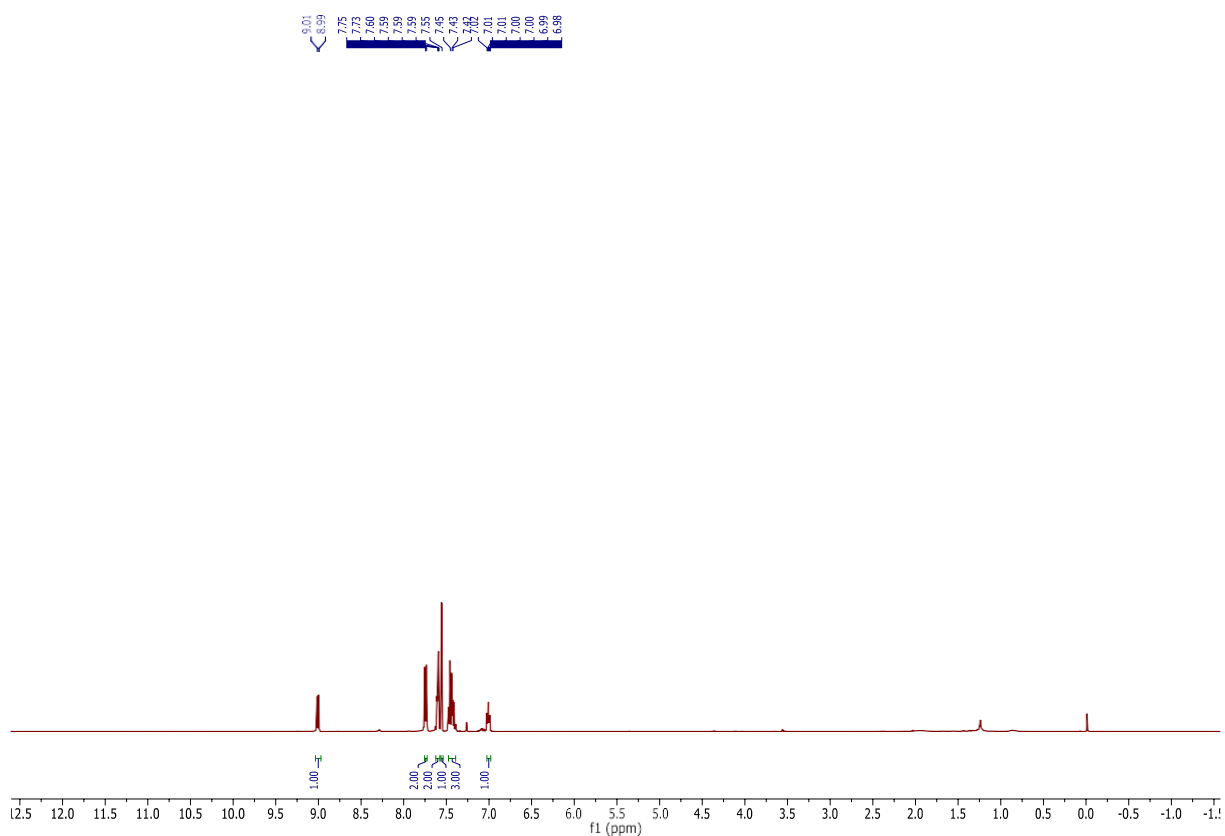
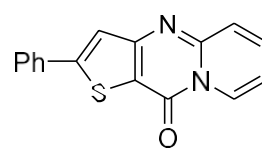
7-methoxy-10H-pyrido[1,2-a]thieno[3,2-d]pyrimidin-10-one

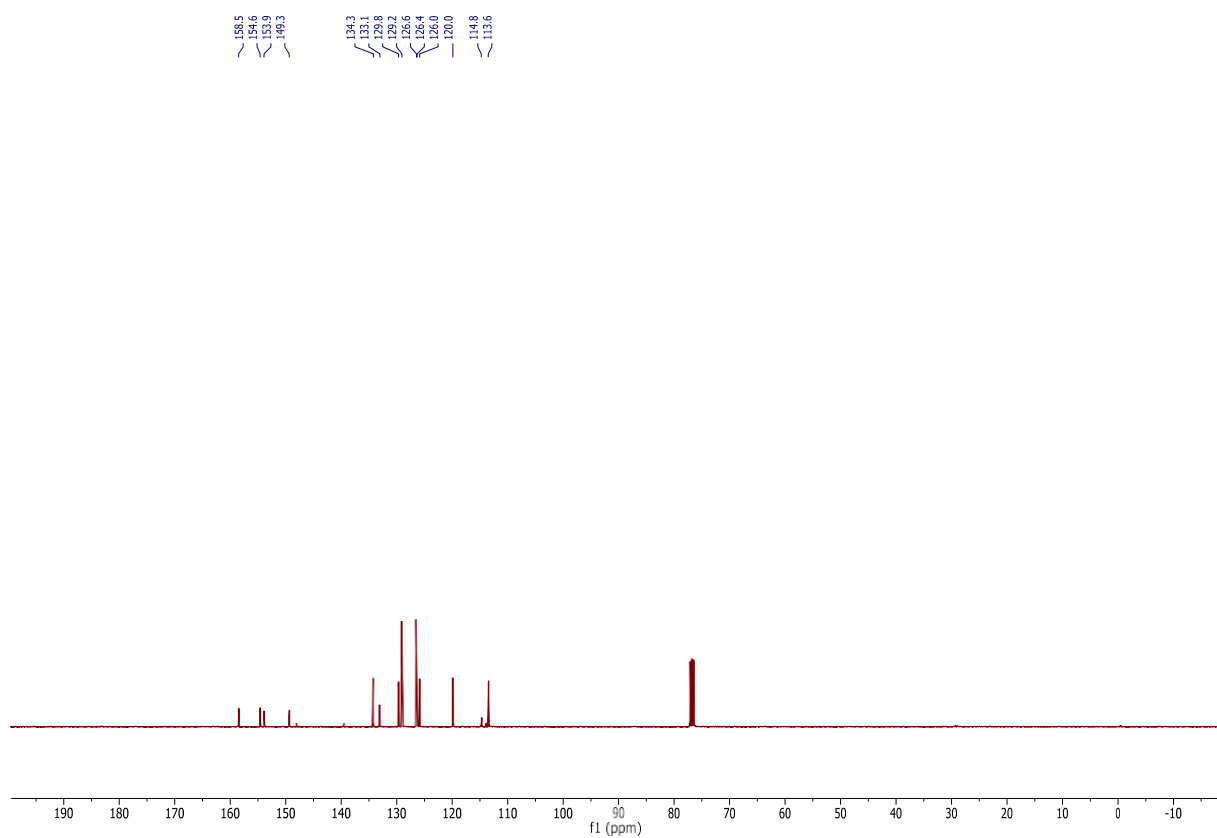




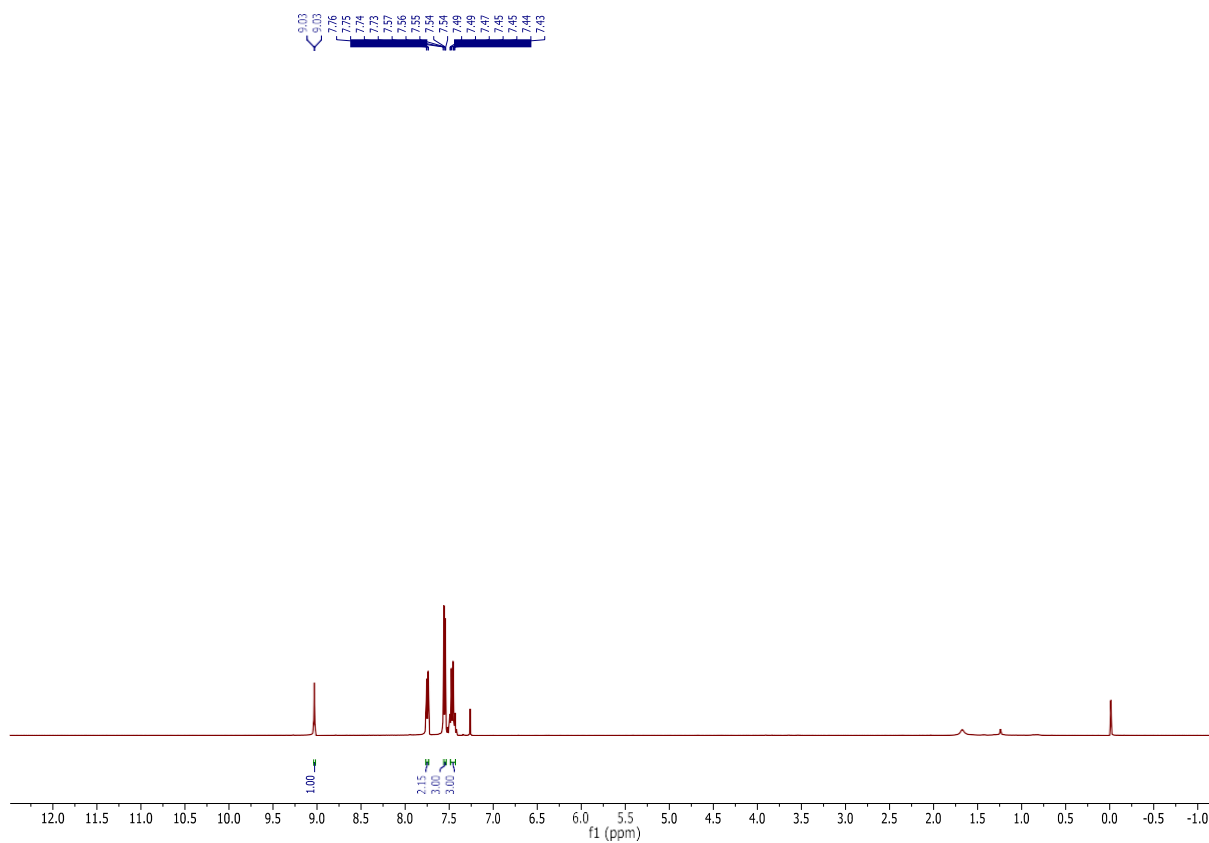
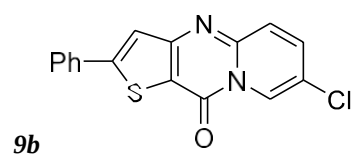
2-phenyl-10H-pyrido[1,2-a]thieno[3,2-d]pyrimidin-10-one

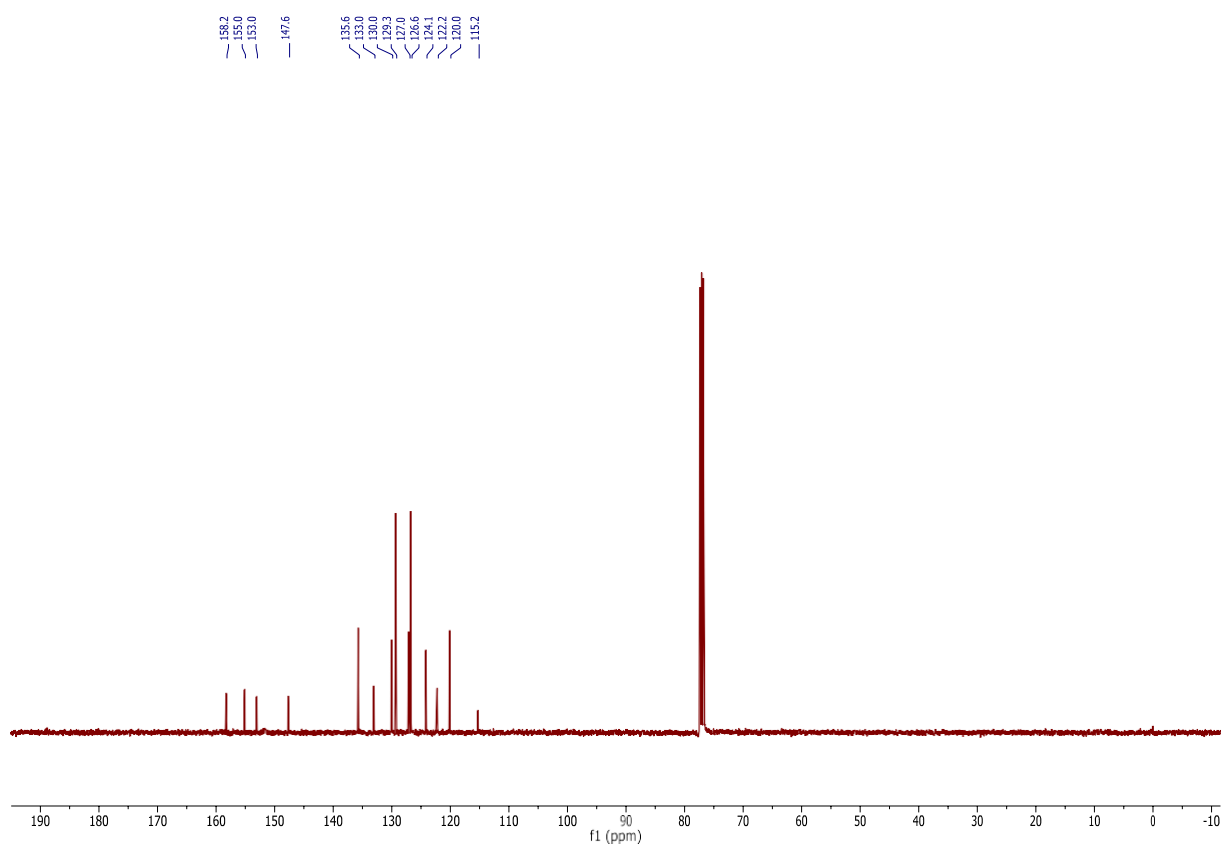
9a





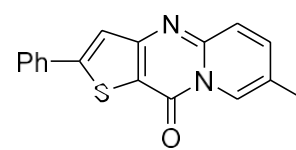
7-chloro-2-phenyl-10H-pyrido[1,2-a]thieno[3,2-d]pyrimidin-10-one



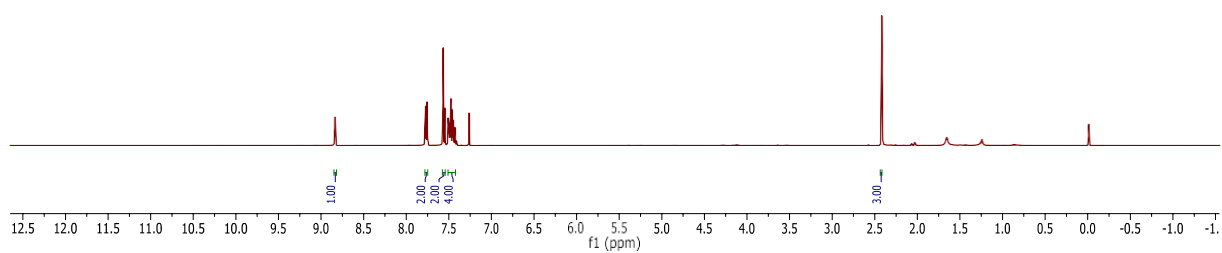


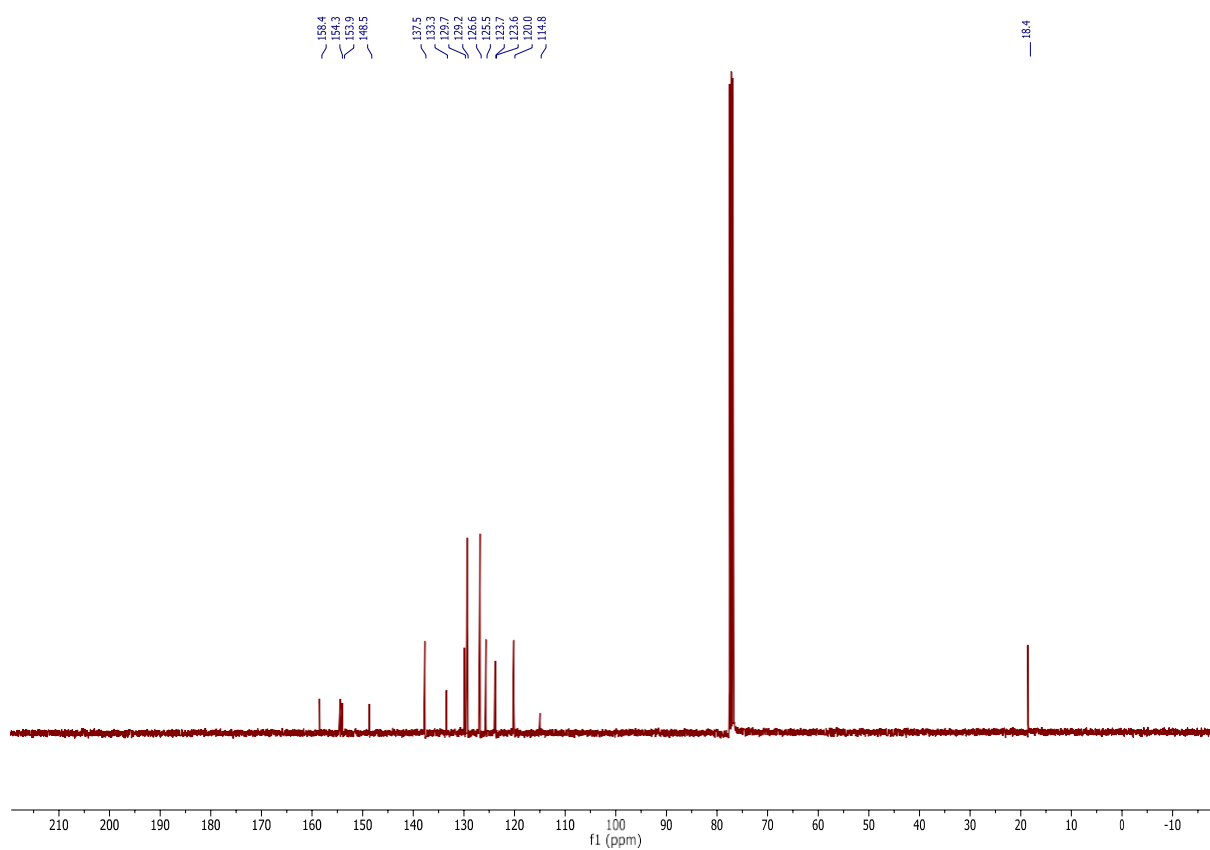


7-methyl-2-phenyl-10H-pyrido[1,2-a]thieno[3,2-d]pyrimidin-10-one

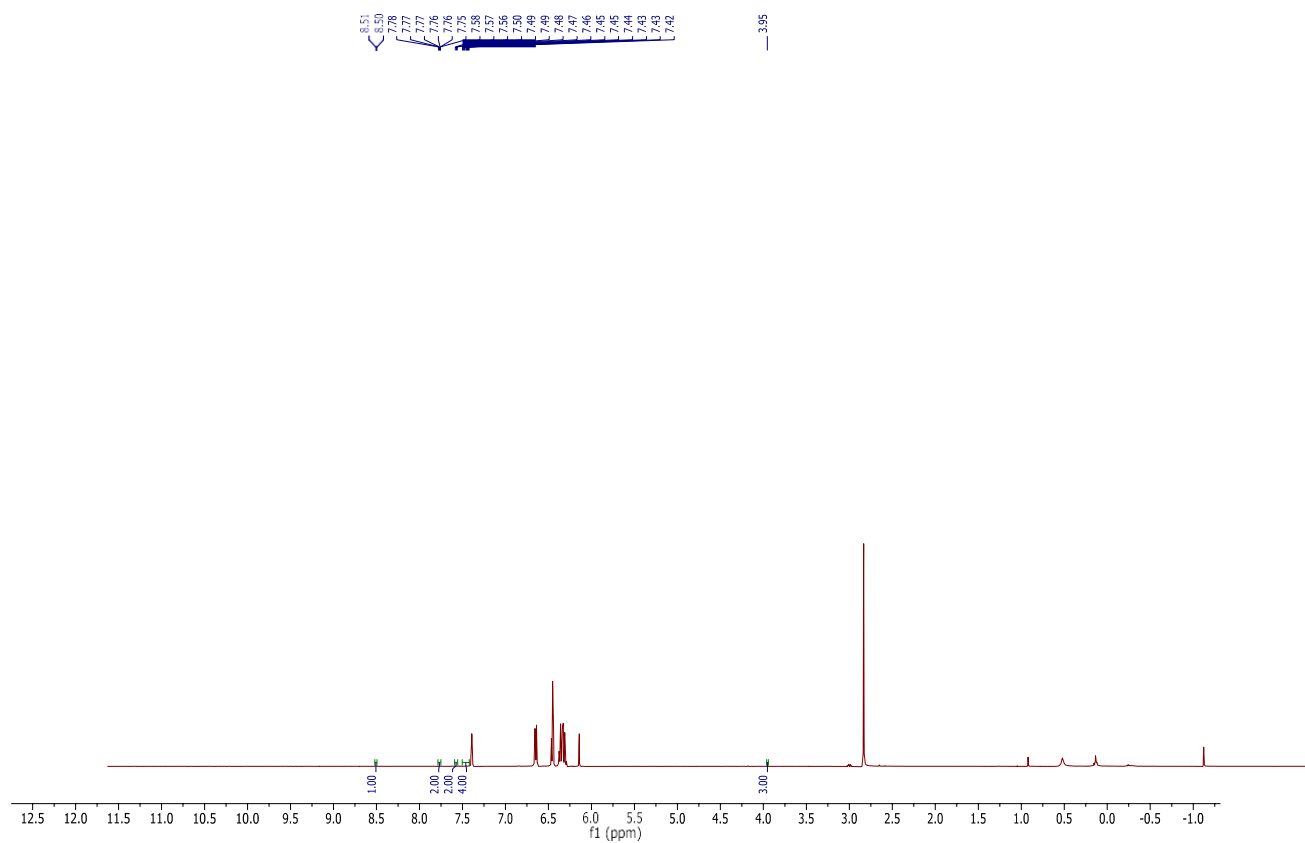
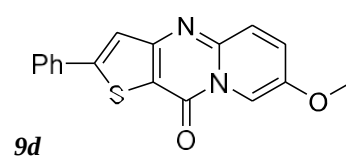


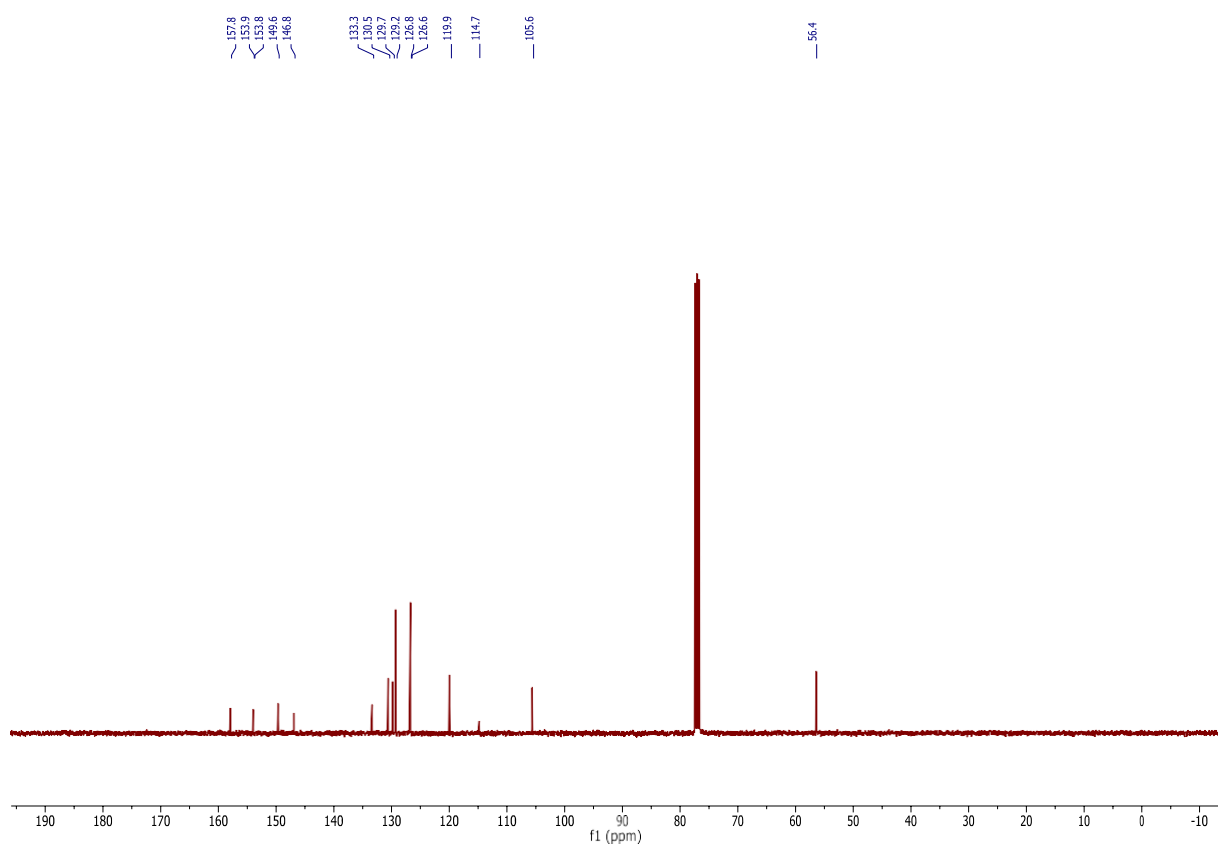
9c





7-methoxy-2-phenyl-10H-pyrido[1,2-a]thieno[3,2-d]pyrimidin-10-one



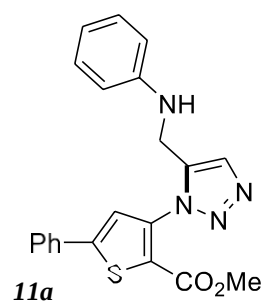


methyl 5-phenyl-3-(5-((phenylamino)methyl)-1H-1,2,3-triazol-1-yl)thiophene-2-carboxylate

8.32
7.71
7.68
7.67
7.65
7.45
7.44
7.20
6.96
6.75
6.73
6.71

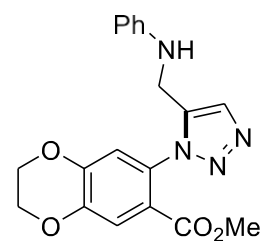
4.57

3.81



12.5

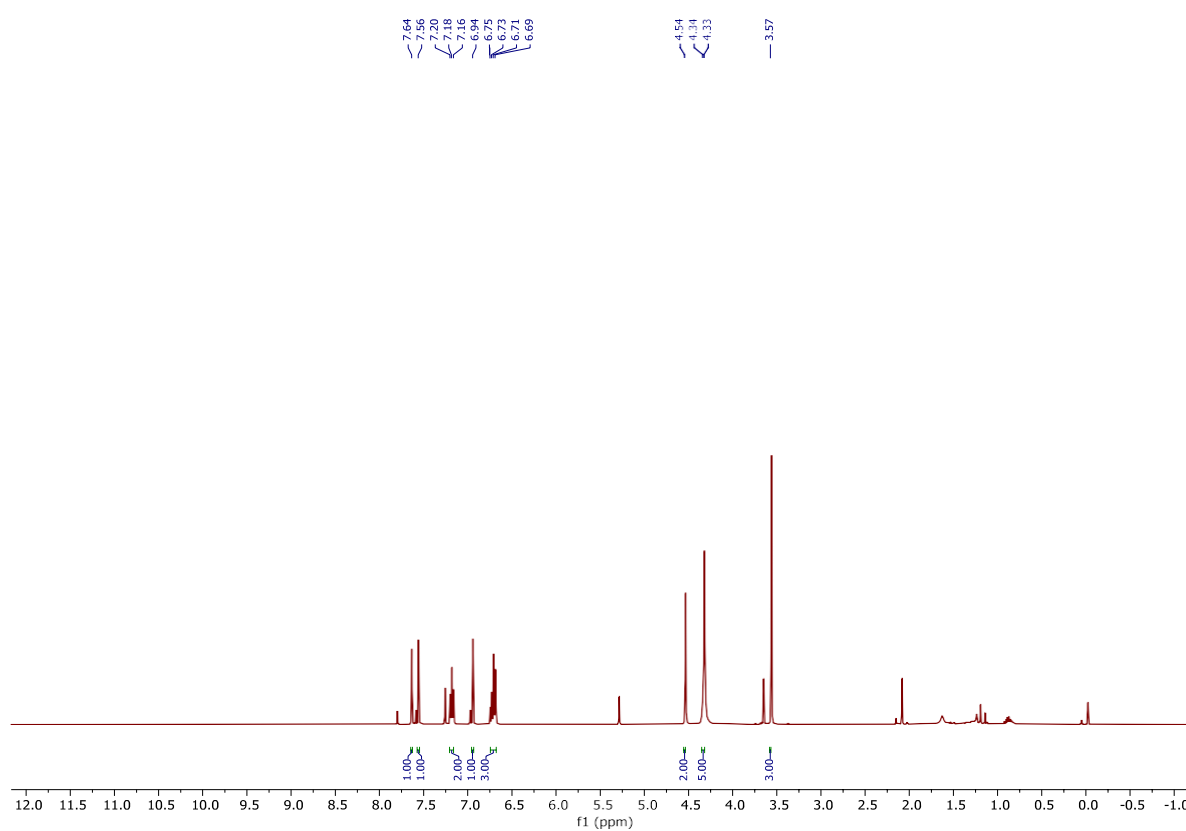


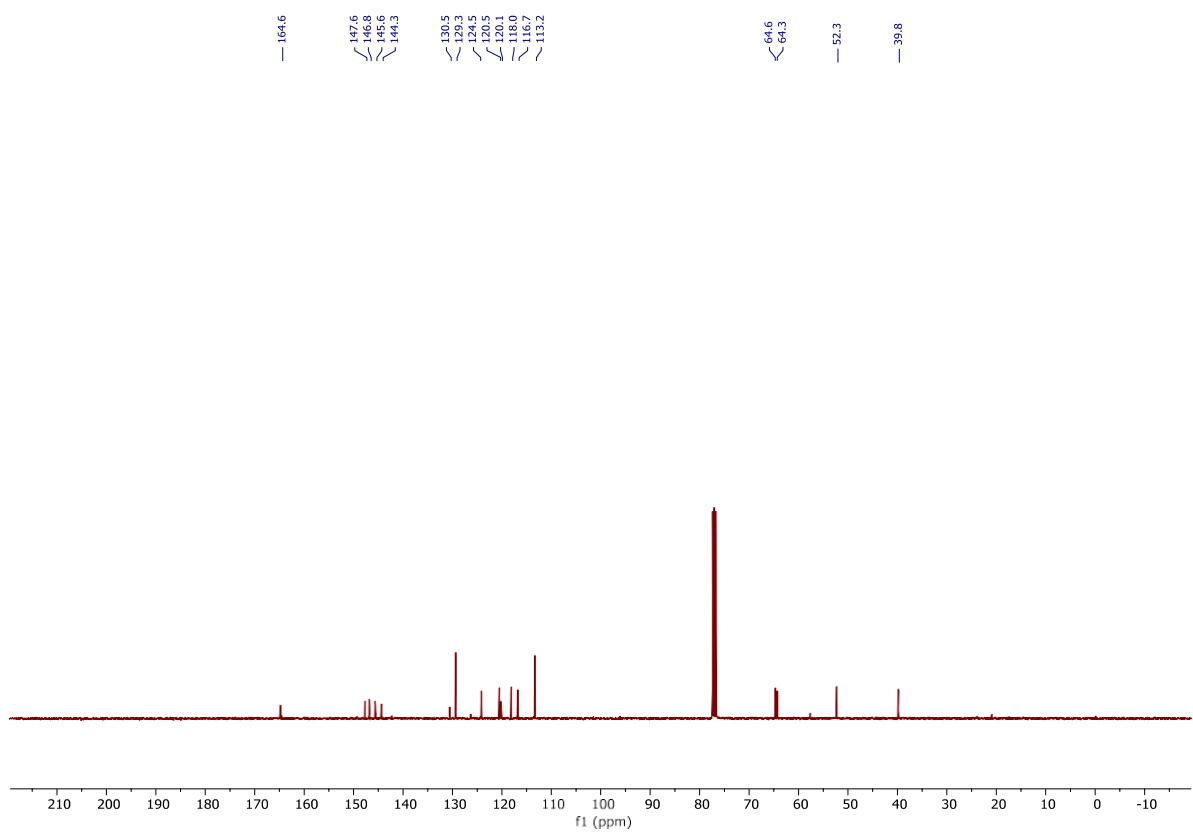


methyl

7-((5-((phenylamino)methyl)-1H-1,2,3-triazol-1-yl)-2,3-dihydrobenzo[b][1,4]dioxine-6-carboxylate

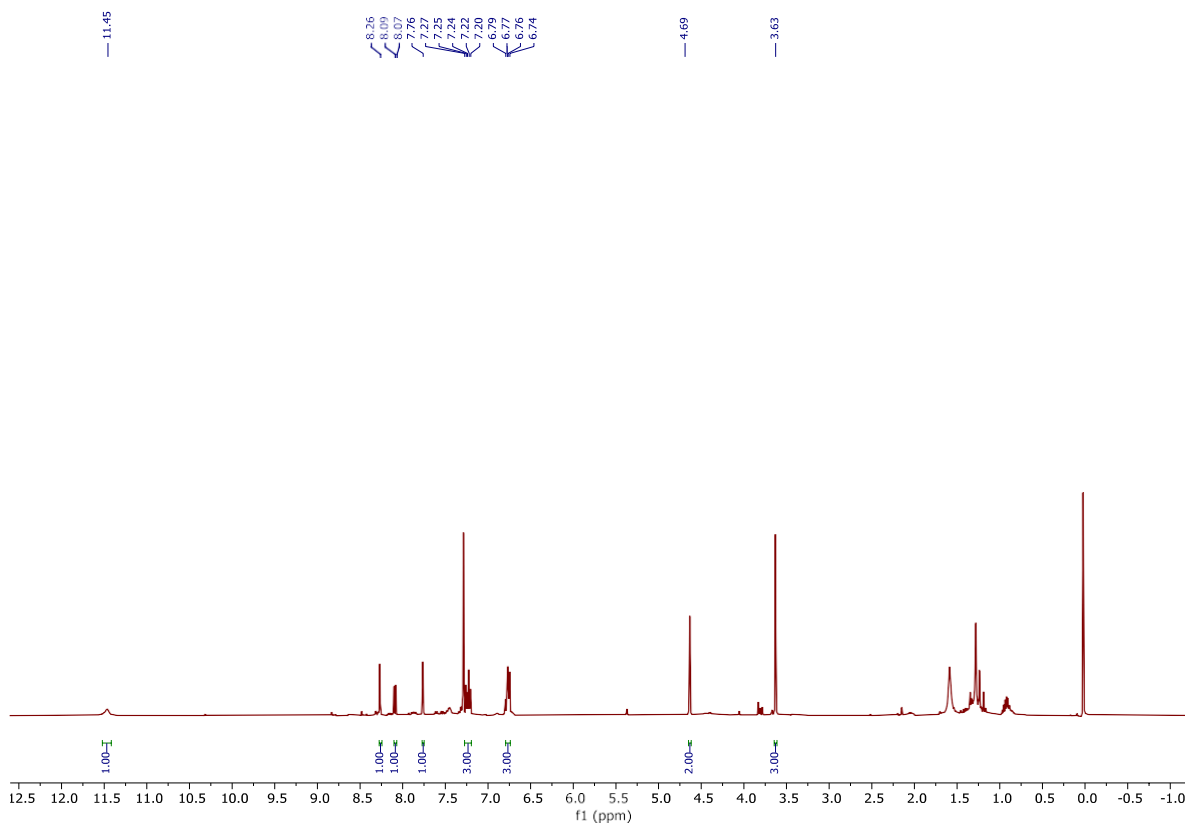
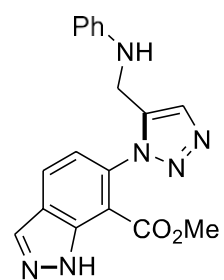
12a

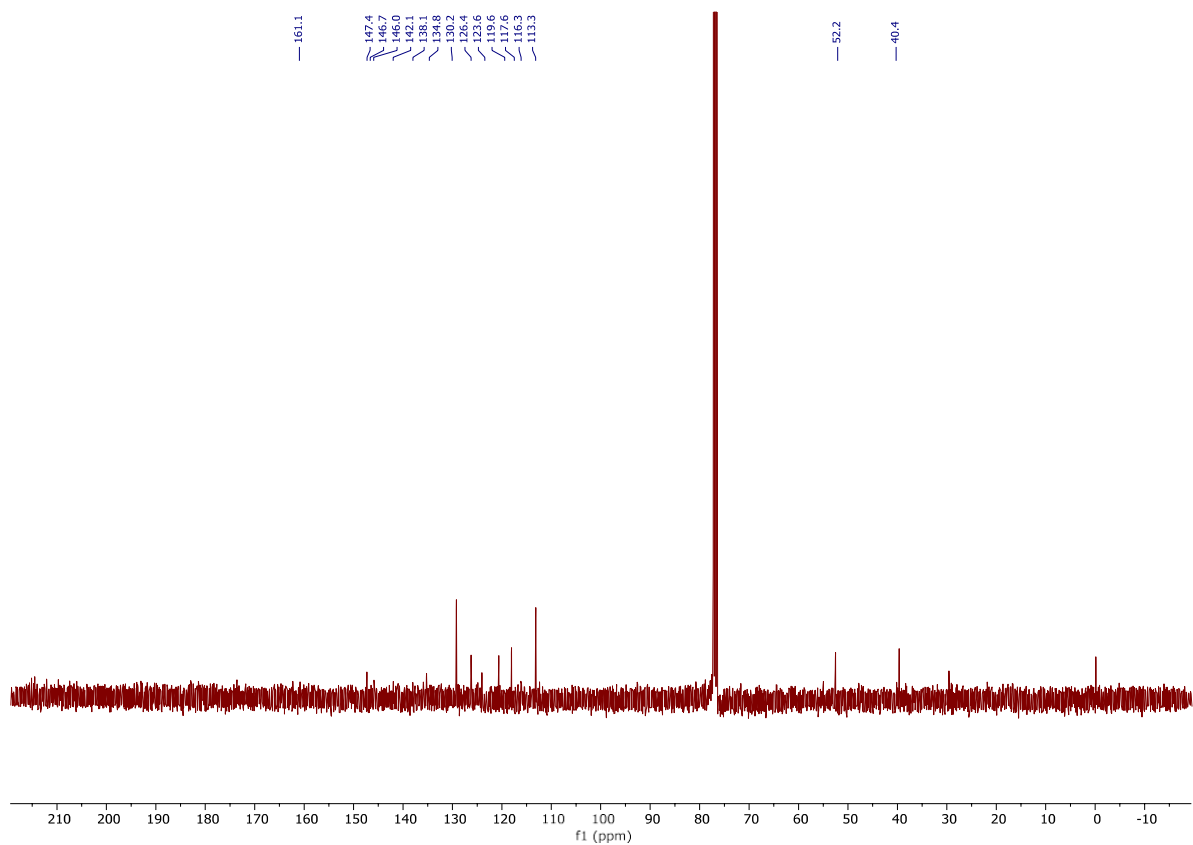




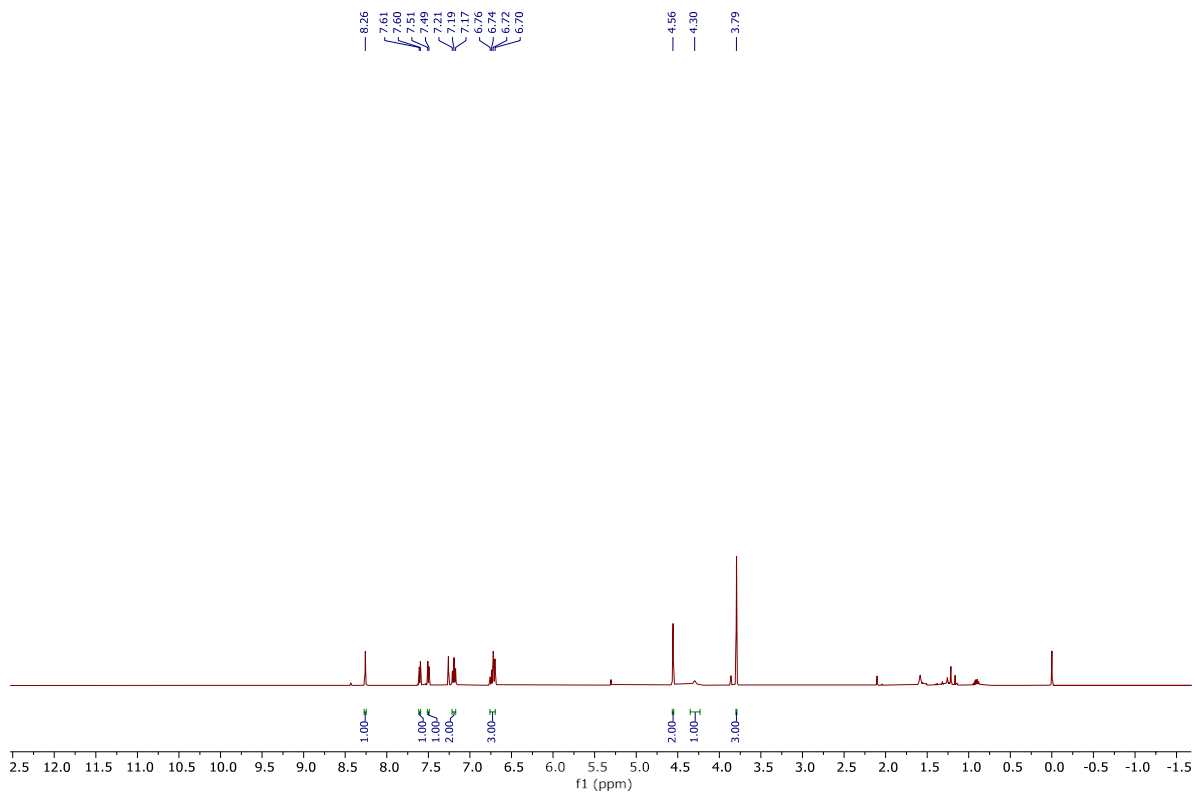
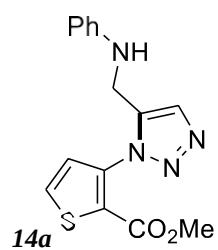
methyl 6-((5-((phenylamino)methyl)-1H-1,2,3-triazol-1-yl)-1H-indazole-7-carboxylate

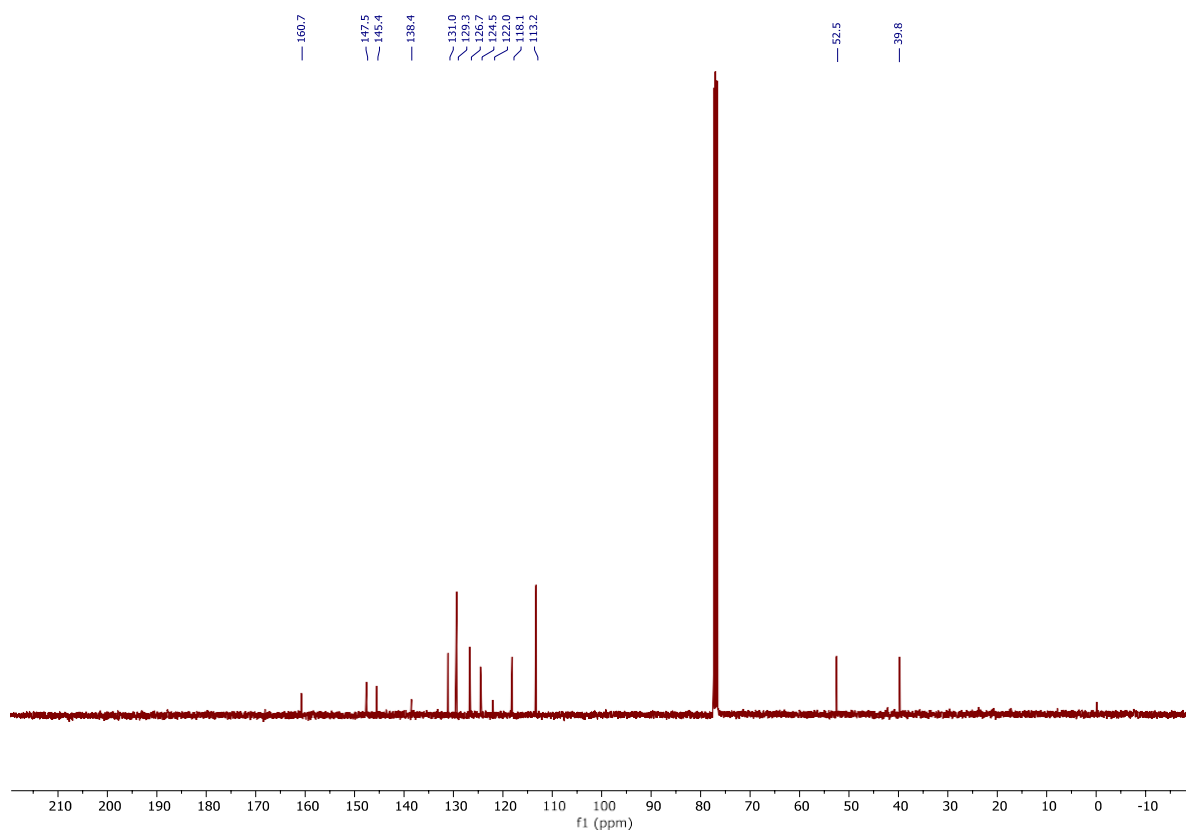
13a





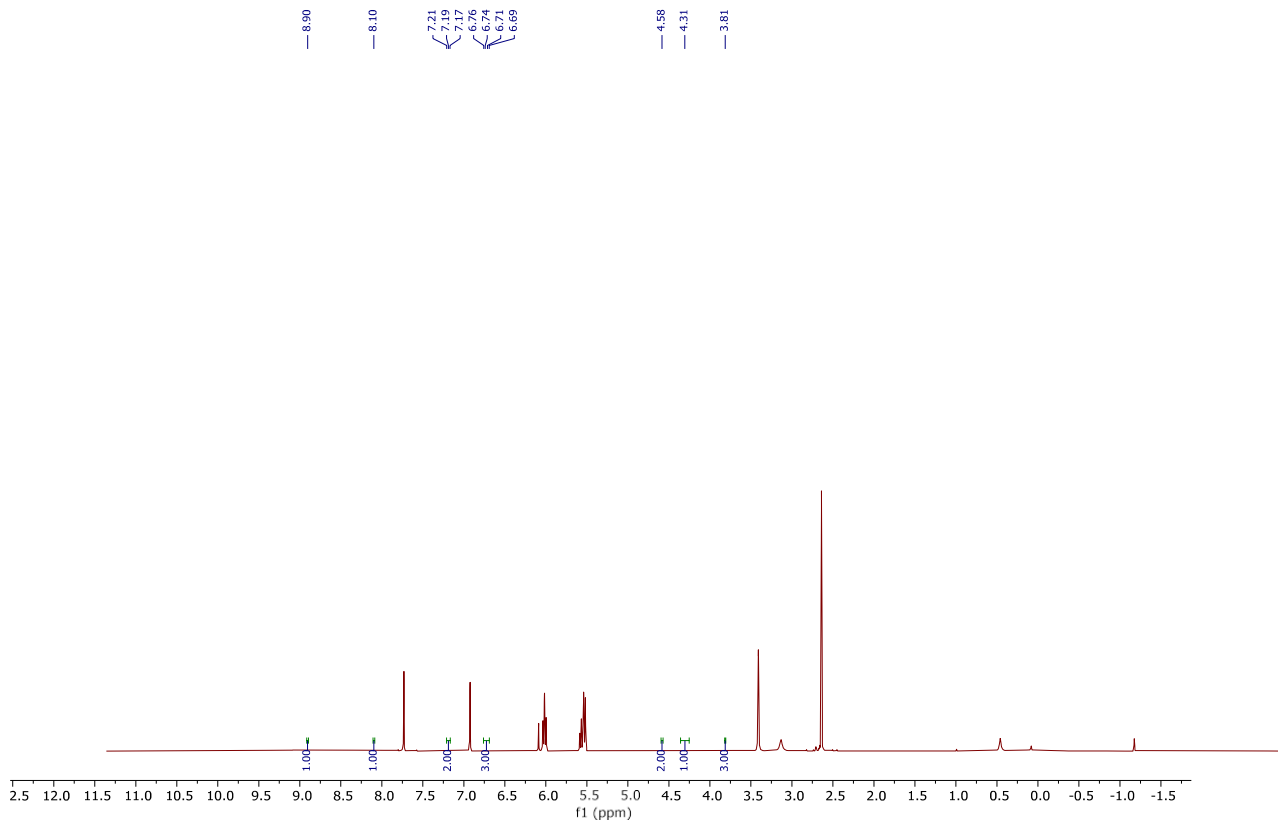
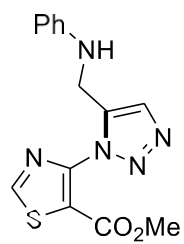
methyl 3-((5-((phenylamino)methyl)-1H-1,2,3-triazol-1-yl)thiophene-2-carboxylate

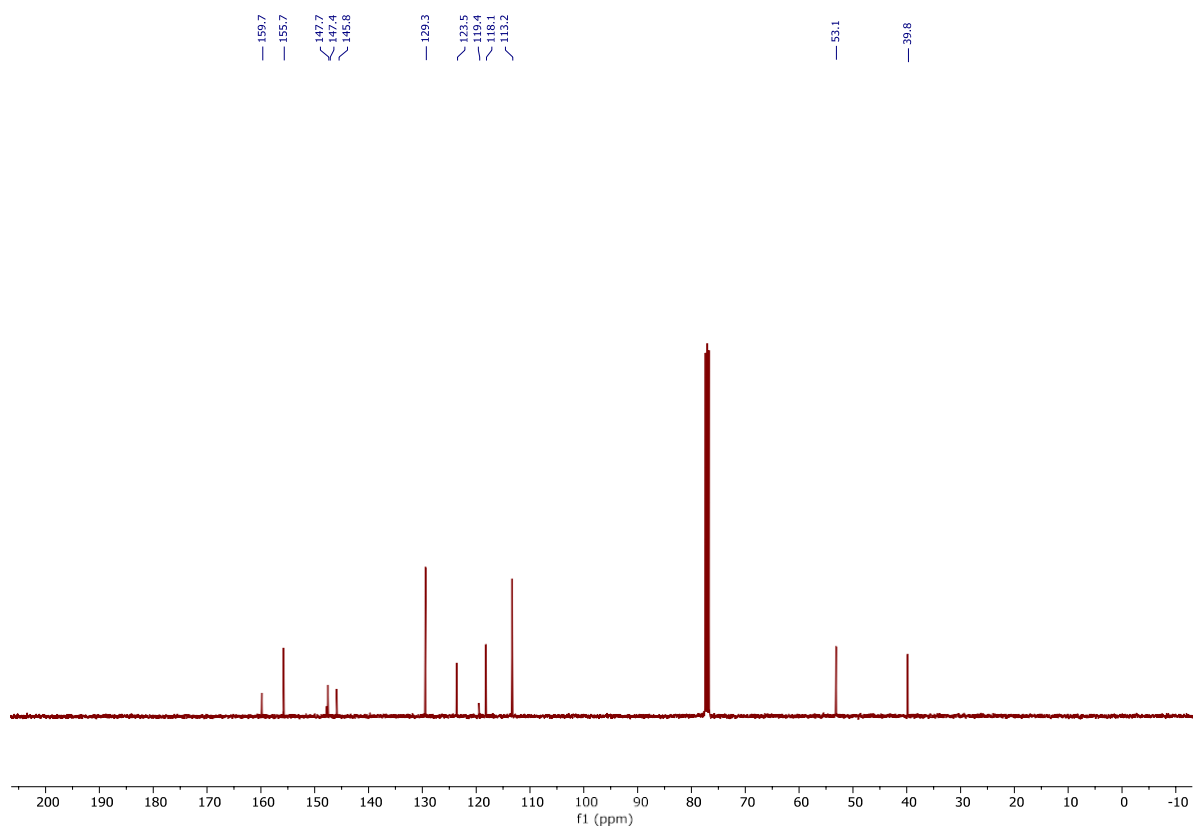




methyl 4-(5-((phenylamino)methyl)-1H-1,2,3-triazol-1-yl)thiazole-5-carboxylate

15a





methyl 3-((5-(benzofuran-5-ylamino)methyl)-1H-1,2,3-triazol-1-yl)-5-phenylthiophene-2-carboxylate 11b

