

# Domino aza-Michael Addition-S<sub>N</sub>Ar-Heteroaromatization Route to C5-Substituted 1-Alkyl-1*H*-indole-3-carboxylic Esters

Ebenezer Ametsetor, Spencer Farthing and Richard A. Bunce\*

Department of Chemistry, Oklahoma State University, Stillwater, OK 74078-3071, USA

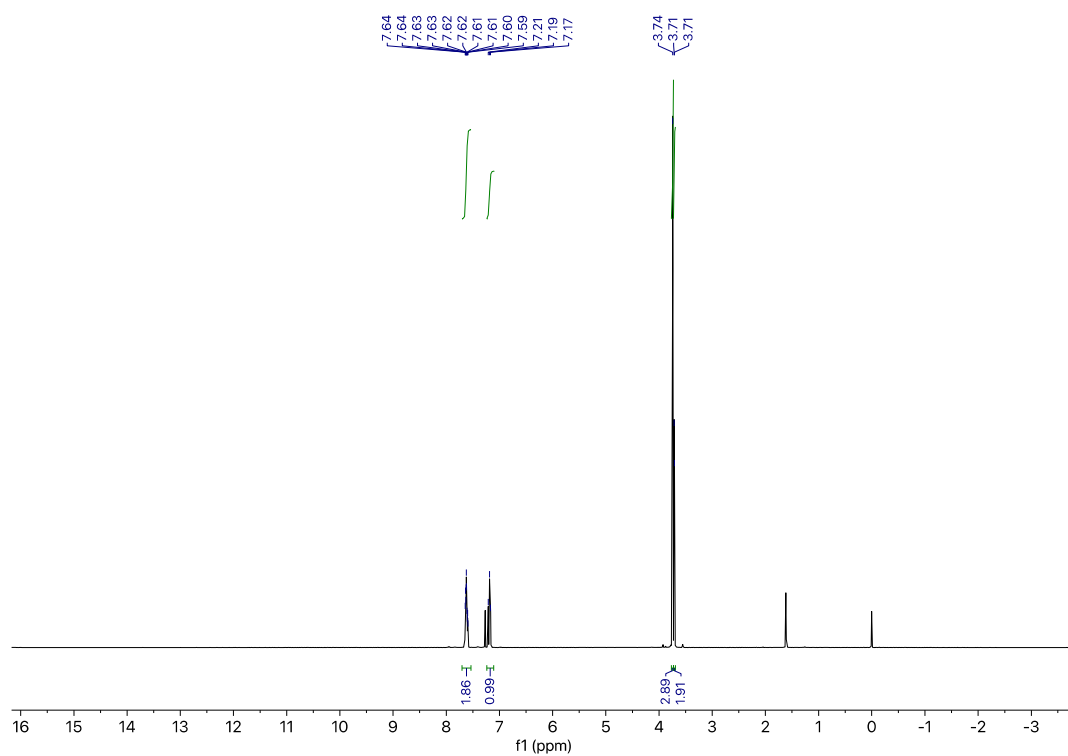
\*Correspondence: rab@okstate.edu; Tel: +1-405-744-5952

## Supplementary Information

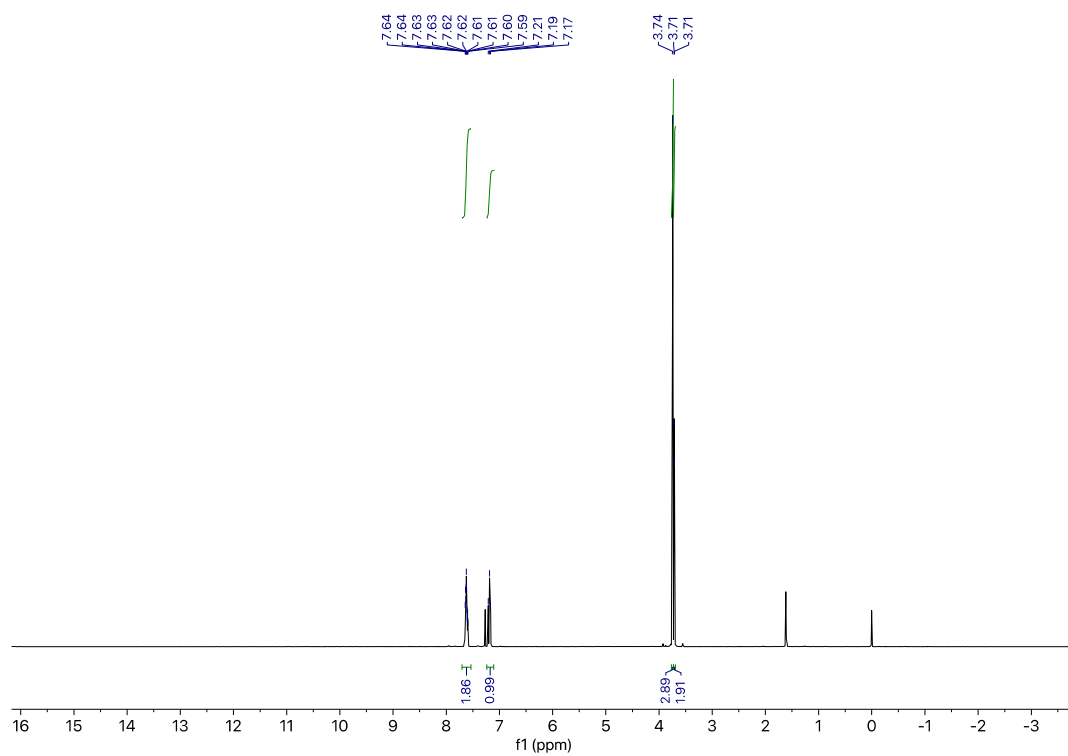
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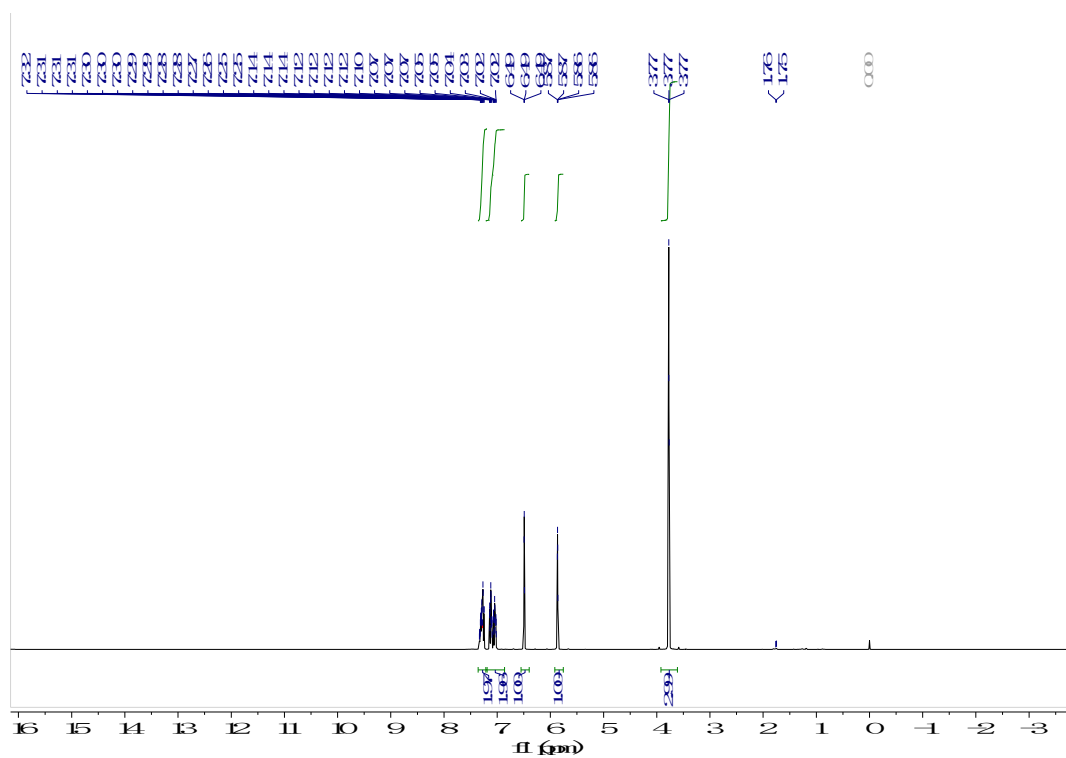
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<sup>1</sup>H for methyl 2-(5-cyano-2-fluorophenyl)acetate (9)

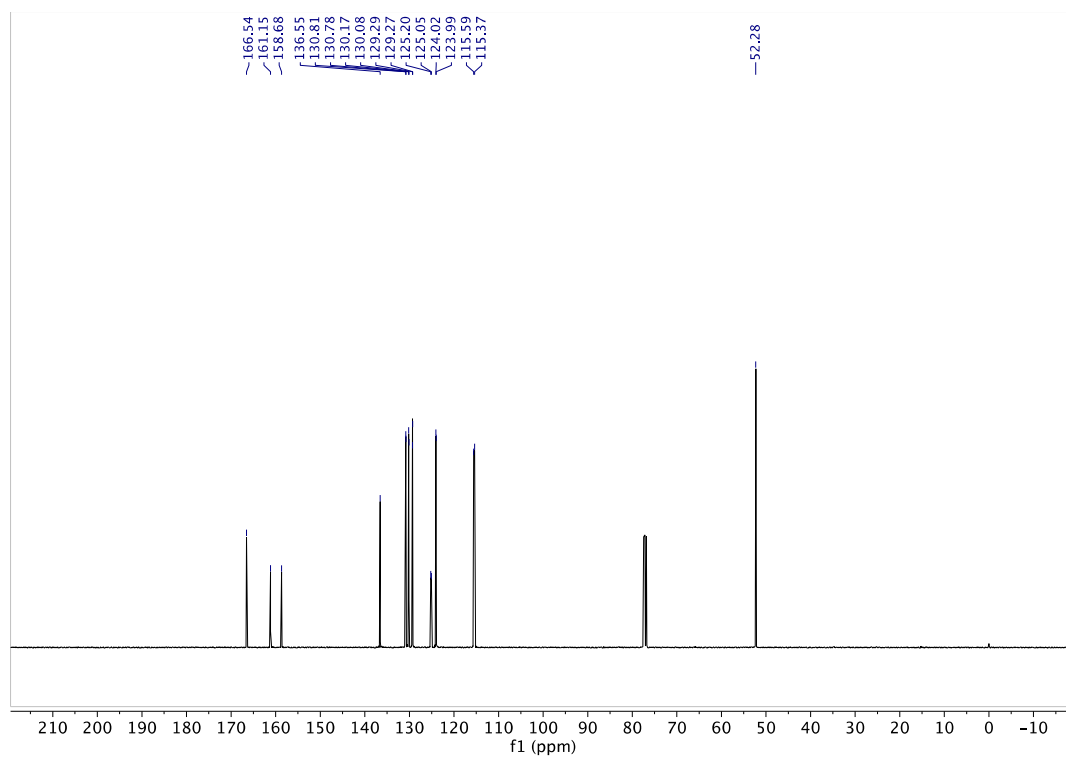


<sup>13</sup>C for methyl 2-(5-cyano-2-fluorophenyl)acetate (9)

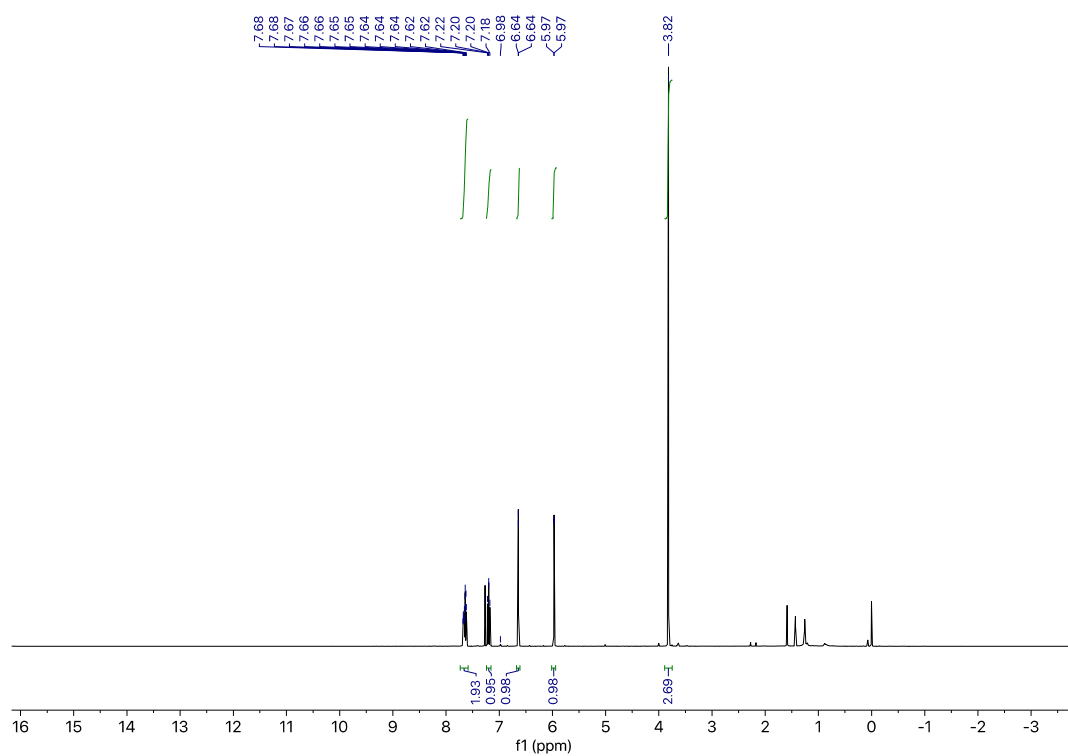


<sup>1</sup>H NMR for methyl 2-(5-nitro-2-fluorophenyl)acrylate (7)

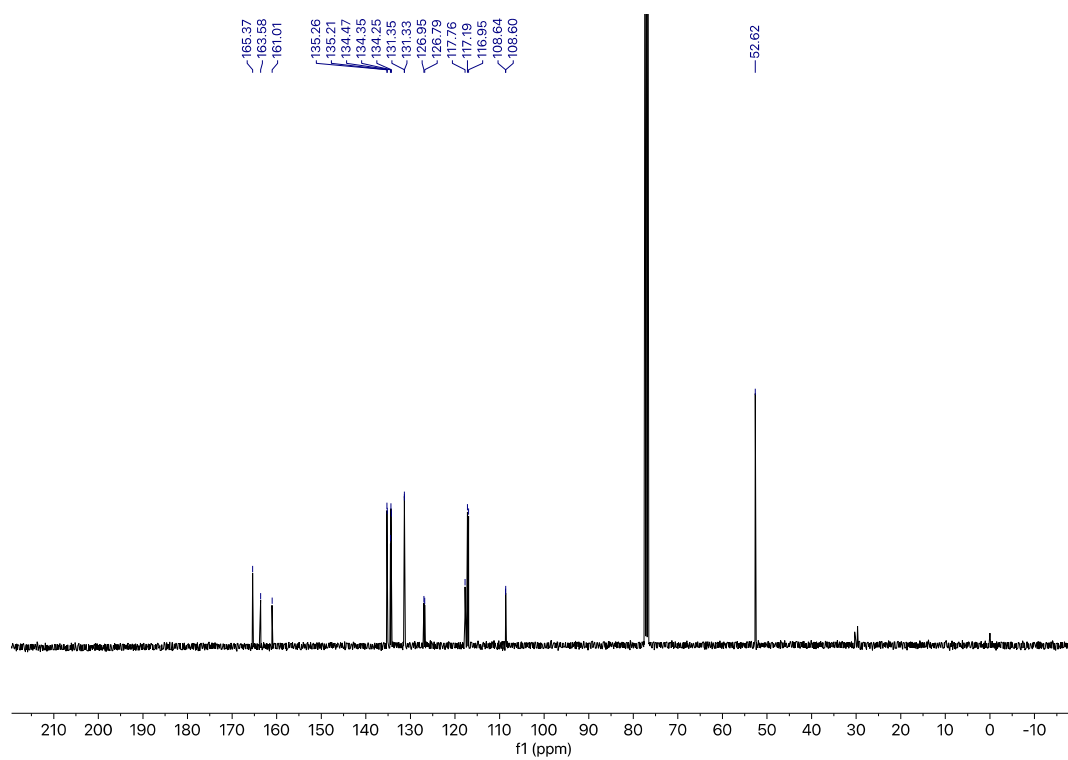
<sup>13</sup>C NMR for methyl 2-(5-nitro-2-fluorophenyl)acrylate (7)



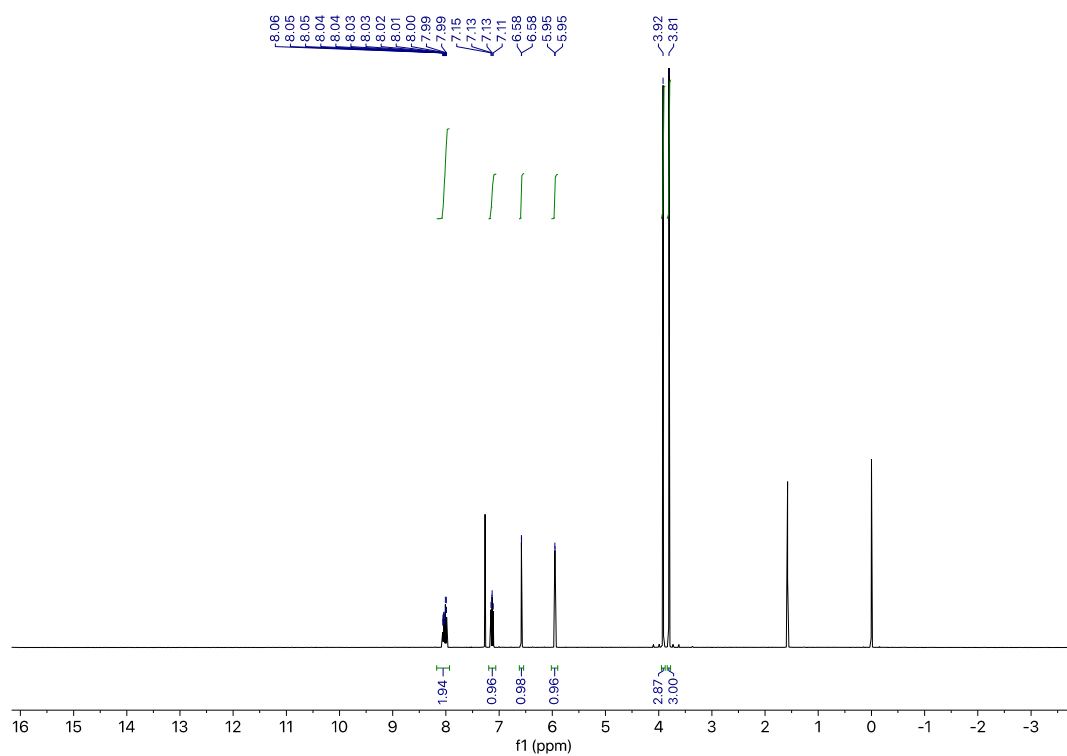
$^1\text{H}$  NMR for methyl 2-(5-cyano-2-fluorophenyl)acrylate (**10**)



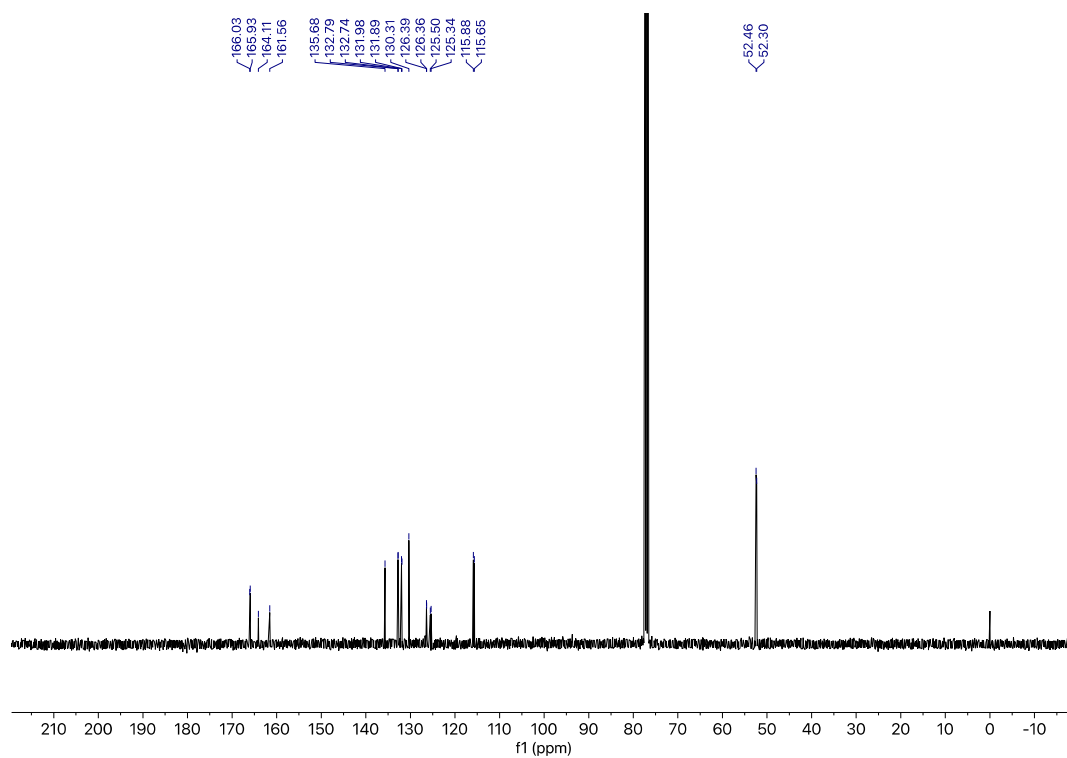
$^{13}\text{C}$  for methyl 2-(5-cyano-2-fluorophenyl)acrylate (**10**)



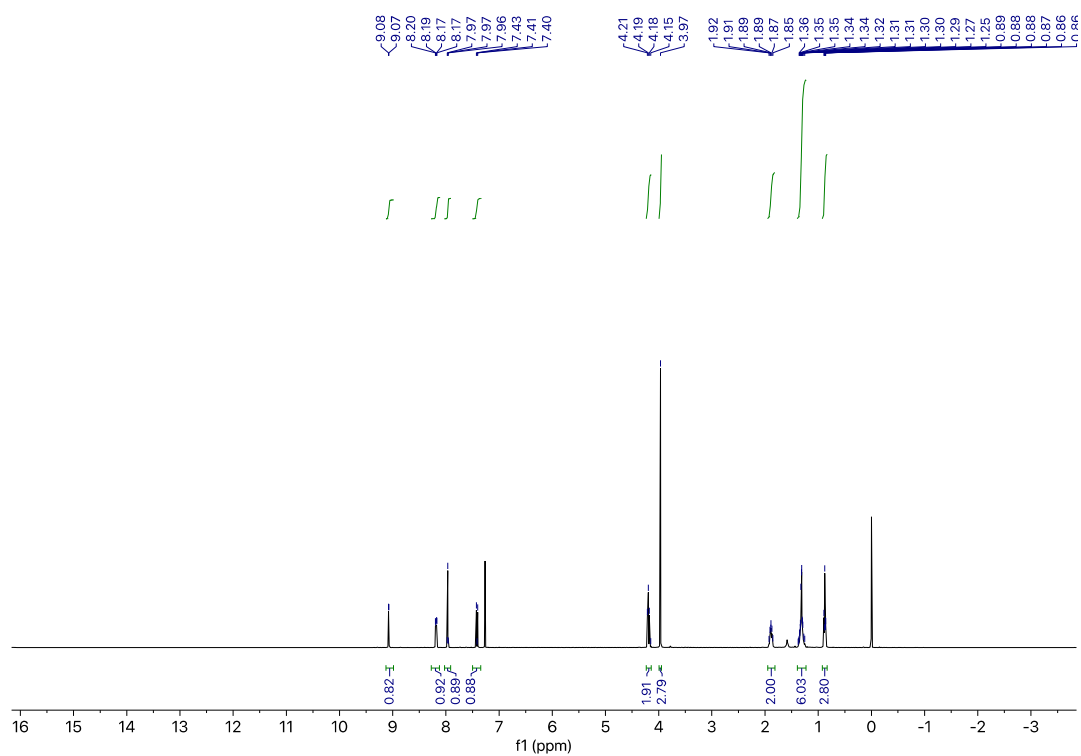
$^1\text{H}$  NMR for methyl 2-(5-carbomethoxy-2-fluorophenyl)acrylate (**13**)



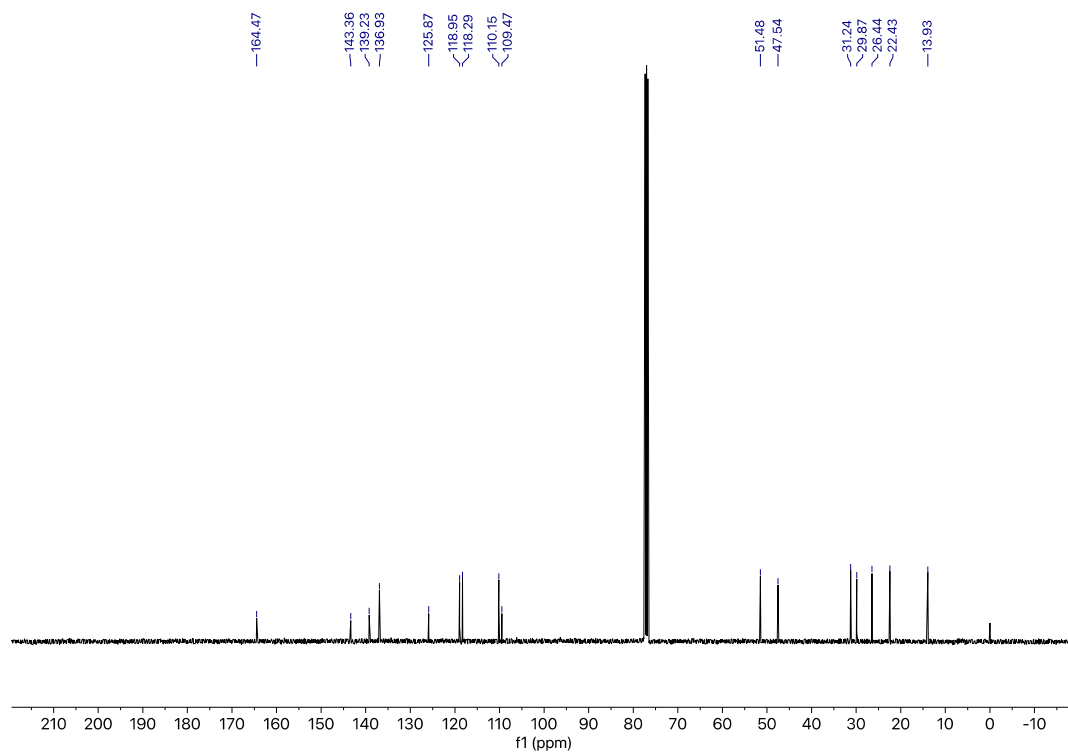
$^{13}\text{C}$  NMR for methyl 2-(5-carbomethoxy-2-fluorophenyl)acrylate (**13**)



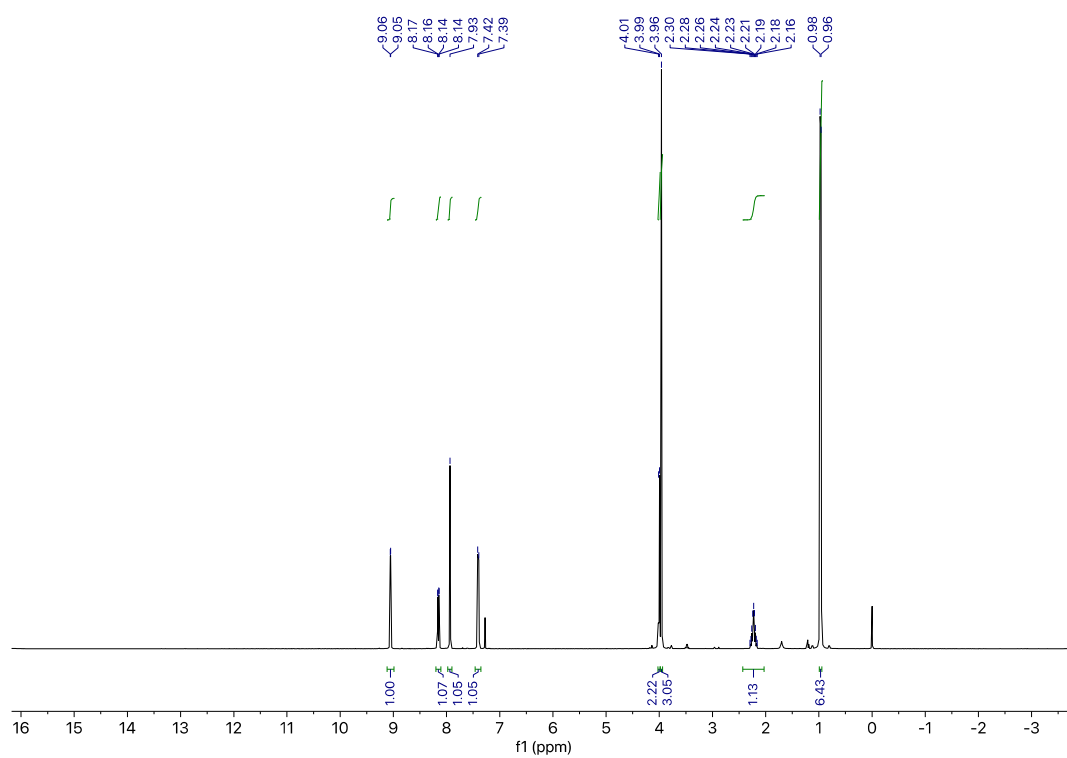
<sup>1</sup>H NMR for methyl 1-hexyl-5-nitro-1*H*-indole-3-carboxylate (**17a**)



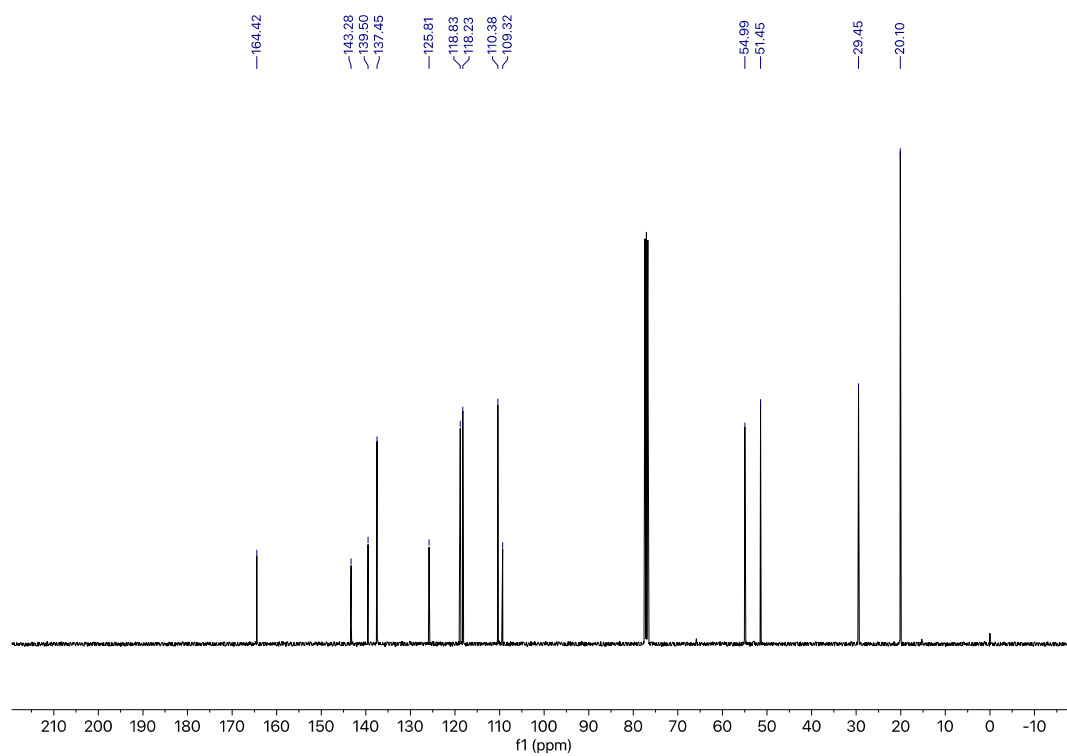
<sup>13</sup>C NMR for methyl 1-hexyl-5-nitro-1*H*-indole-3-carboxylate (**17a**)



$^1\text{H}$  NMR for methyl 1-isobutyl-5-nitro-1*H*-indole-3-carboxylate (**17b**)

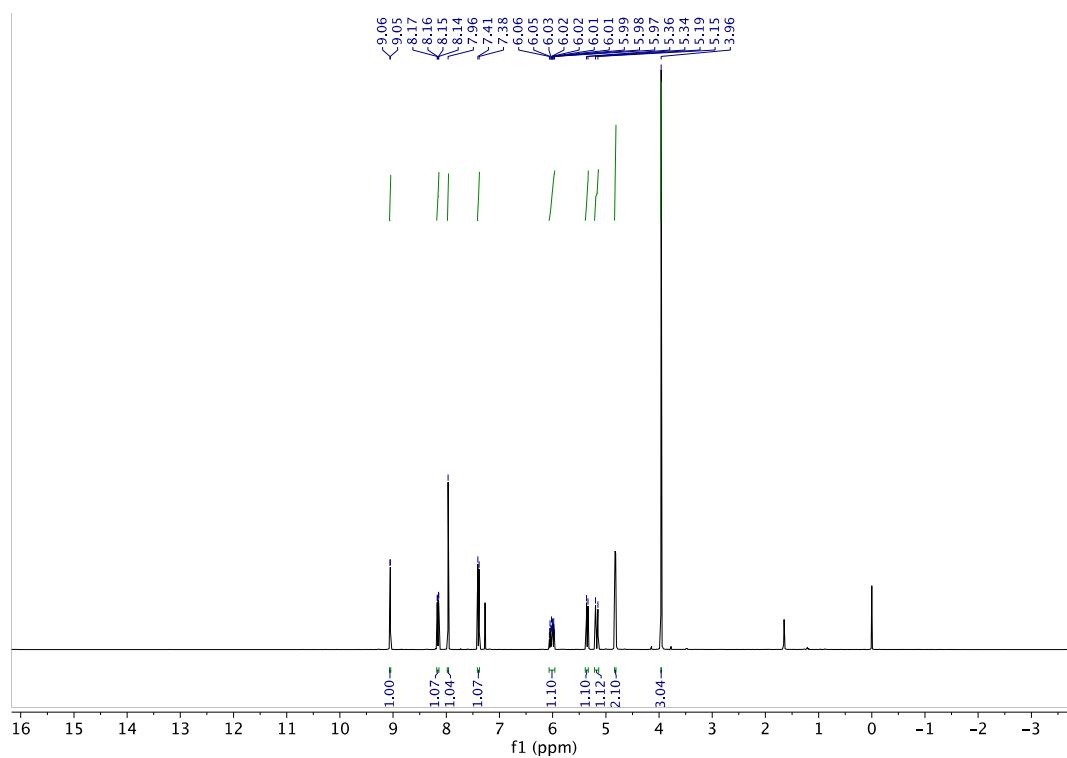


$^{13}\text{C}$  NMR for methyl 1-isobutyl-5-nitro-1*H*-indole-3-carboxylate (**17b**)

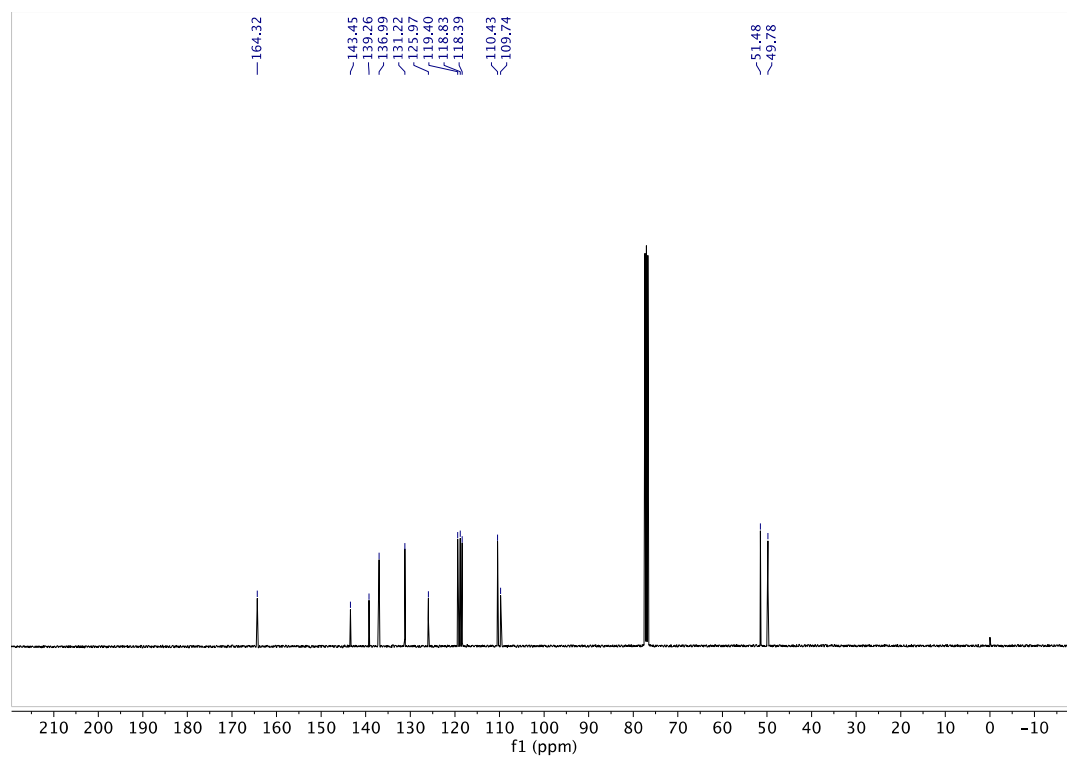




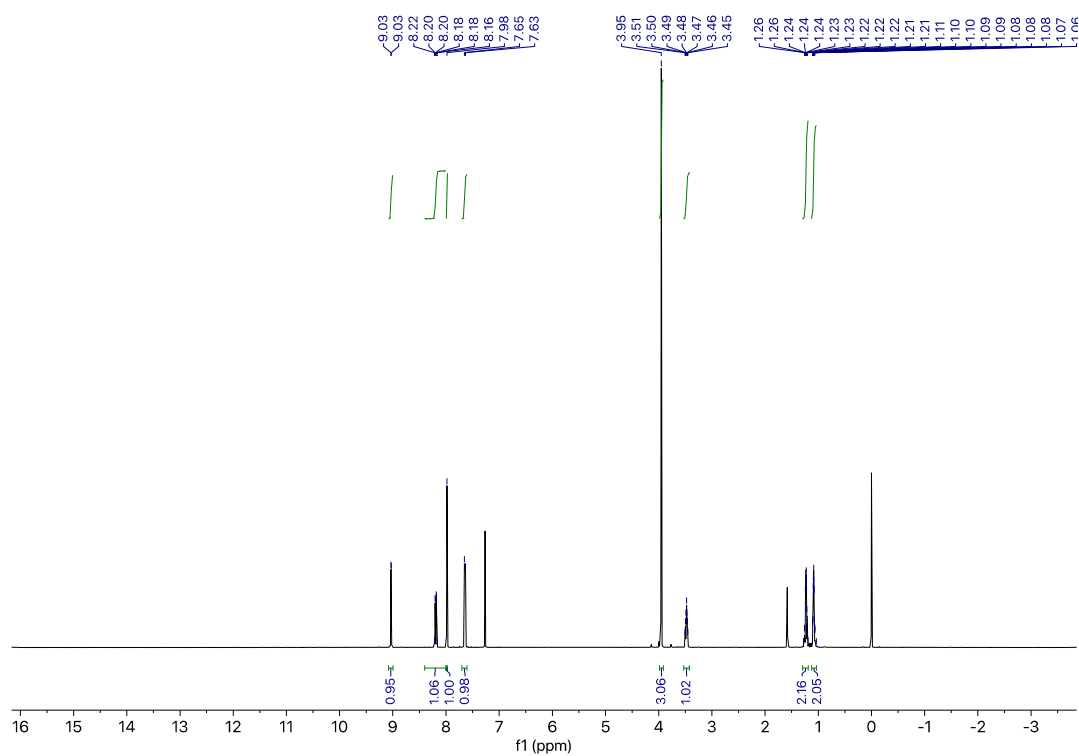
<sup>1</sup>H NMR for methyl 1-allyl-5-nitro-1*H*-indole-3-carboxylate (**17c**)



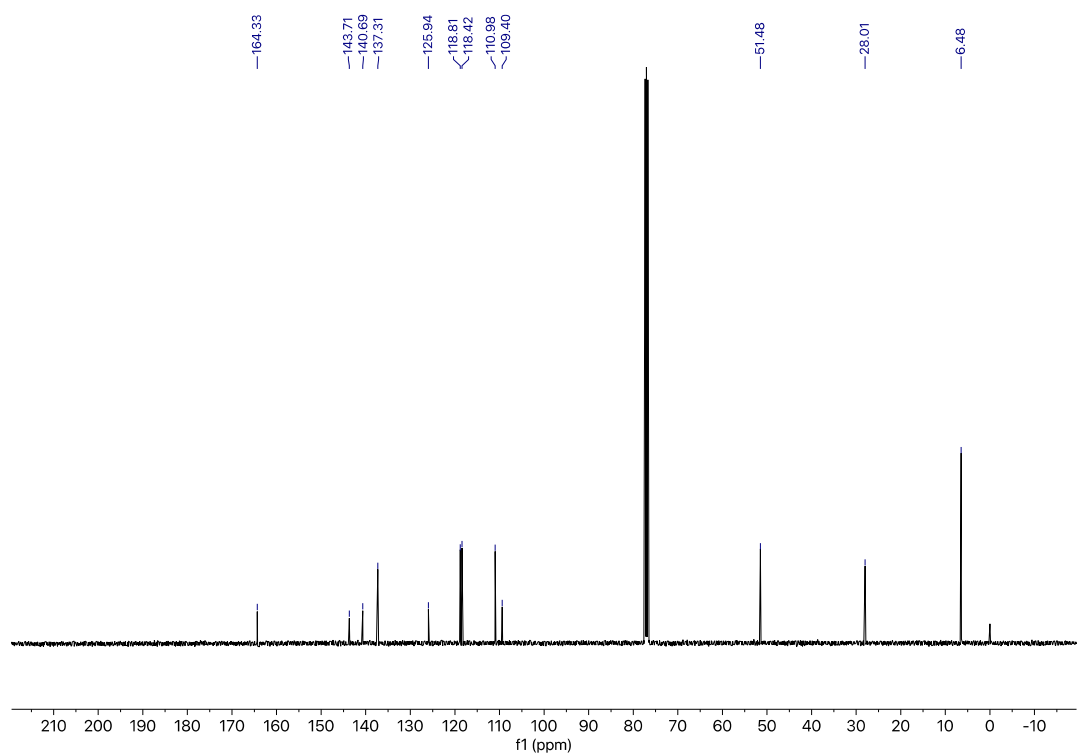
<sup>13</sup>C NMR for methyl 1-allyl-5-nitro-1*H*-indole-3-carboxylate (**17c**)



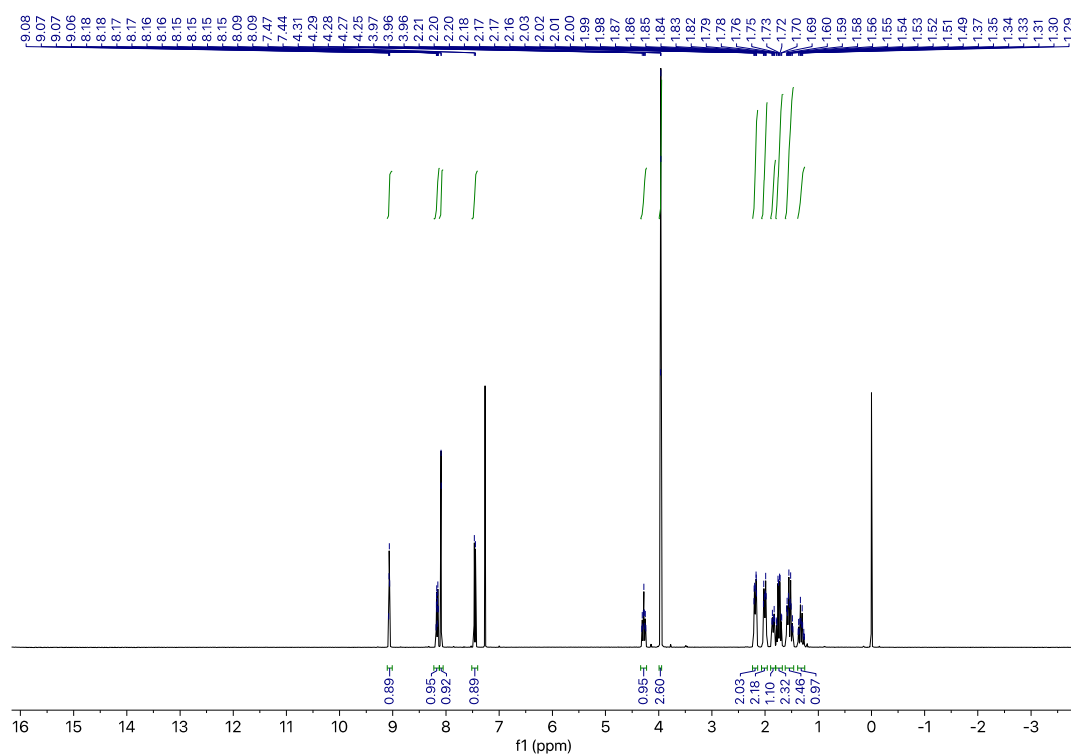
$^1\text{H}$  NMR for methyl 1-cyclopropyl-5-nitro-1*H*-indole-3-carboxylate (**17d**)



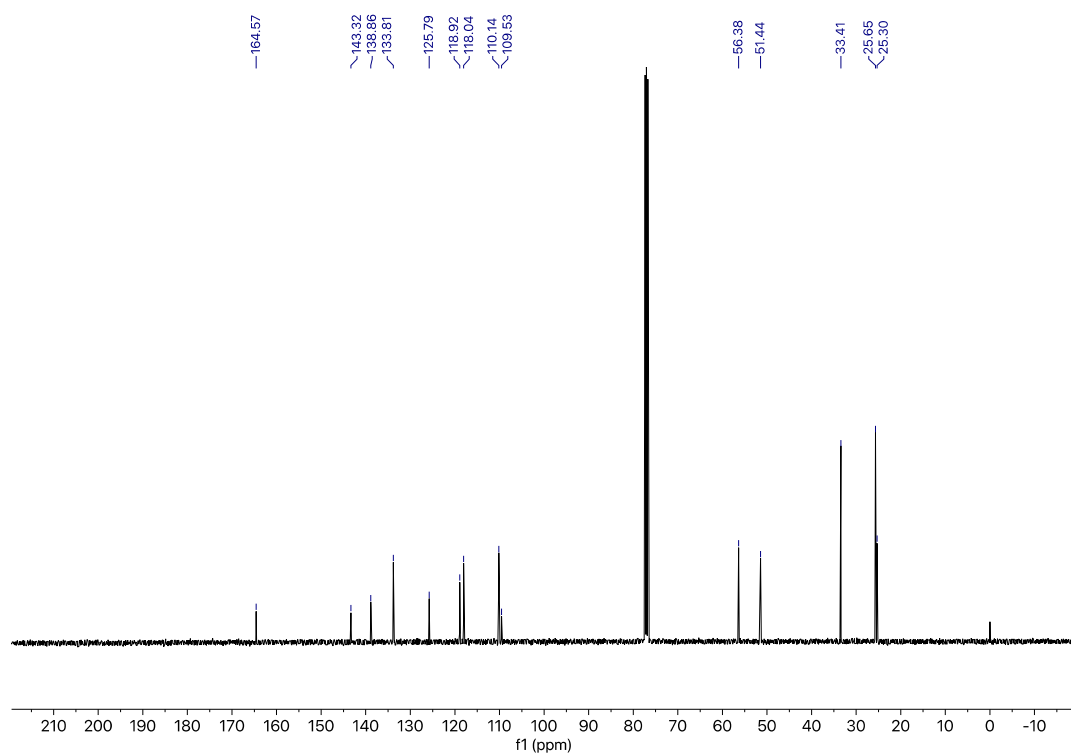
$^{13}\text{C}$  NMR for methyl 1-cyclopropyl-5-nitro-1*H*-indole-3-carboxylate (**17d**)



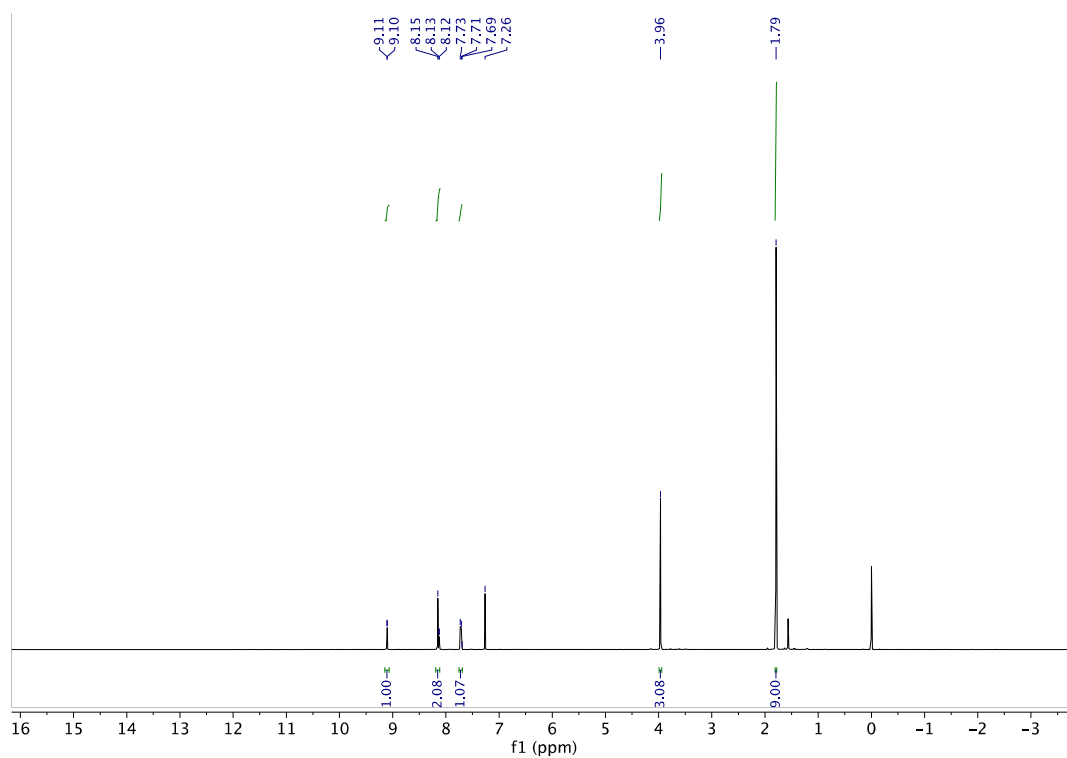
<sup>1</sup>H NMR for methyl 1-cyclohexyl-5-nitro-1*H*-indole-3-carboxylate (**17e**)



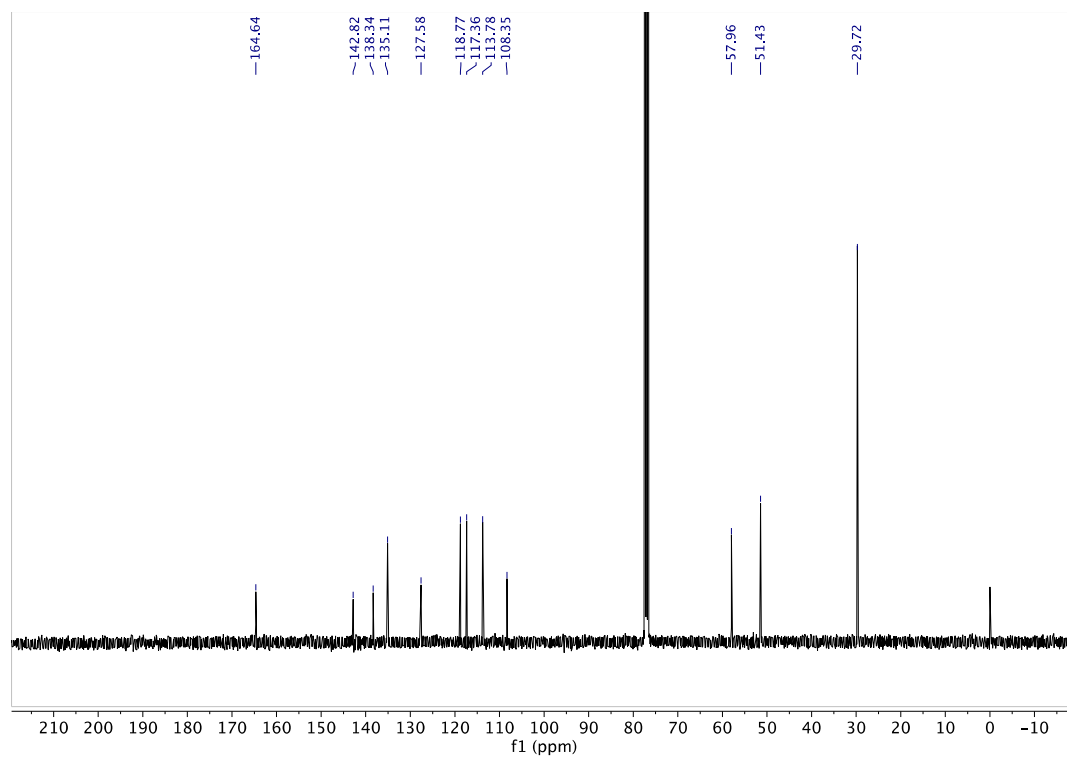
<sup>13</sup>C NMR for methyl 1-cyclohexyl-5-nitro-1*H*-indole-3-carboxylate (**17e**)



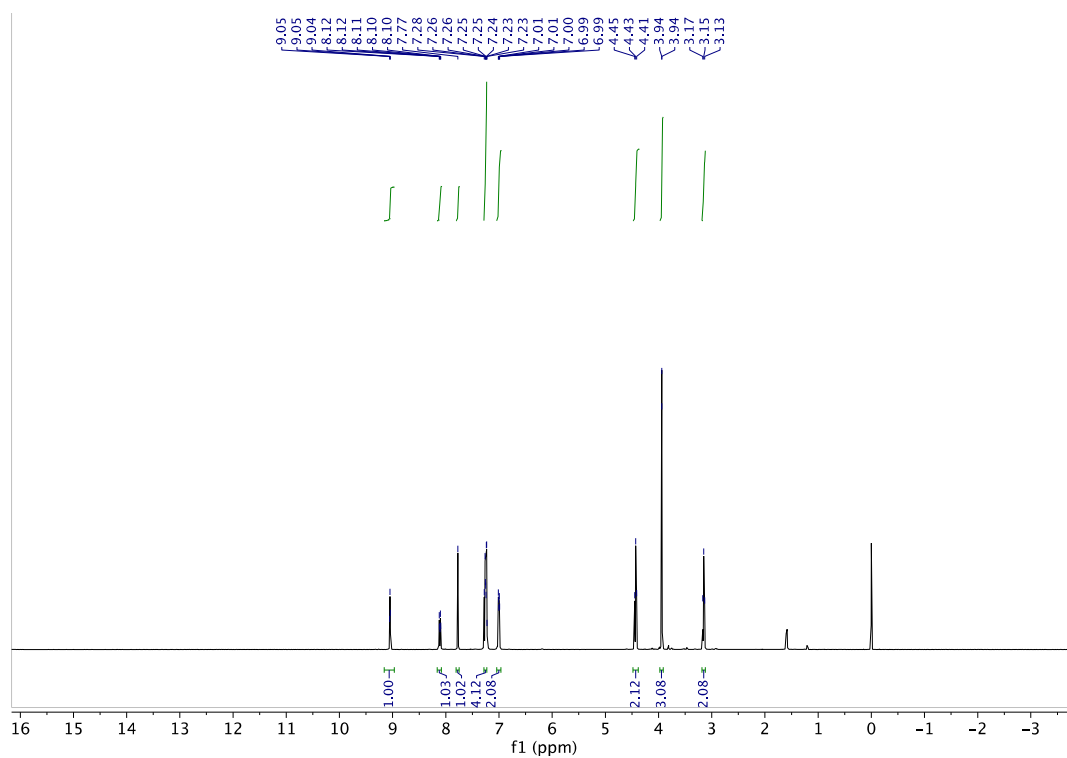
$^1\text{H}$  NMR for methyl 1-(*tert*-butyl)-5-nitro-1*H*-indole-3-carboxylate (**17f**)



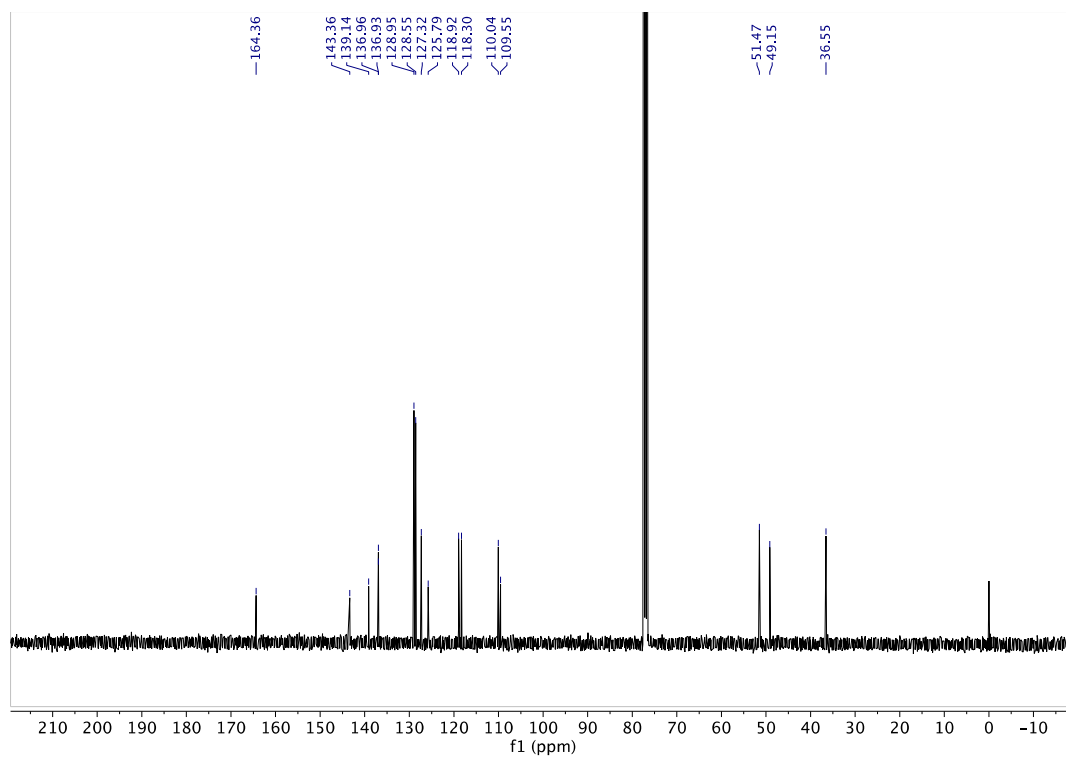
$^{13}\text{C}$  NMR for methyl 1-(*tert*-butyl)-5-nitro-1*H*-indole-3-carboxylate (**17f**)



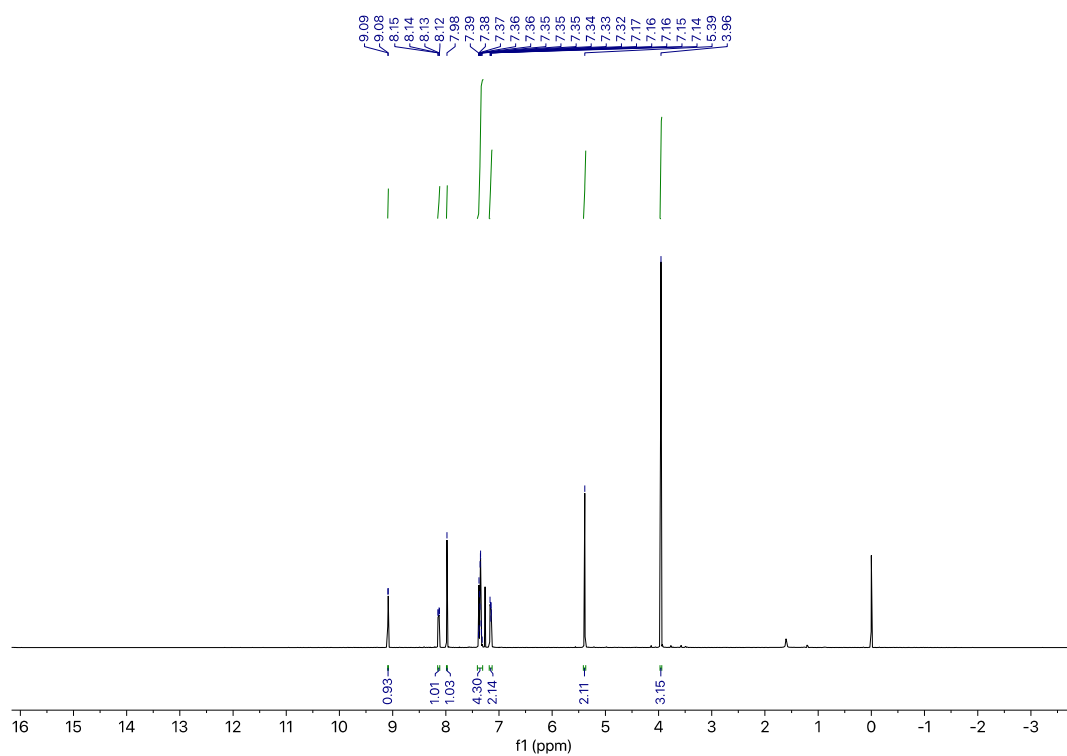
<sup>1</sup>H NMR for methyl 5-nitro-1-phenethyl-1*H*-indole-3-carboxylate (**17g**)



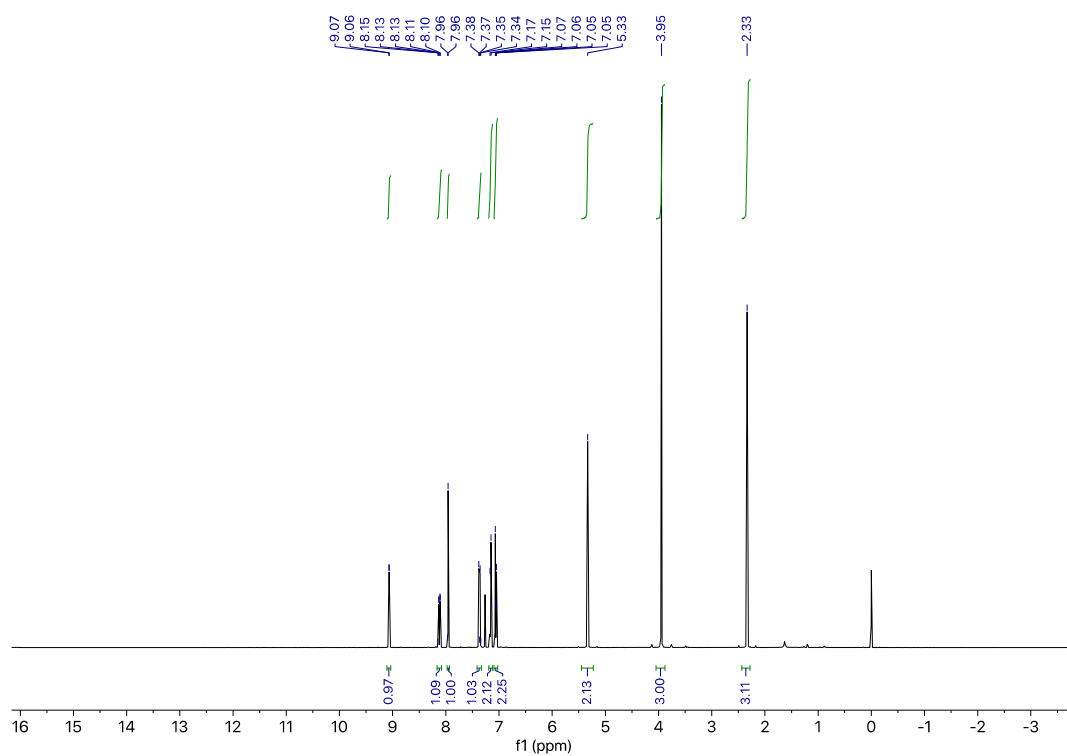
<sup>13</sup>C NMR for methyl 5-nitro-1-phenethyl-1*H*-indole-3-carboxylate (**17g**)



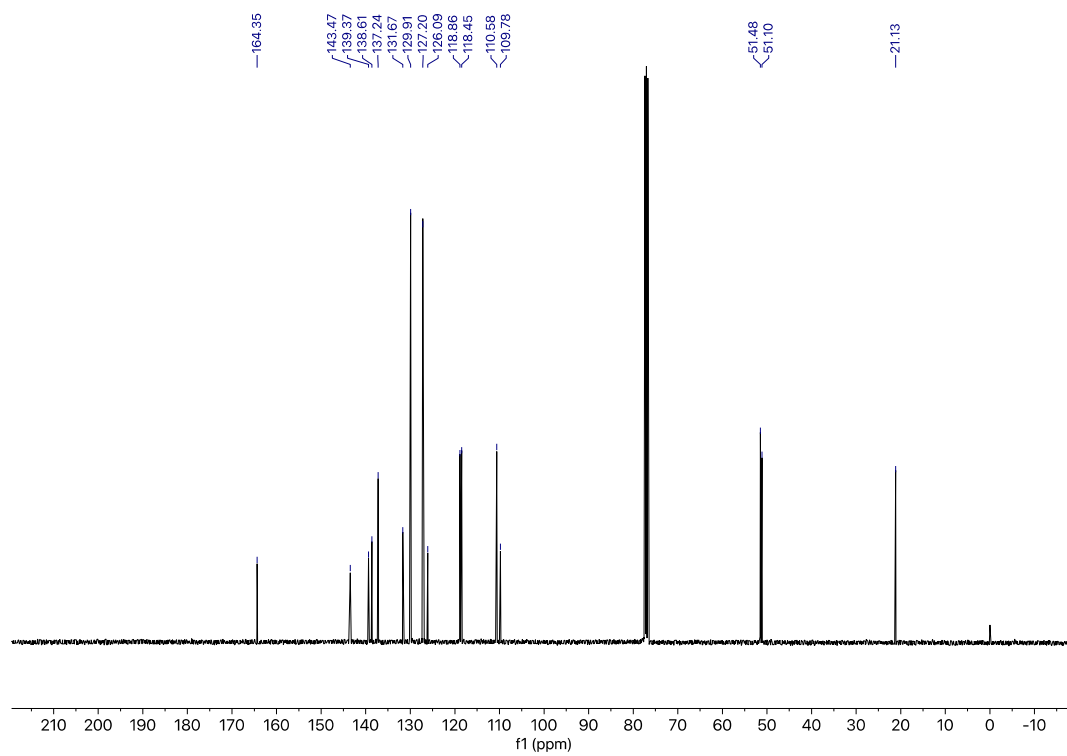
$^1\text{H}$  NMR for methyl 1-benzyl-5-nitro-1*H*-indole-3-carboxylate (**17h**)



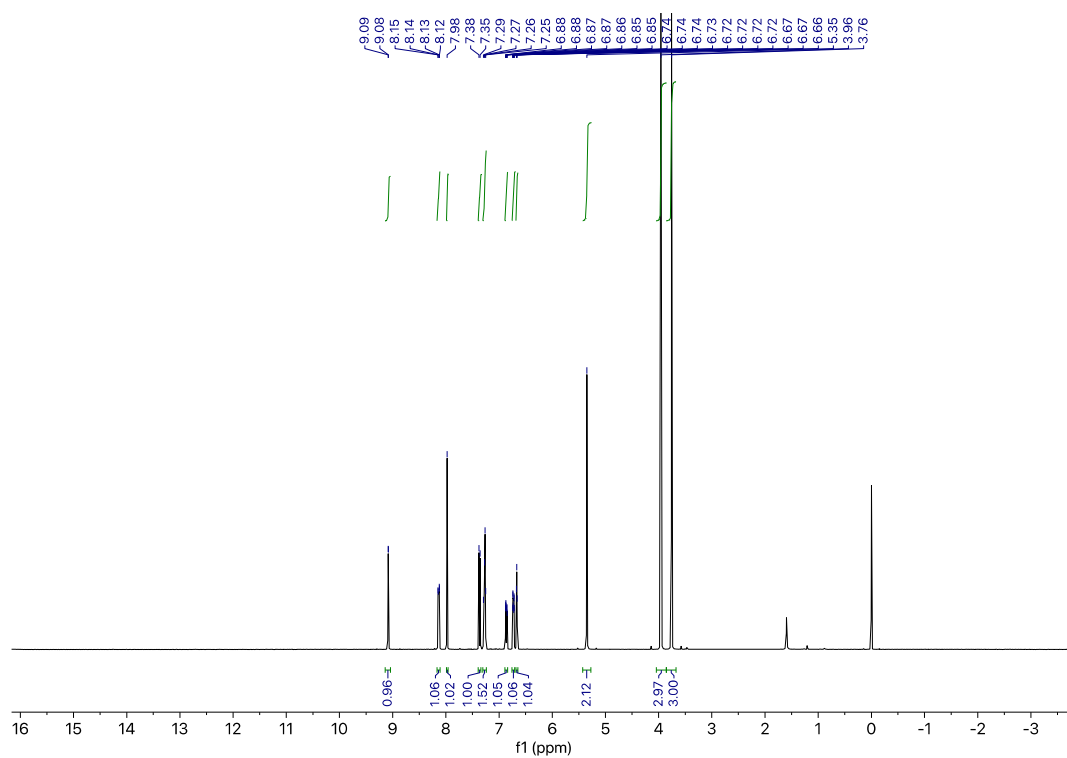
$^1\text{H}$  NMR for methyl 1-(4-methylbenzyl)-5-nitro-1*H*-indole-3-carboxylate (**17i**)



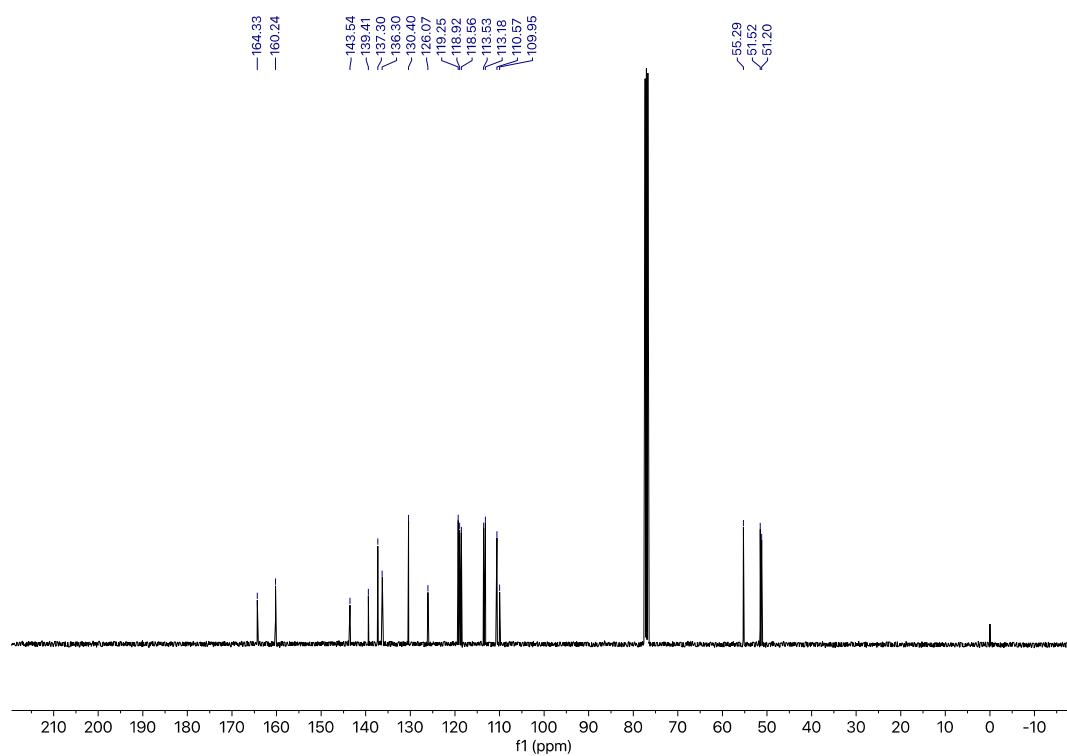
$^{13}\text{C}$  NMR for methyl 1-(4-methylbenzyl)-5-nitro-1*H*-indole-3-carboxylate (**17i**)



$^1\text{H}$  NMR for methyl 1-(3-methoxybenzyl)-5-nitro-1*H*-indole-3-carboxylate (**17j**)

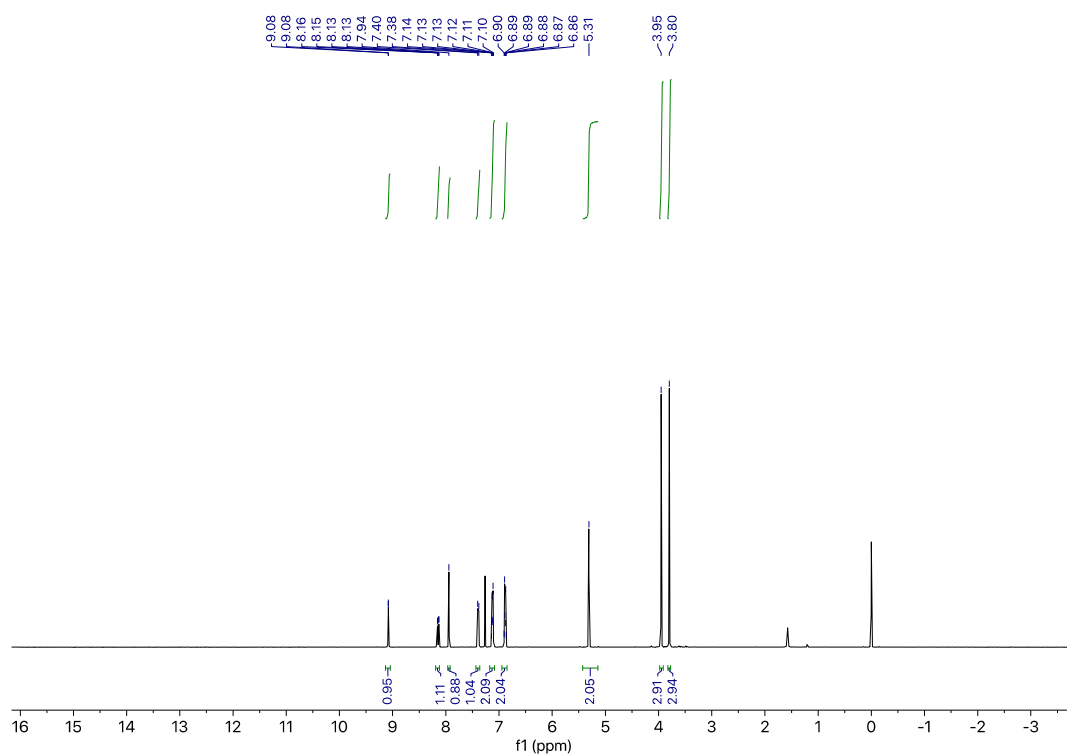


$^{13}\text{C}$  NMR for methyl 1-(3-methoxybenzyl)-5-nitro-1*H*-indole-3-carboxylate (**17j**)

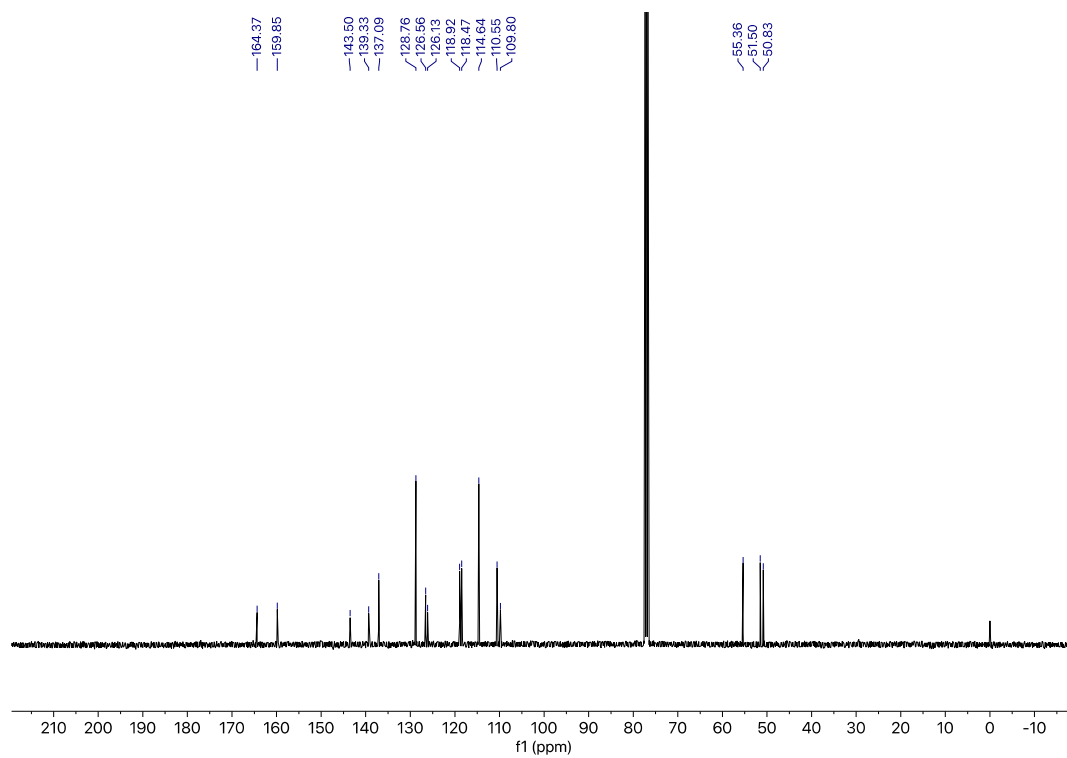




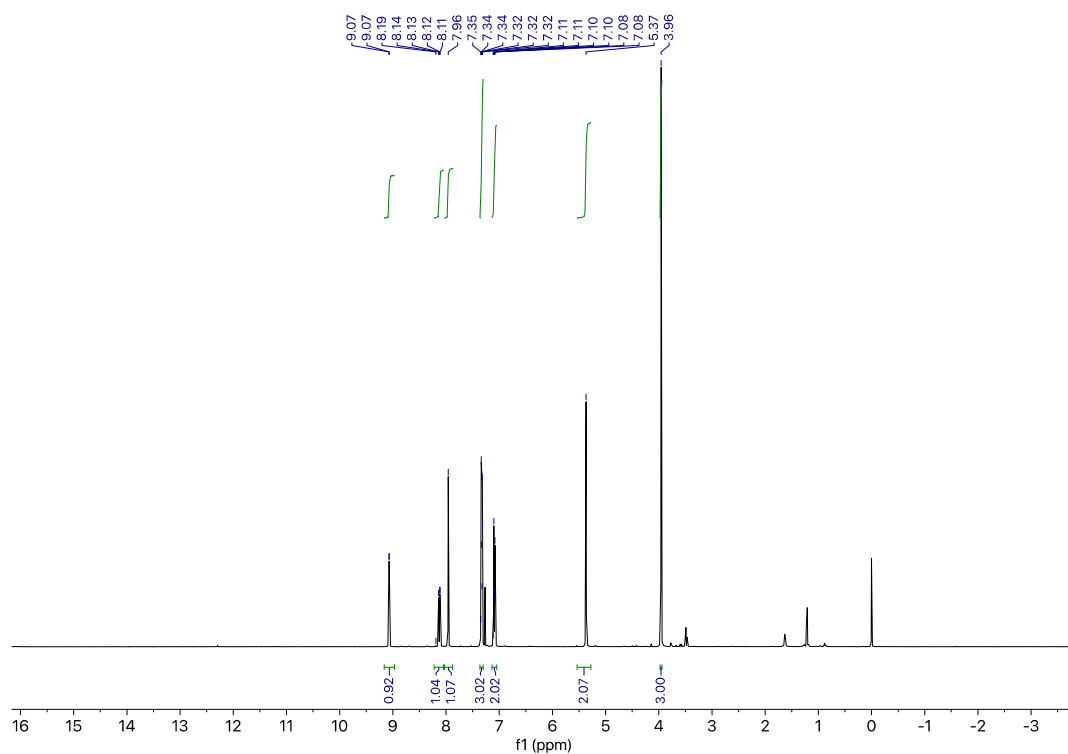
$^1\text{H}$  NMR for Methyl 1-(4-methoxybenzyl)-5-nitro-1*H*-indole-3-carboxylate (**17k**)



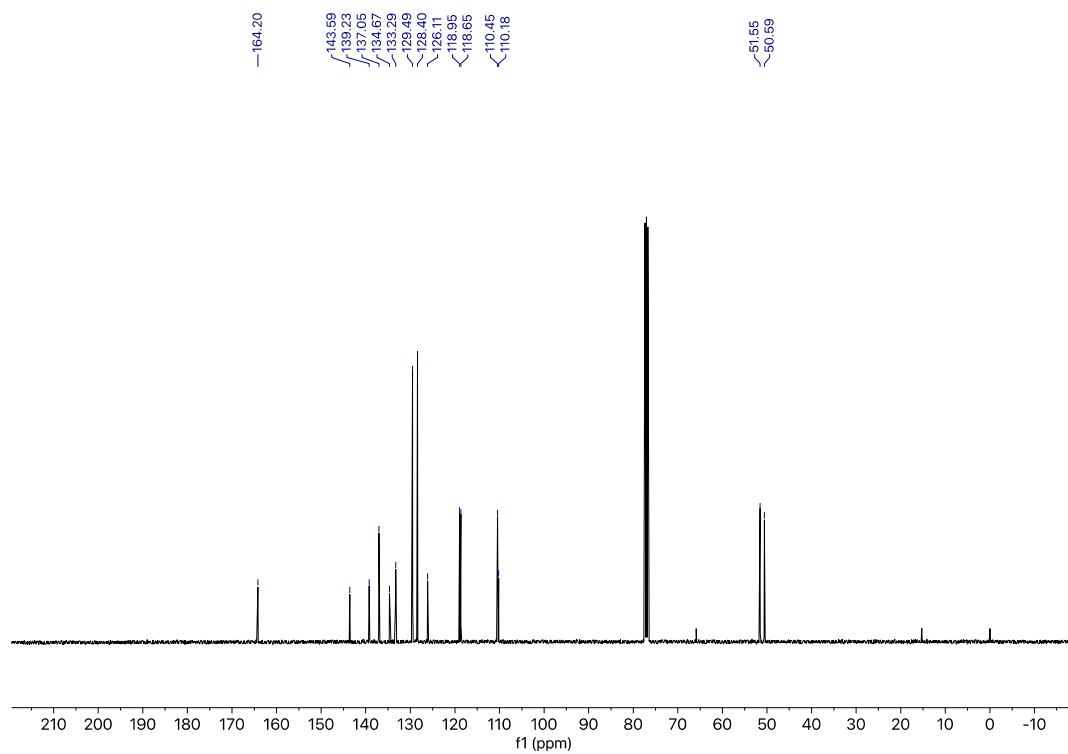
$^{13}\text{C}$  NMR for methyl 1-(4-methoxybenzyl)-5-nitro-1*H*-indole-3-carboxylate (**17k**)



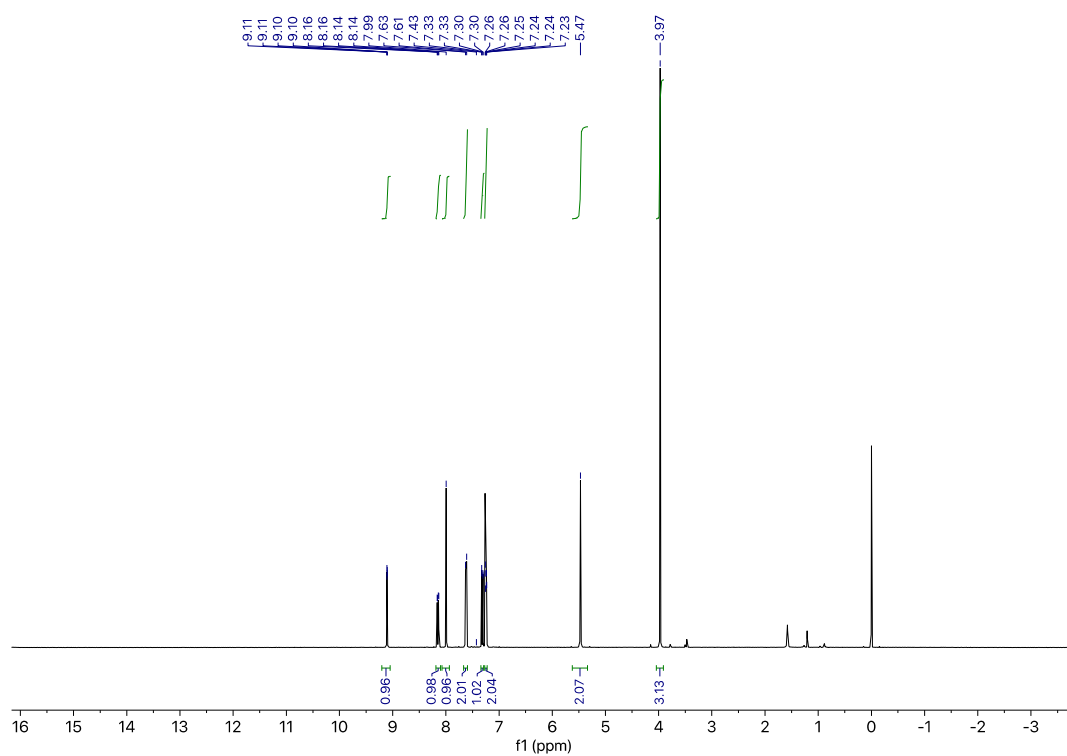
$^1\text{H}$  NMR for Methyl 1-(4-chlorobenzyl)-5-nitro-1*H*-indole-3-carboxylate (**171**)



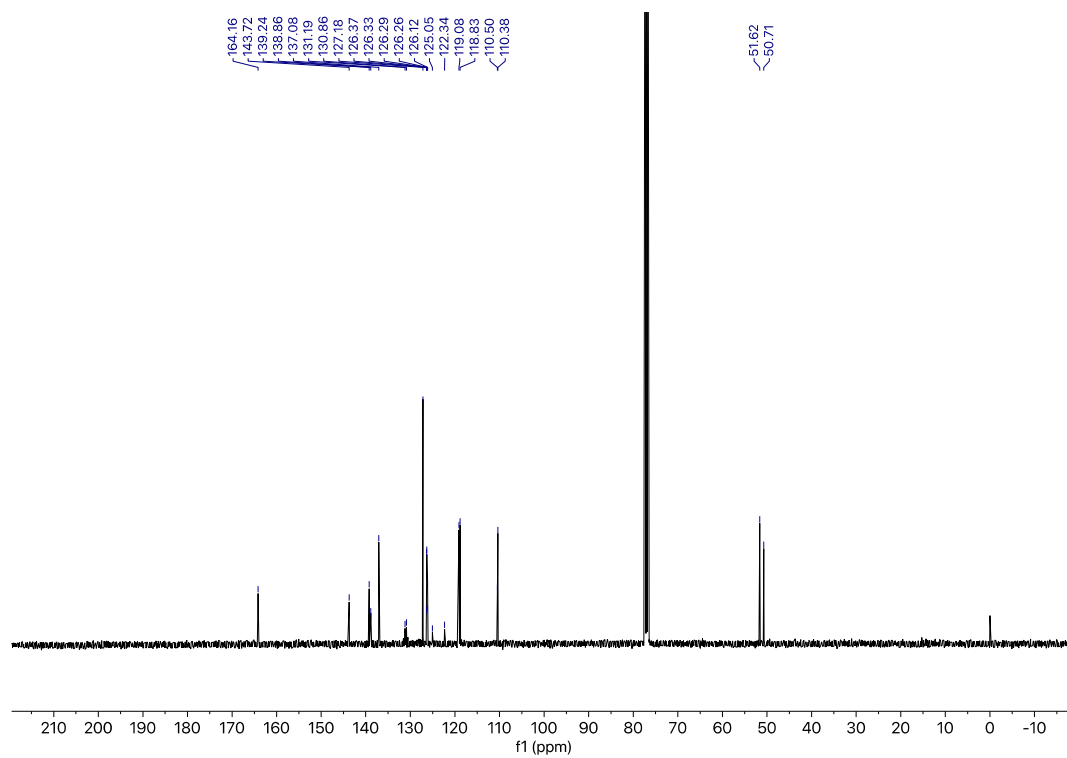
$^{13}\text{C}$  NMR for Methyl 1-(4-chlorobenzyl)-5-nitro-1*H*-indole-3-carboxylate (**171**)



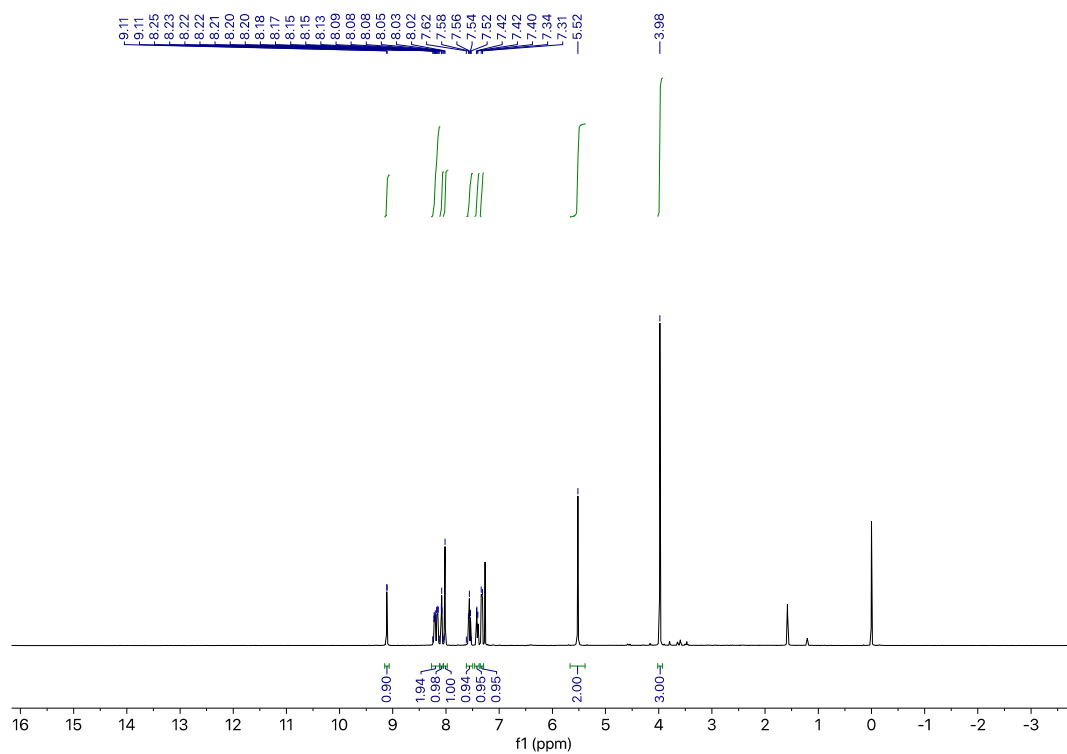
$^1\text{H}$  NMR for methyl 5-nitro-1-((4-trifluoromethyl)benzyl)-1*H*-indole-3-carboxylate (**17m**)



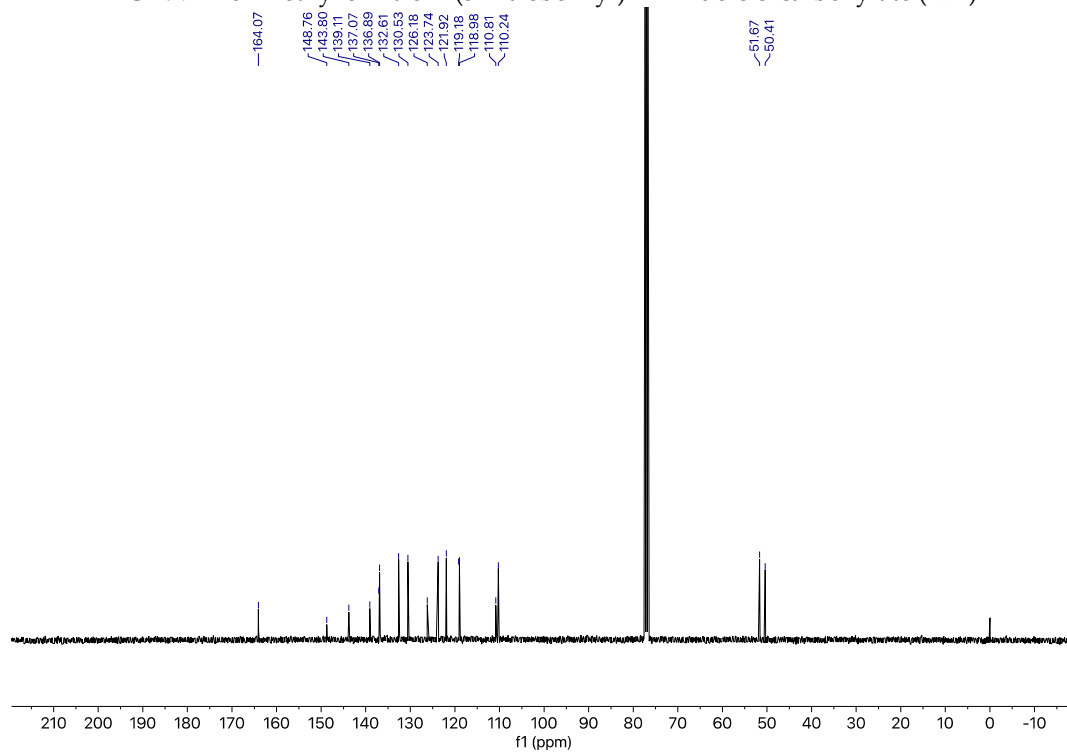
$^{13}\text{C}$  NMR for methyl 5-nitro-1-((4-trifluoromethyl)benzyl)-1*H*-indole-3-carboxylate (**17m**)



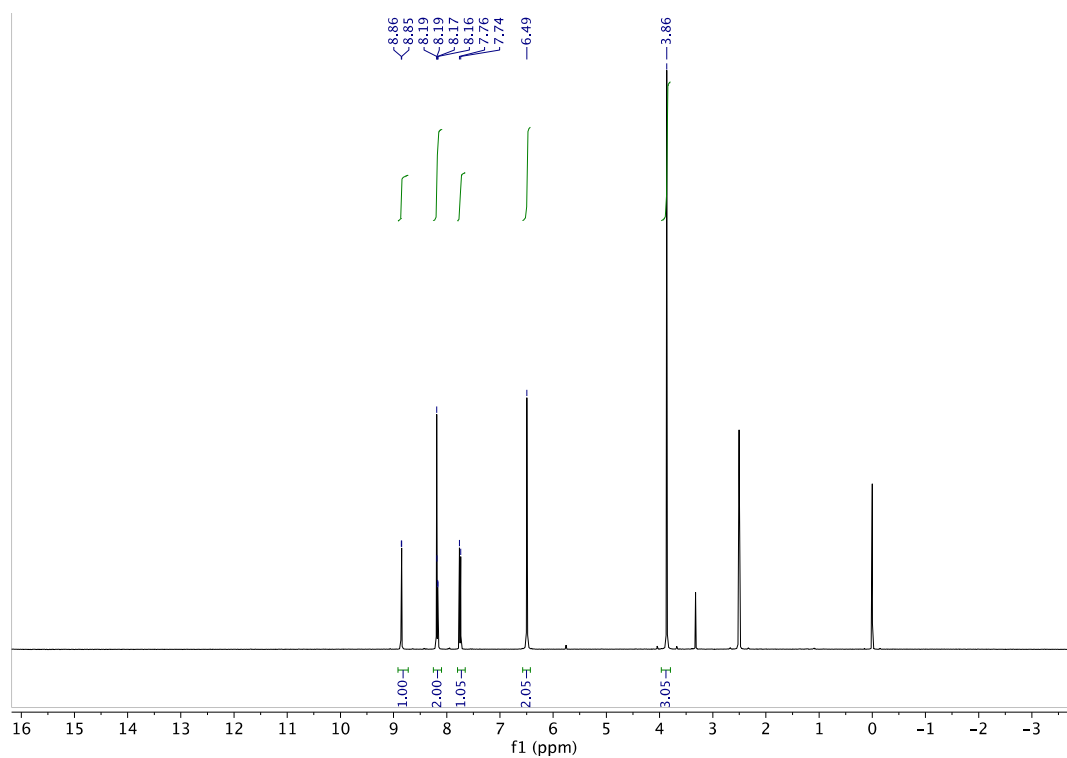
<sup>1</sup>H NMR for methyl 5-nitro-1-(3-nitrobenzyl)-1*H*-indole-3-carboxylate (**17n**)



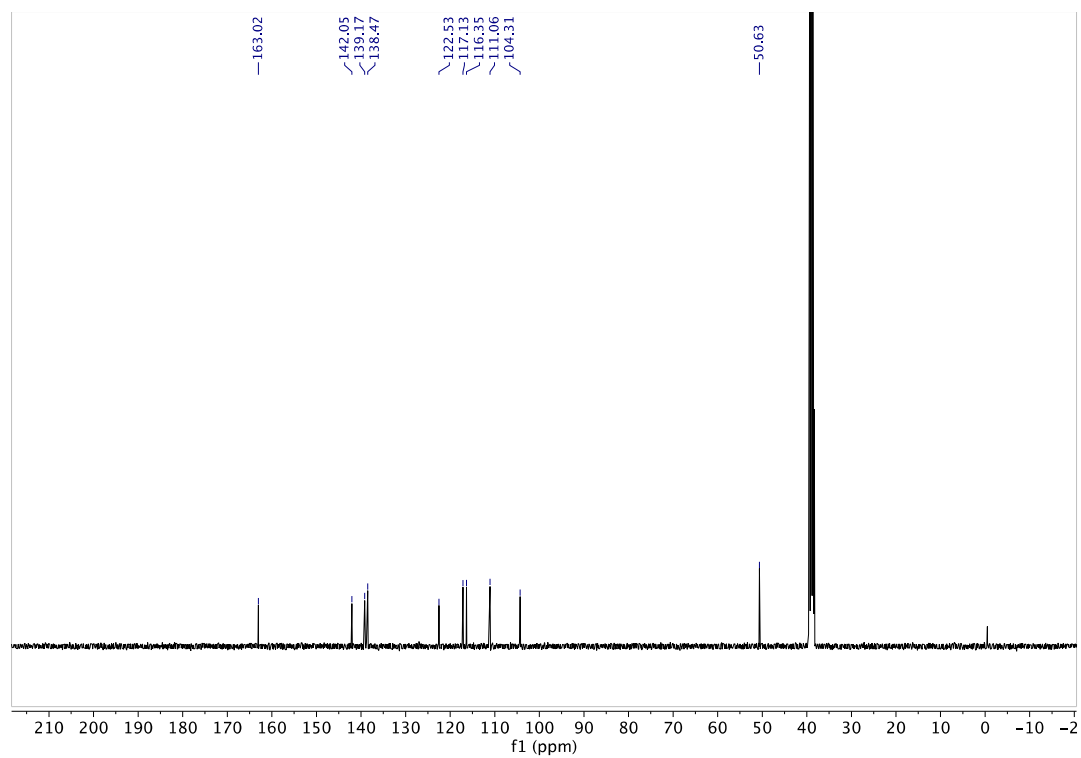
<sup>13</sup>C NMR for methyl 5-nitro-1-(3-nitrobenzyl)-1*H*-indole-3-carboxylate (**17n**)



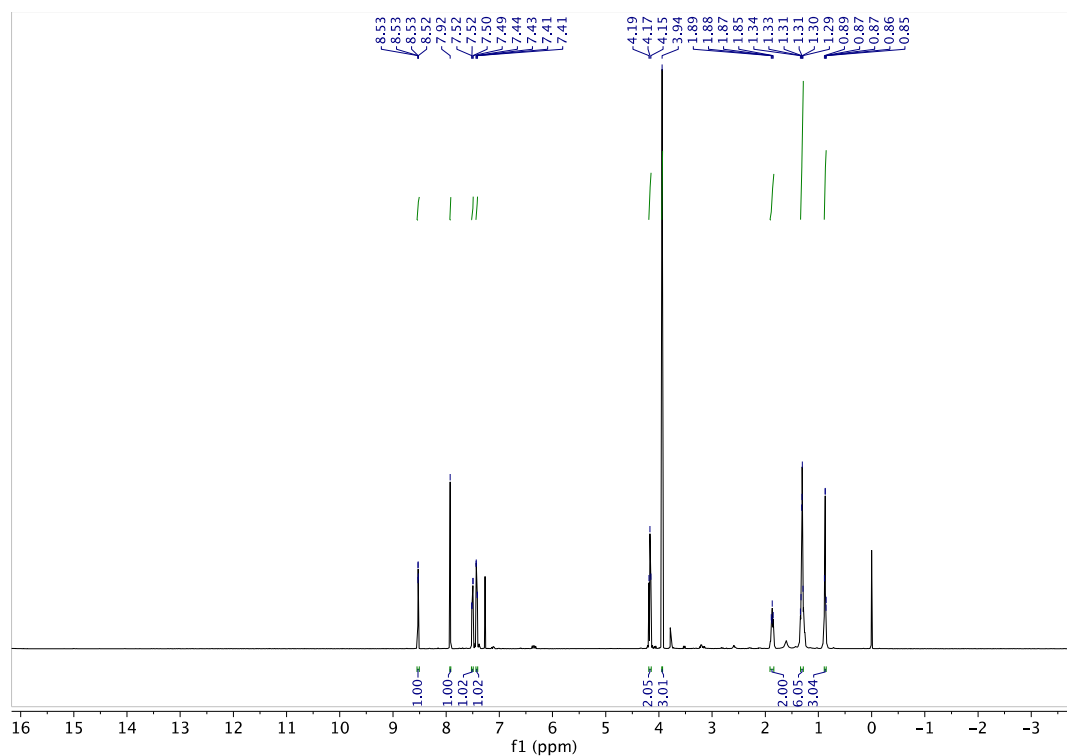
$^1\text{H}$  NMR for methyl 1-amino-5-nitro-1*H*-indole-3-carboxylate (**17o**)



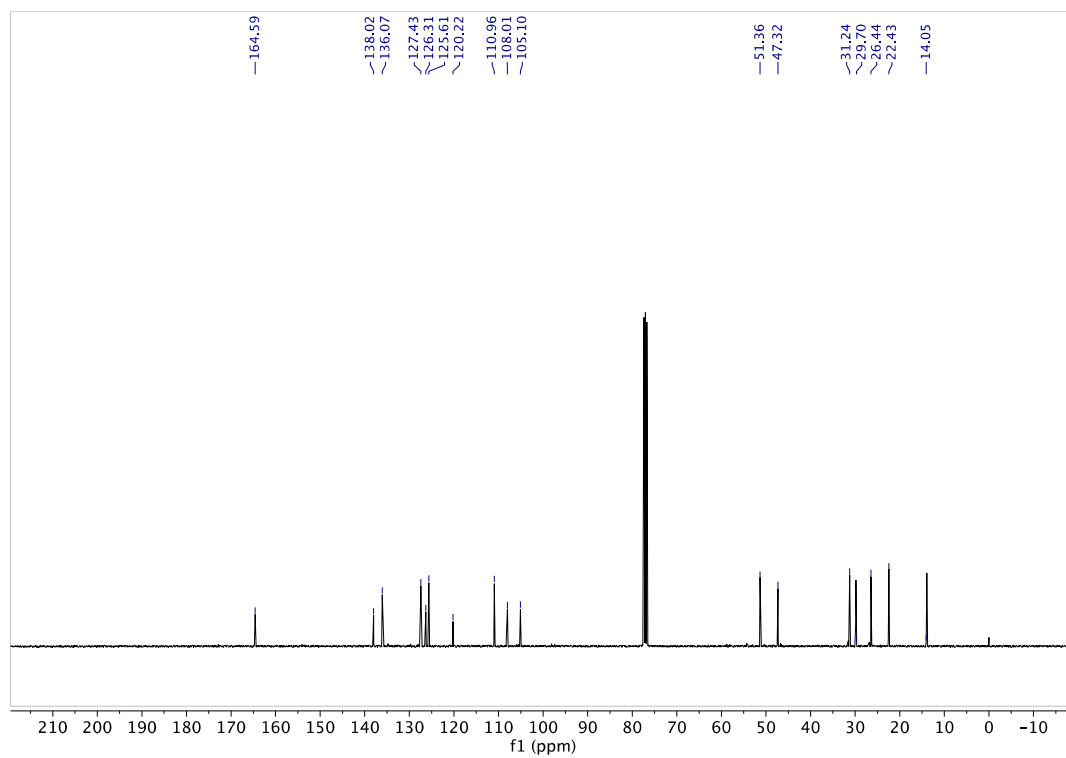
$^{13}\text{C}$  NMR for methyl 1-amino-5-nitro-1*H*-indole-3-carboxylate (**17o**)



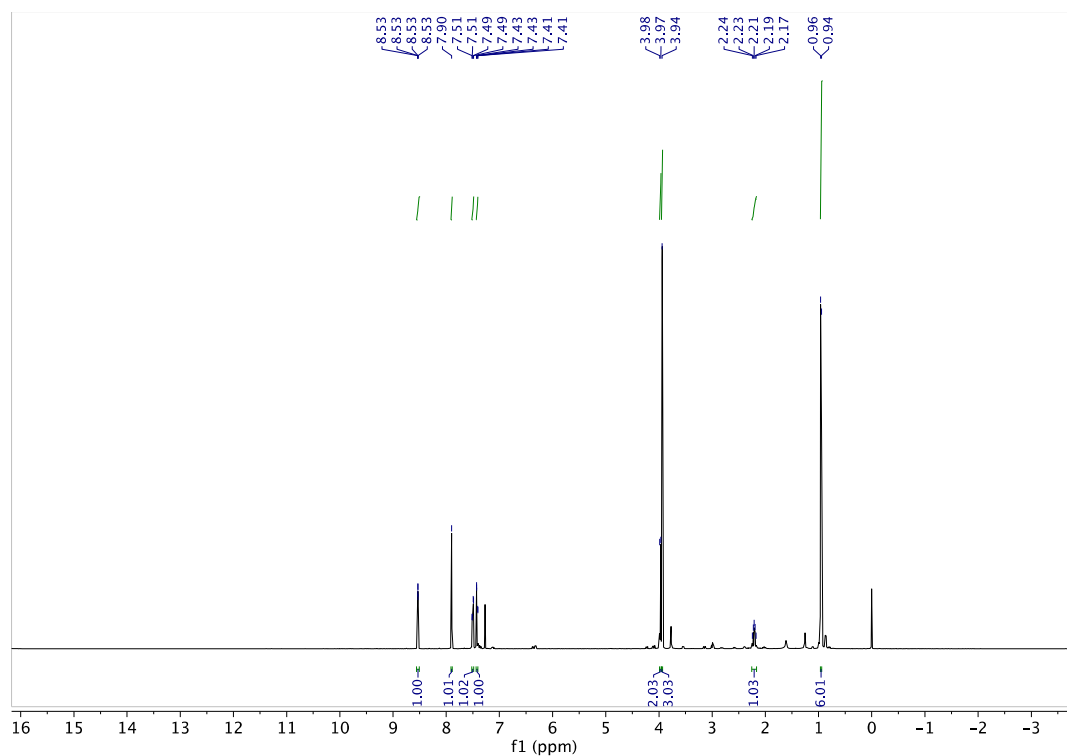
$^1\text{H}$  NMR for methyl 5-cyano-1-hexyl-1*H*-indole-3-carboxylate (**18a**)



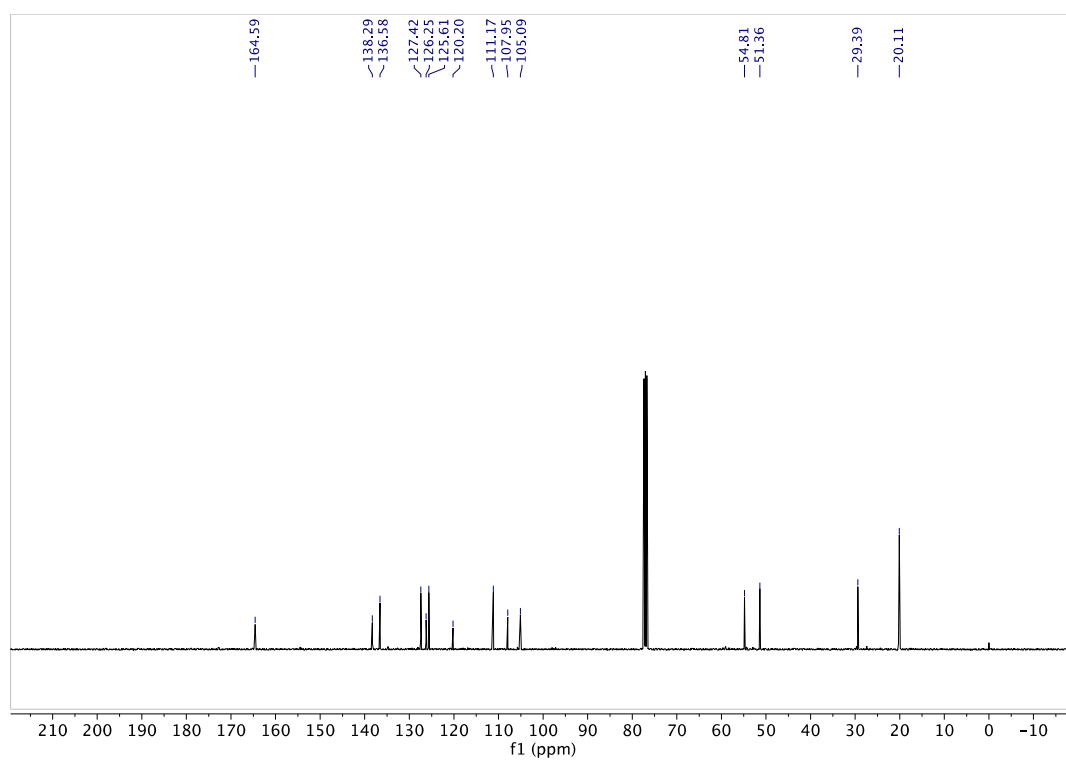
$^{13}\text{C}$  NMR for methyl 5-cyano-1-hexyl-1*H*-indole-3-carboxylate (**18a**)



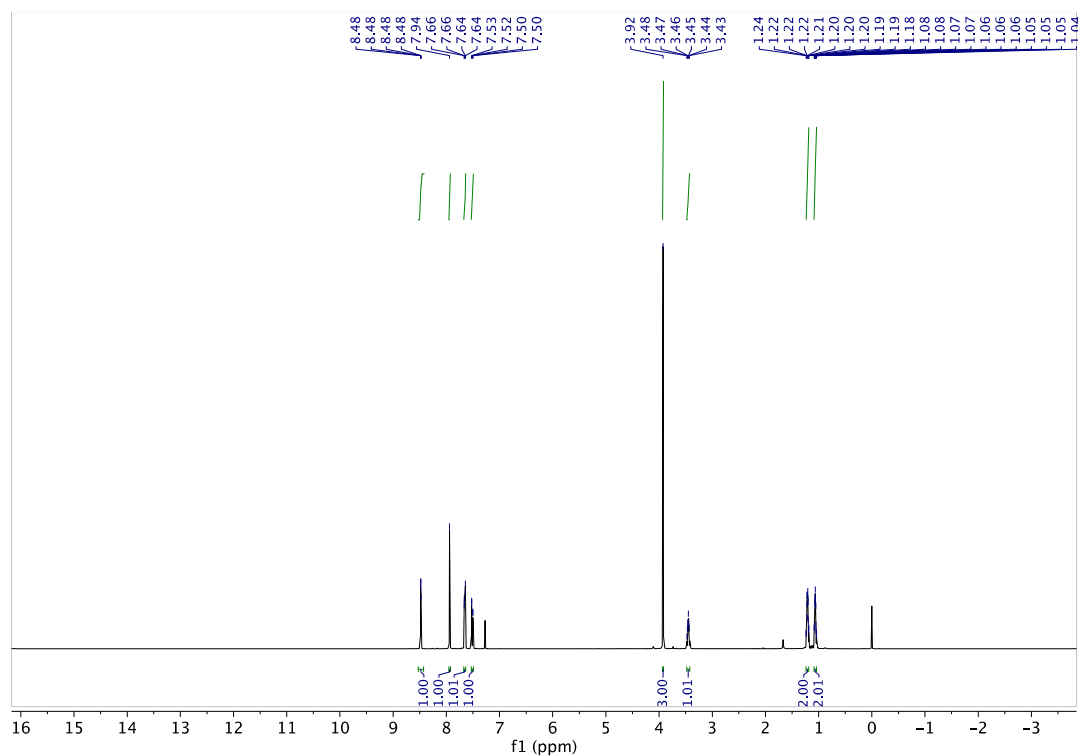
$^1\text{H}$  NMR for methyl 5-cyano-1-isobutyl-1*H*-indole-3-carboxylate (**18b**)



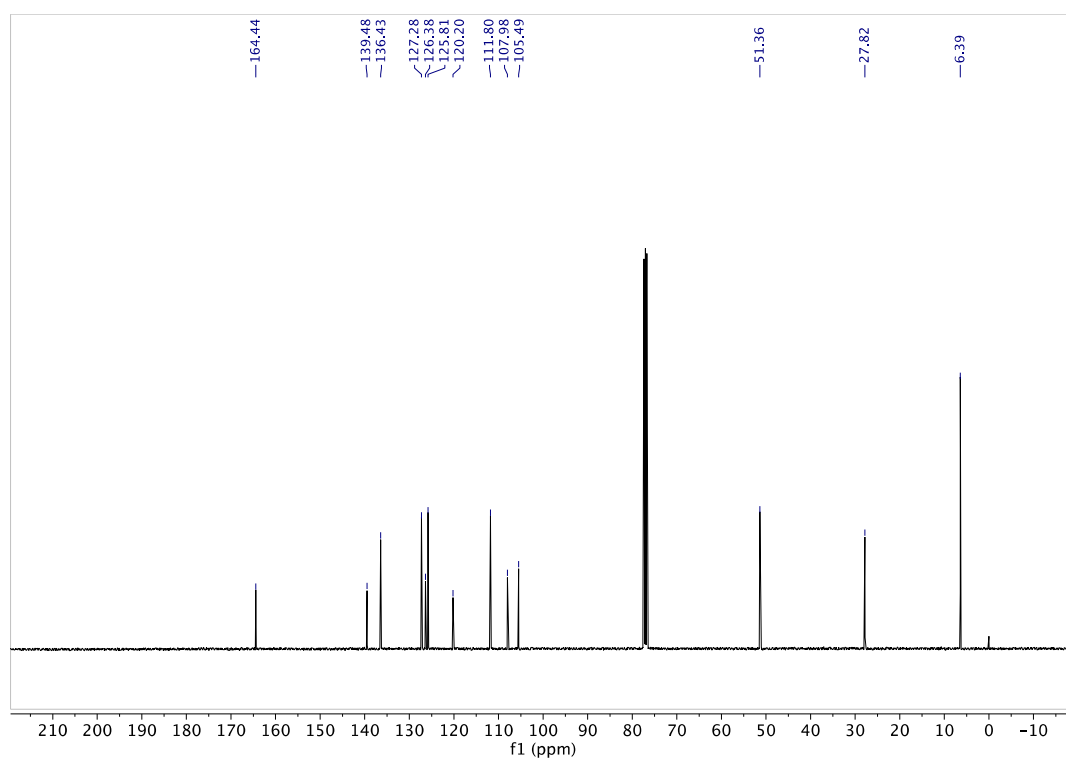
$^{13}\text{C}$  NMR for methyl 5-cyano-1-isobutyl-1*H*-indole-3-carboxylate (**18b**)



$^1\text{H}$  NMR for methyl 5-cyano-1-cyclopropyl-1*H*-indole-3-carboxylate (**18d**)

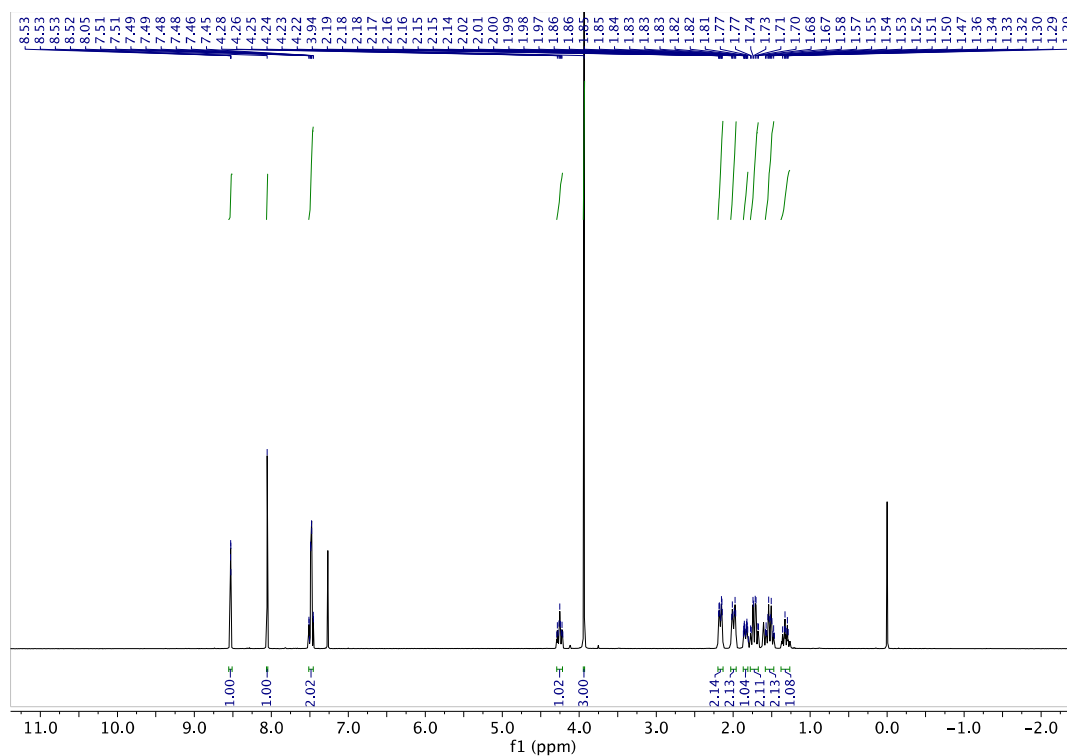


$^{13}\text{C}$  NMR for methyl 5-cyano-1-cyclopropyl-1*H*-indole-3-carboxylate (**18d**)

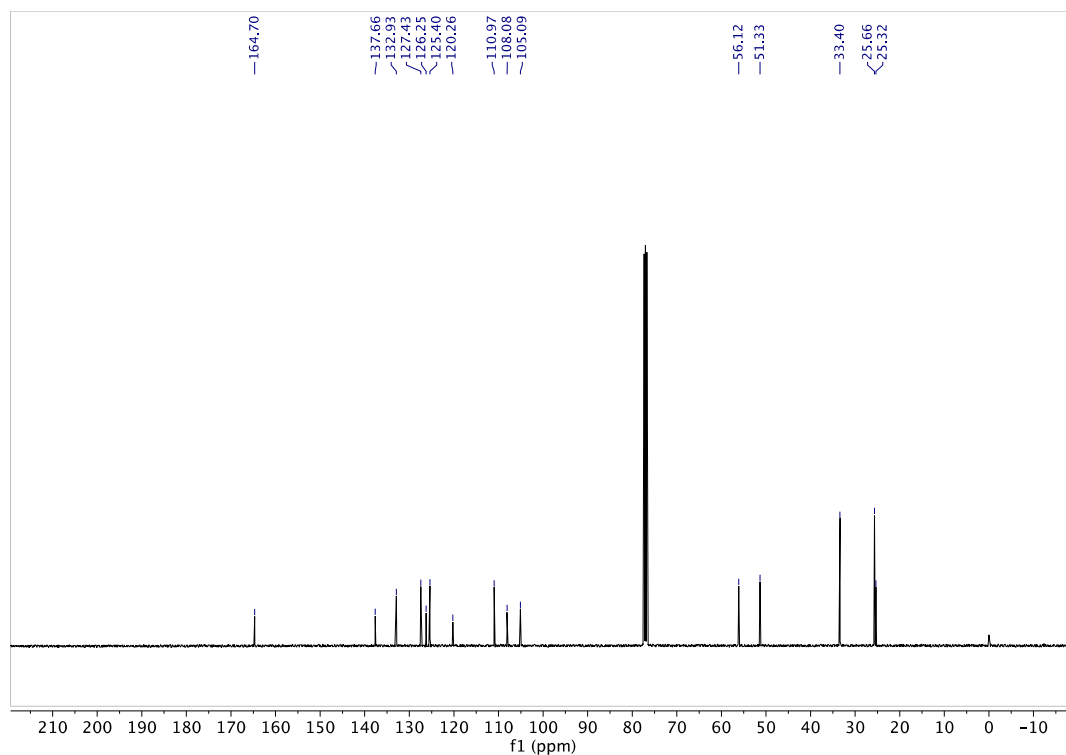




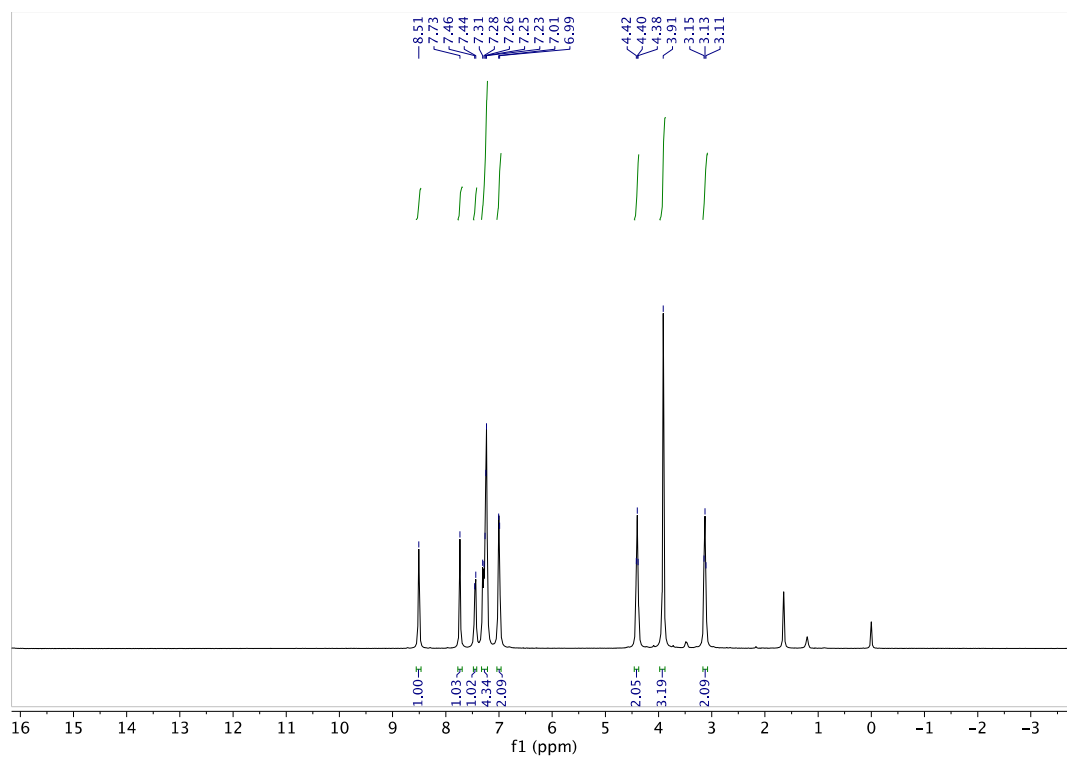
$^1\text{H}$  NMR for methyl 5-cyano-1-cyclohexyl-1*H*-indole-3-carboxylate (**18e**)



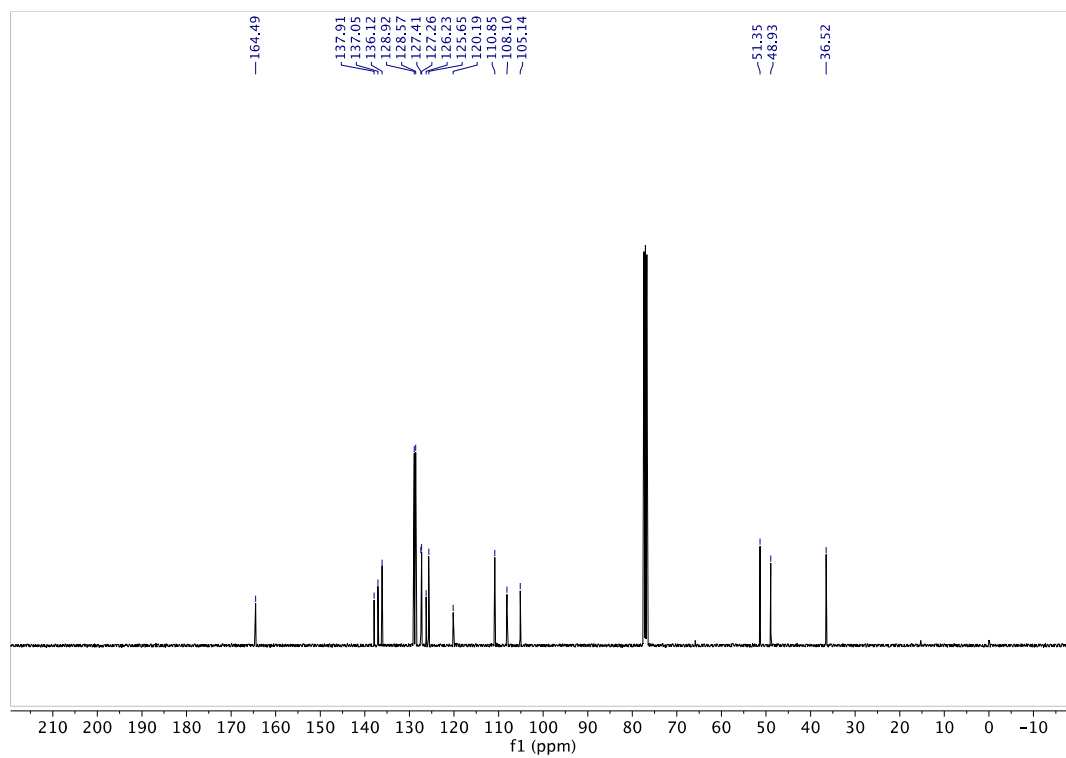
$^{13}\text{C}$  NMR for methyl 5-cyano-1-cyclohexyl-1*H*-indole-3-carboxylate (**18e**)



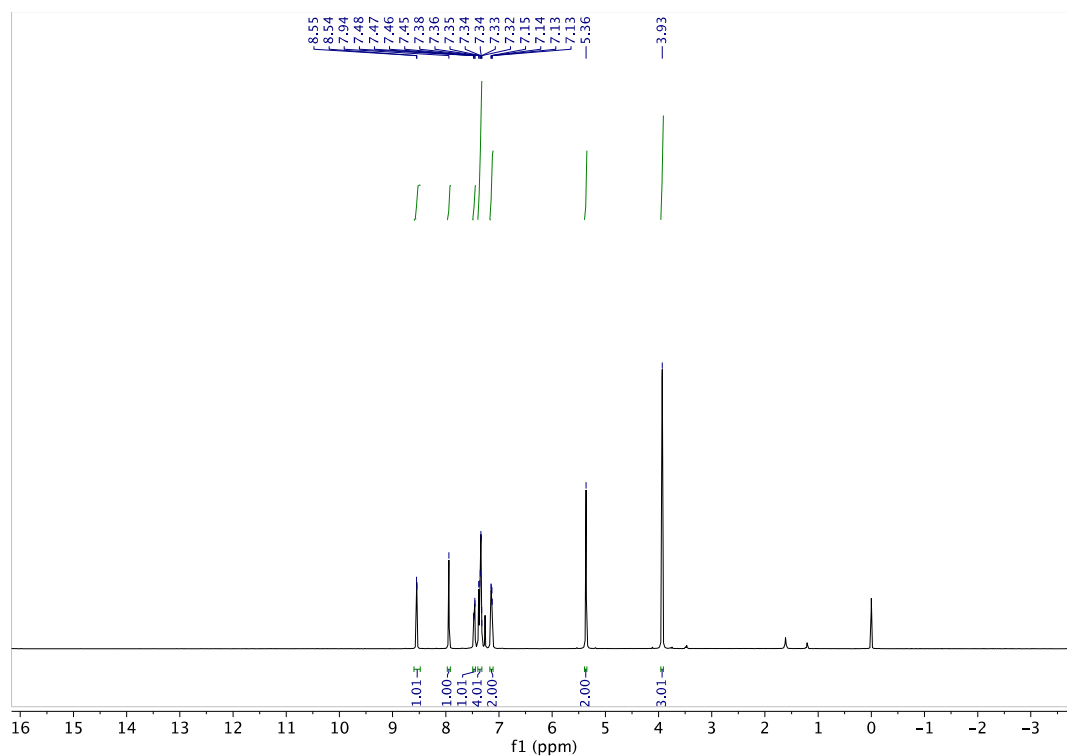
$^1\text{H}$  NMR for methyl 5-cyano-1-phenethyl-1*H*-indole-3-carboxylate (**18g**)



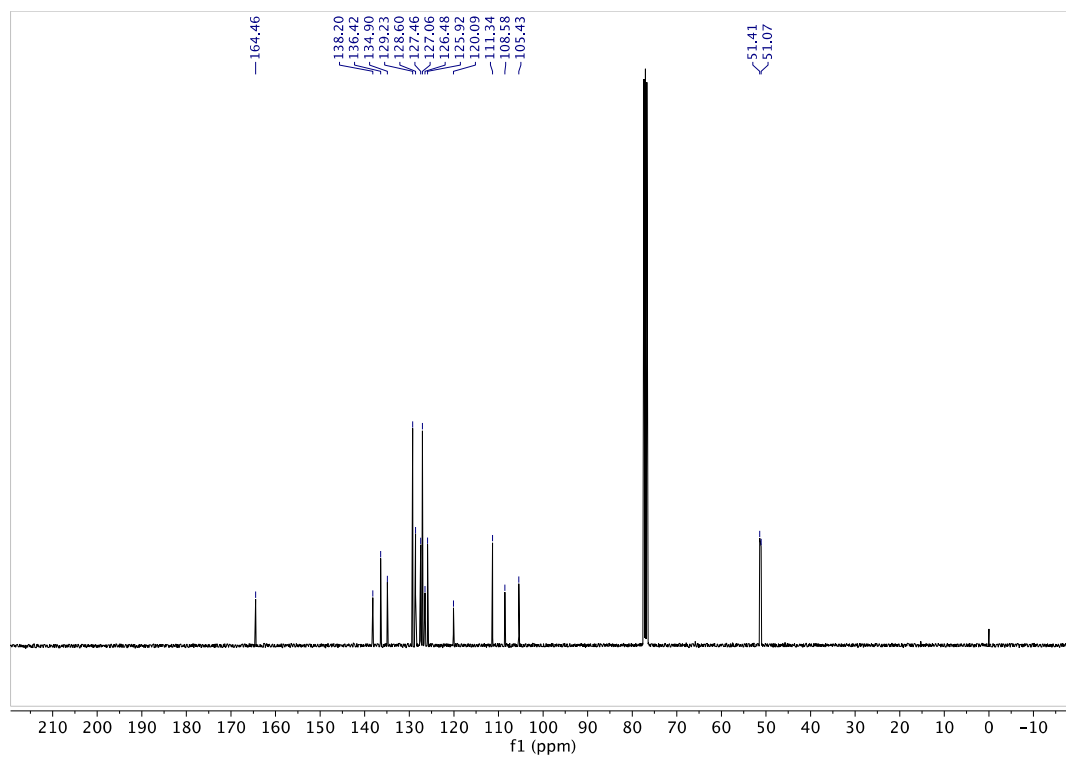
$^{13}\text{C}$  NMR for methyl 5-cyano-1-phenethyl-1*H*-indole-3-carboxylate (**18g**)



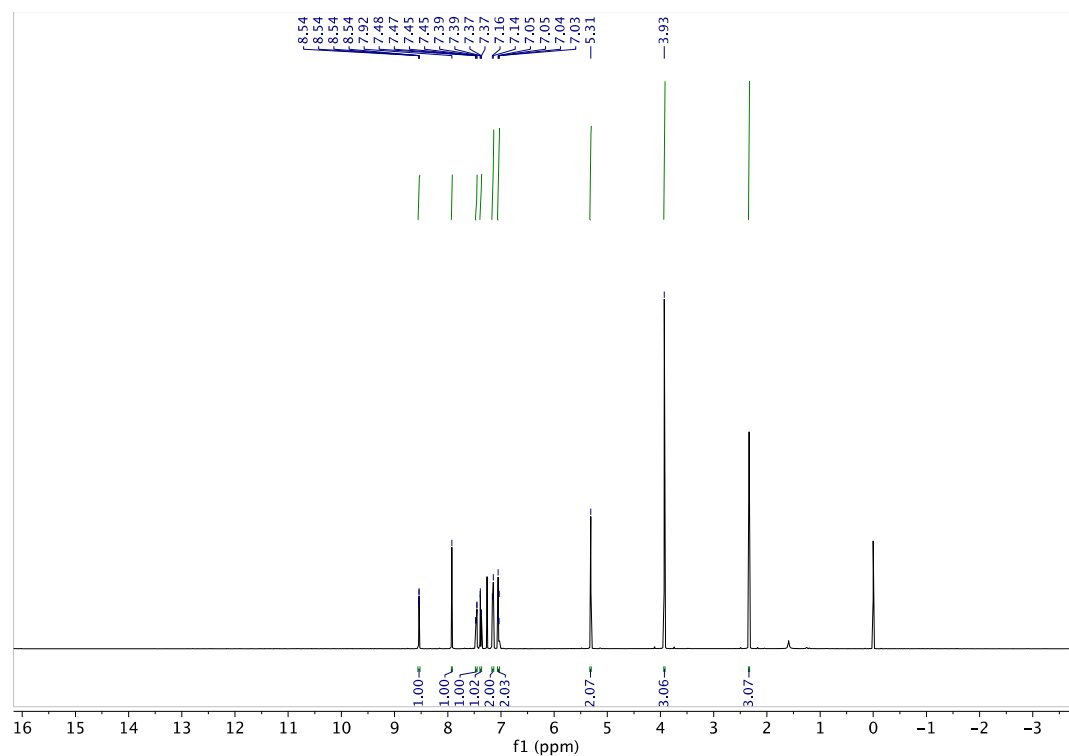
$^1\text{H}$  NMR for methyl 1-benzyl-5-cyano-1*H*-indole-3-carboxylate (**18h**)



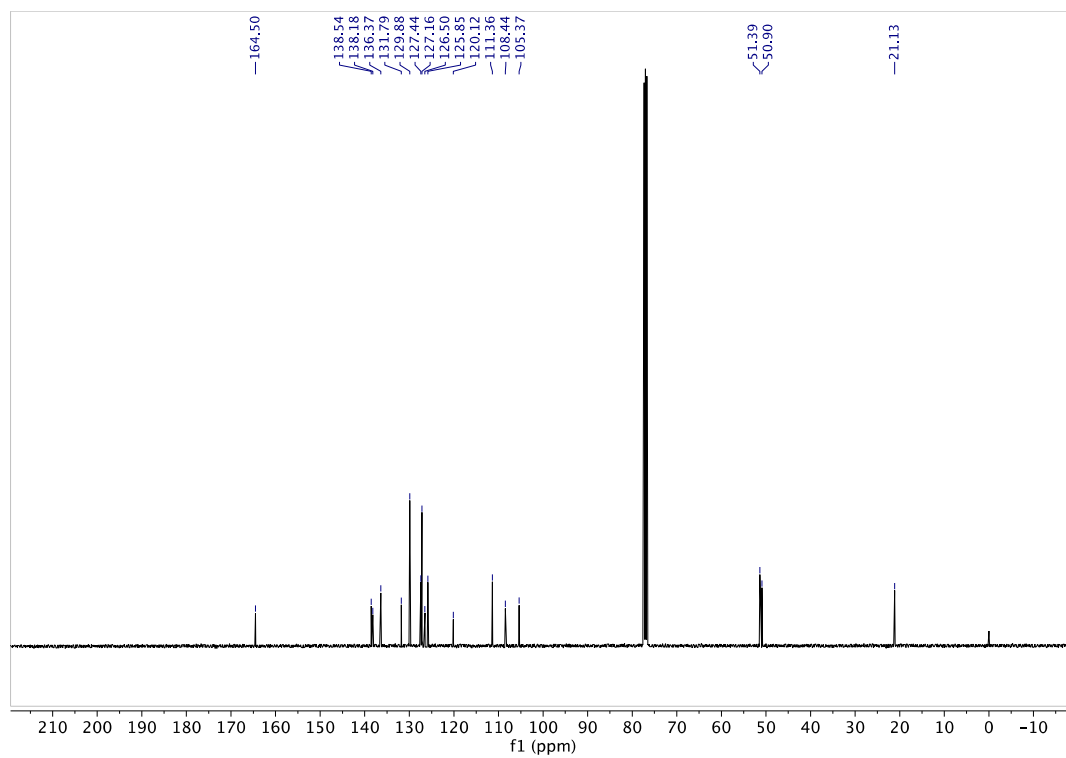
$^{13}\text{C}$  NMR for methyl 1-benzyl-5-cyano-1*H*-indole-3-carboxylate (**18h**)



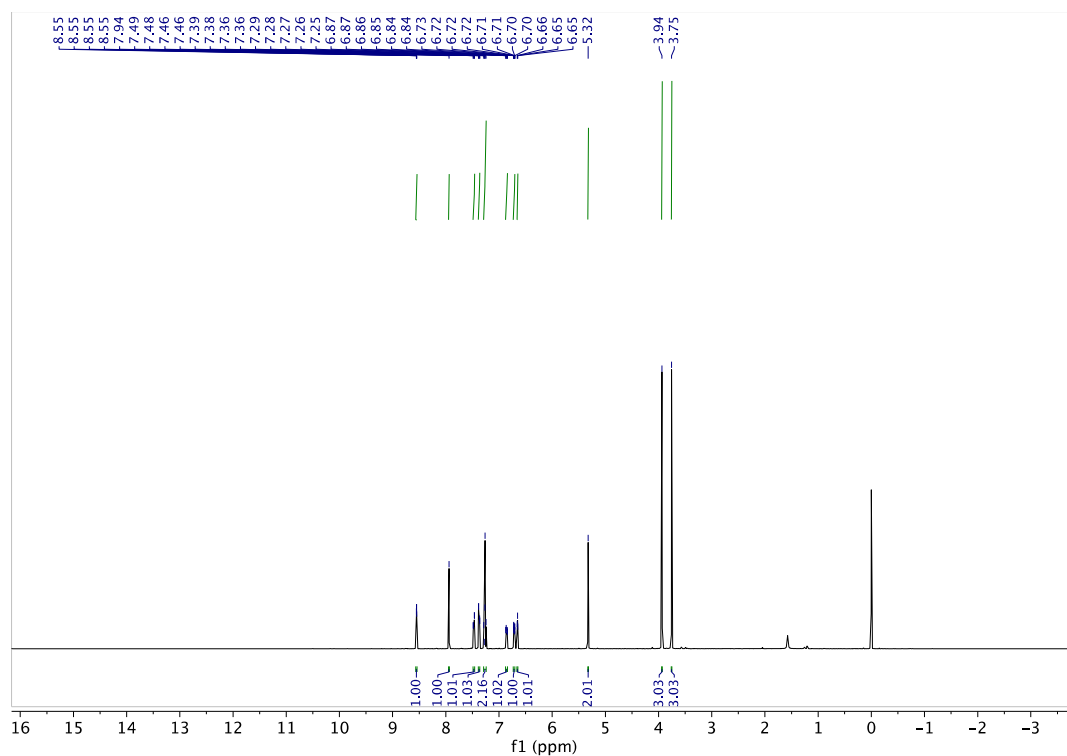
$^1\text{H}$  NMR for methyl 5-cyano-1-(4-methylbenzyl)-1*H*-indole-3-carboxylate (**18i**)



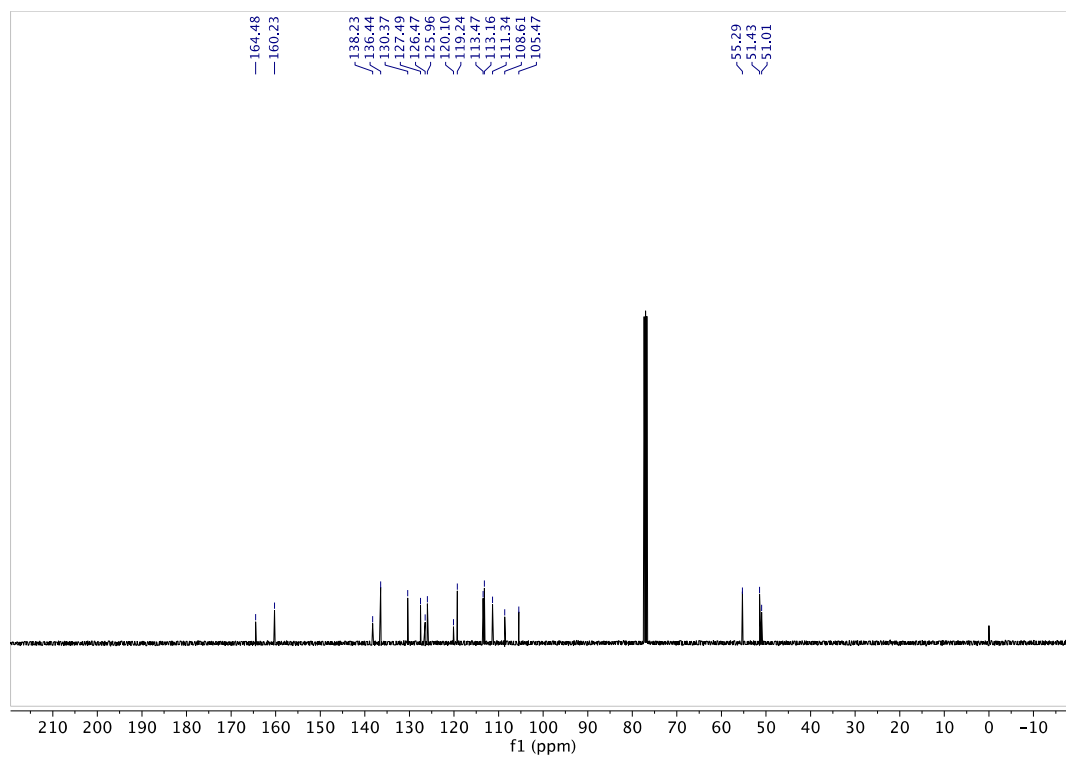
$^{13}\text{C}$  NMR for methyl 5-cyano-1-(4-methylbenzyl)-1*H*-indole-3-carboxylate (**18i**)



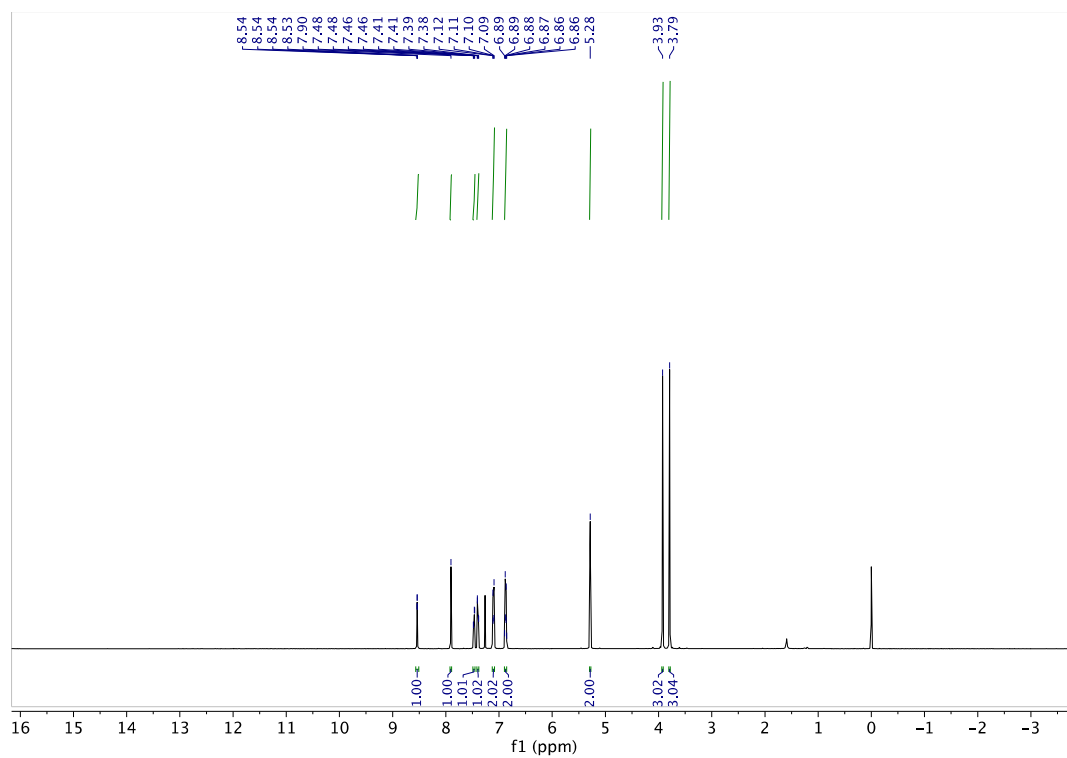
$^1\text{H}$  NMR for methyl 5-cyano-1-(3-methoxyphenyl)-1*H*-indole-3-carboxylate (**18j**)



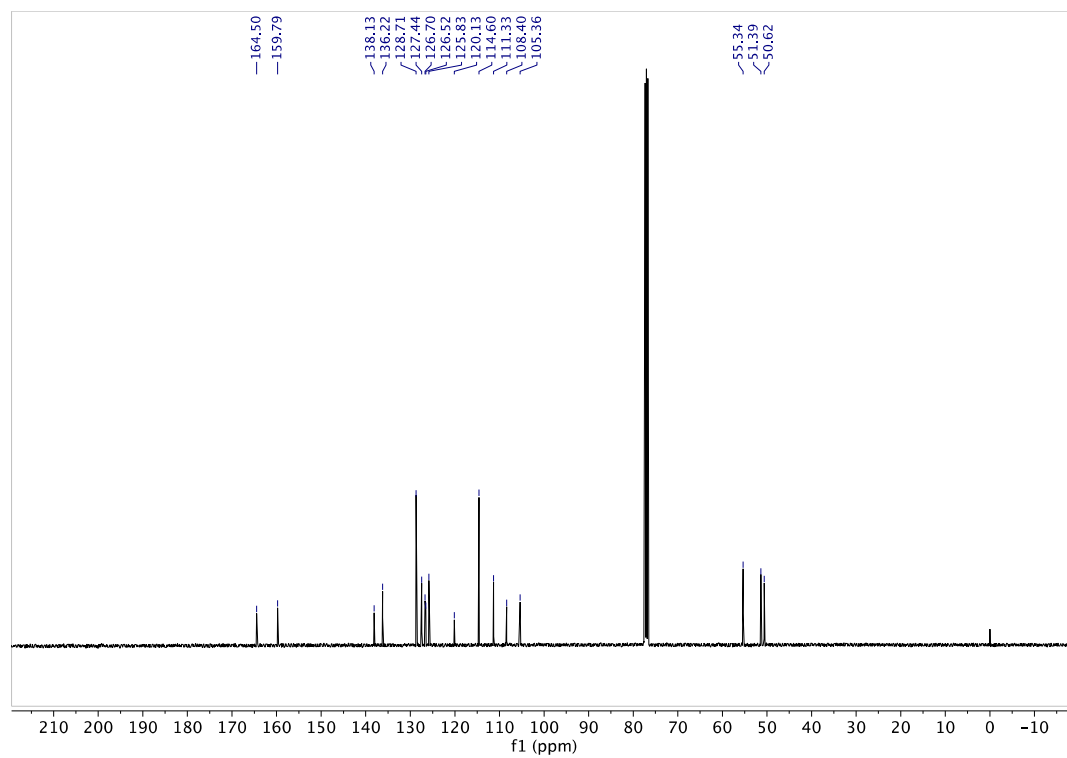
$^{13}\text{C}$  NMR for methyl 5-cyano-1-(3-methoxyphenyl)-1*H*-indole-3-carboxylate (**18j**)



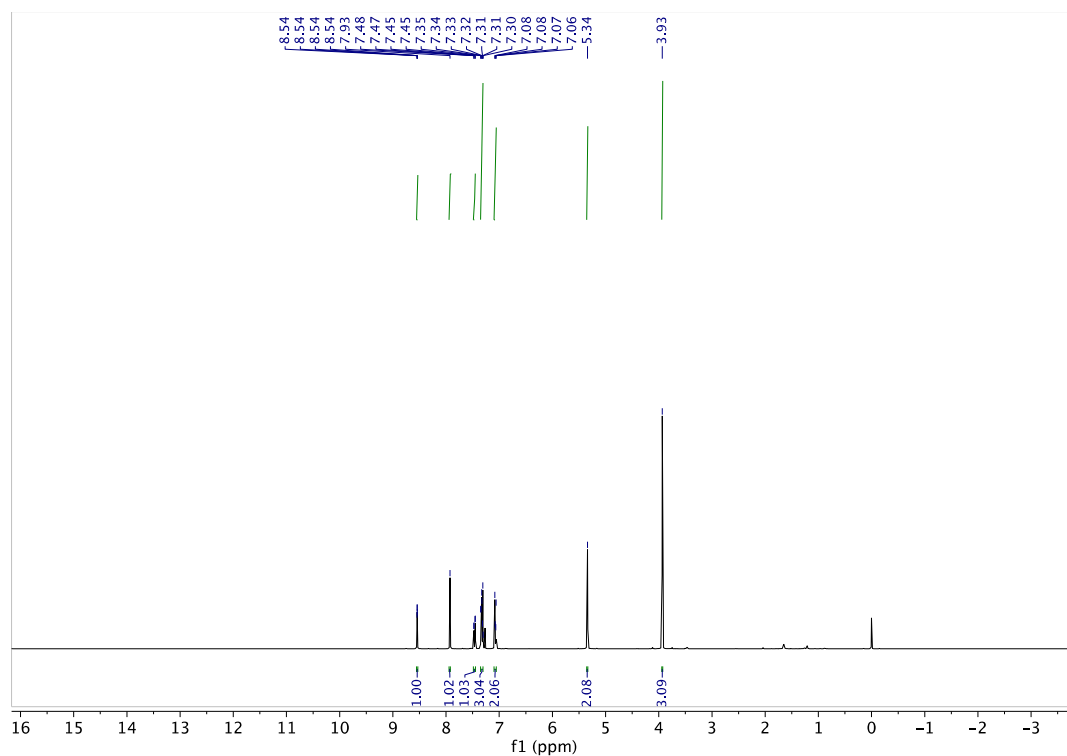
<sup>1</sup>H NMR for methyl 5-cyano-1-(4-methoxyphenyl)-1*H*-indole-3-carboxylate (**18k**)



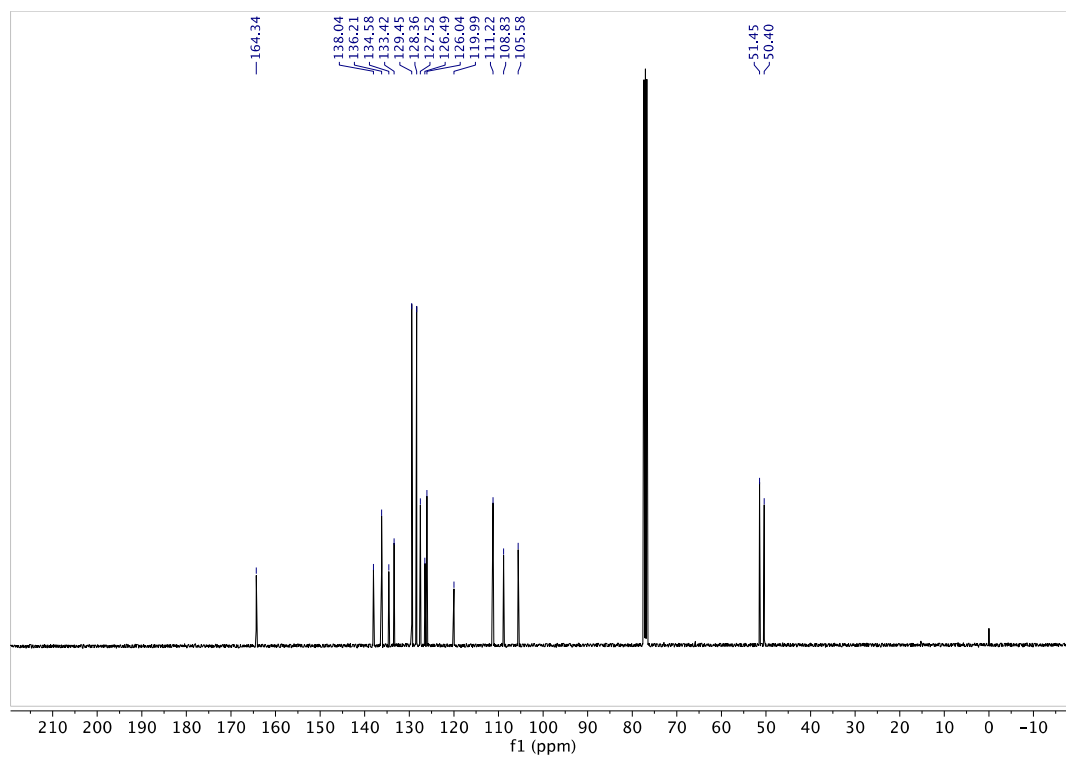
<sup>13</sup>C NMR for methyl 5-cyano-1-(4-methoxyphenyl)-1*H*-indole-3-carboxylate (**18k**)



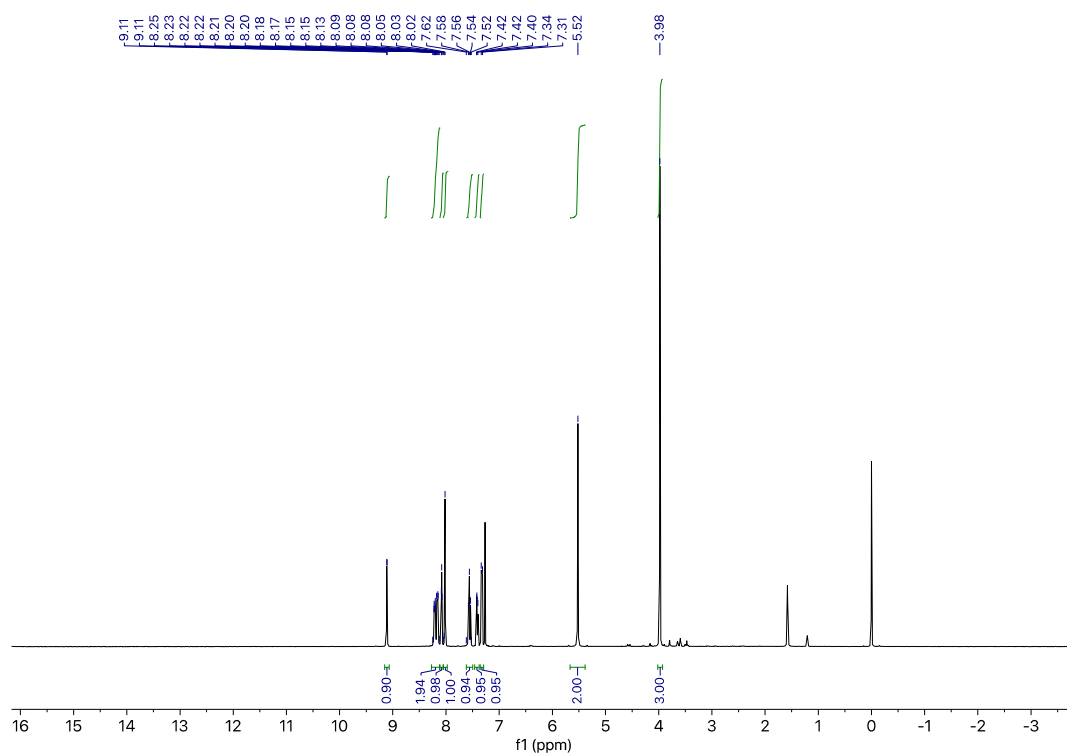
$^1\text{H}$  NMR for methyl 1-(4-chlorophenyl)-5-cyano-1*H*-indole-3-carboxylate (**181**)



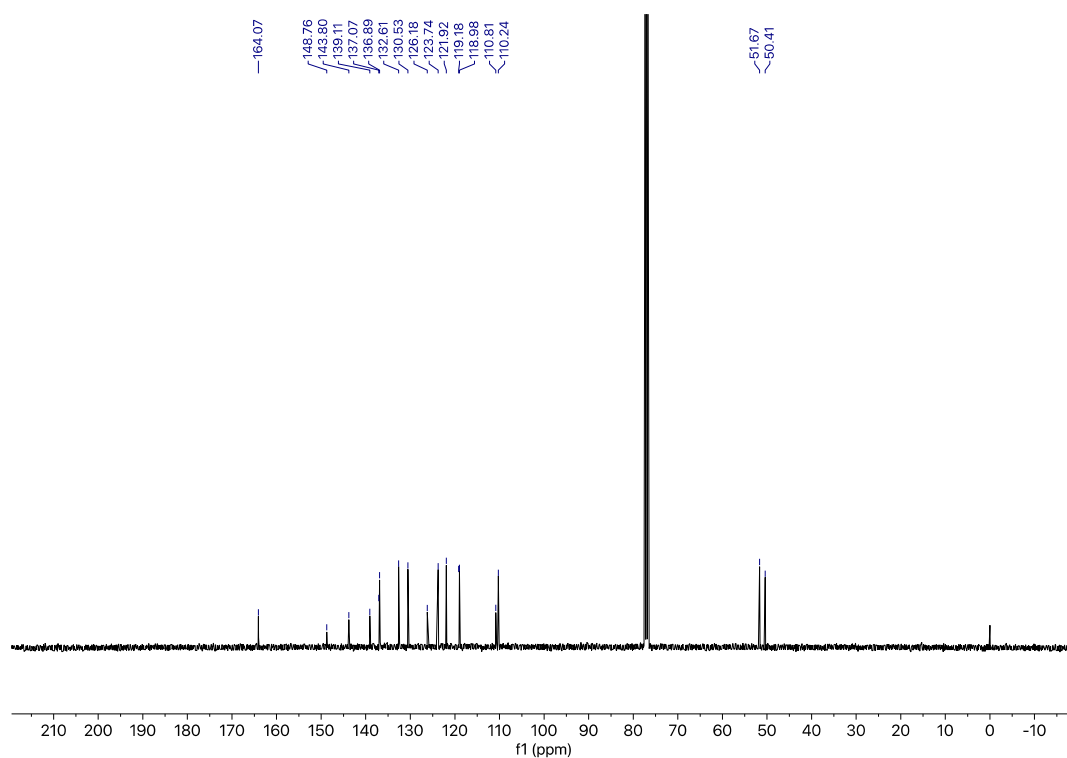
$^{13}\text{C}$  NMR for methyl 1-(4-chlorophenyl)-5-cyano-1*H*-indole-3-carboxylate (**181**)



$^1\text{H}$  NMR for methyl 5-cyano-1-(3-nitrobenzyl)-1*H*-indole-3-carboxylate (**18m**)

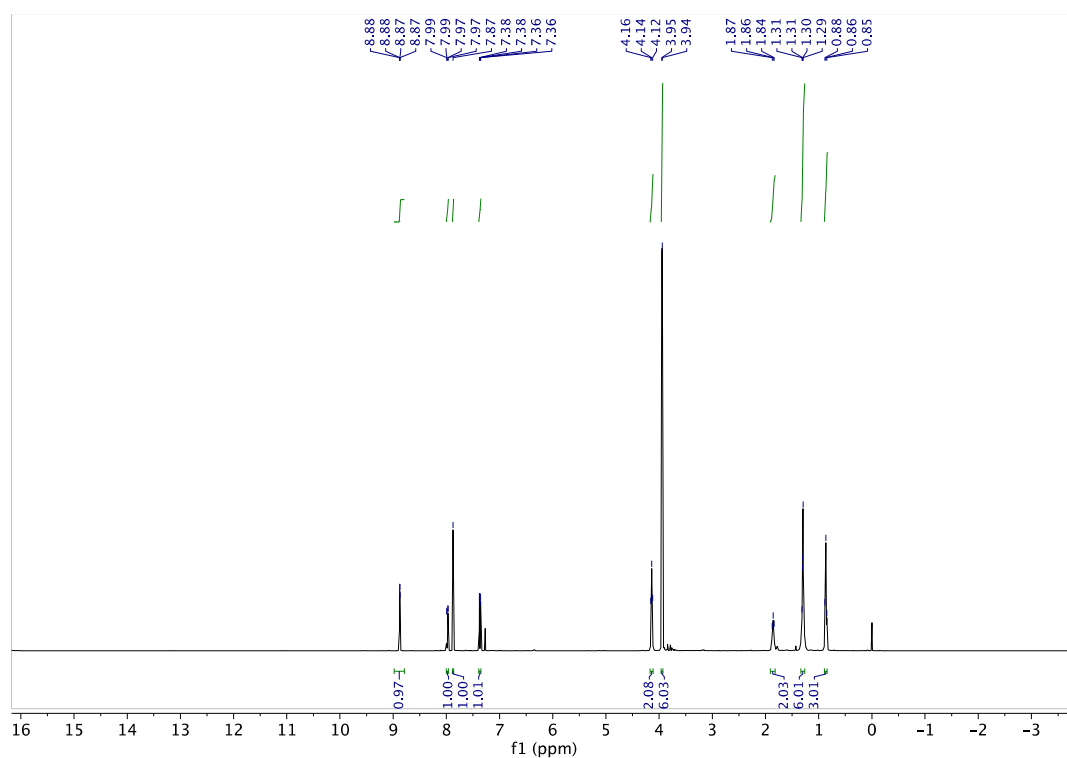


$^{13}\text{C}$  NMR for methyl 5-cyano-1-(3-nitrobenzyl)-1*H*-indole-3-carboxylate (**18m**)

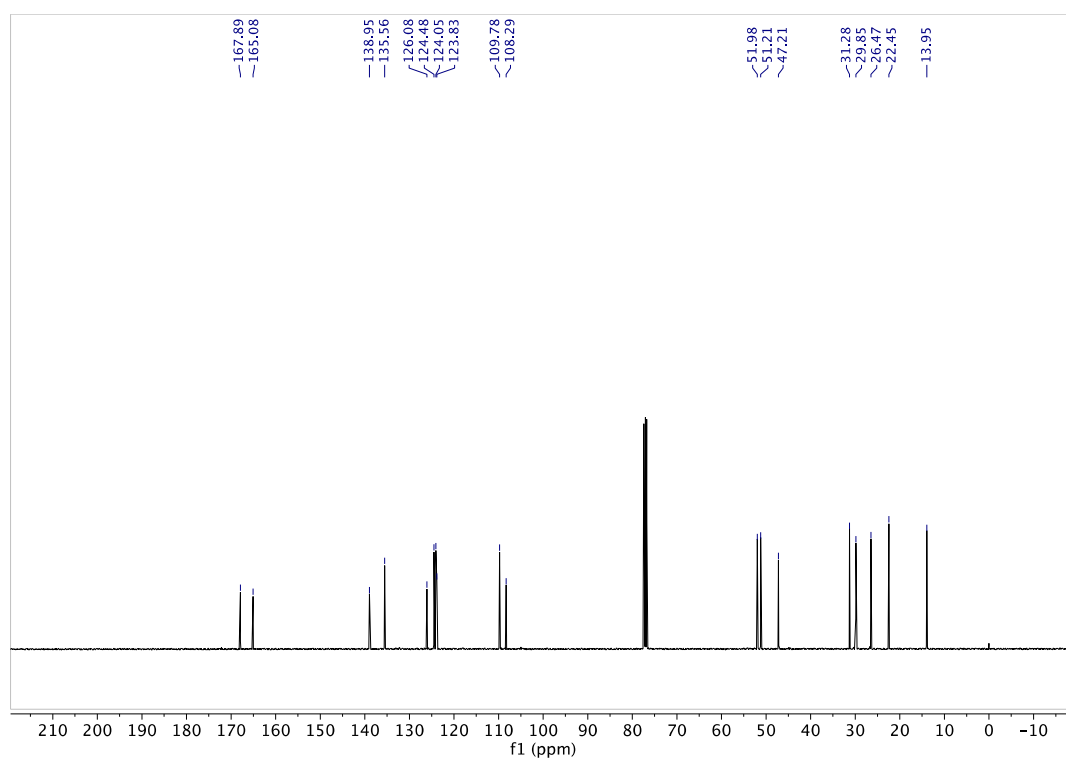




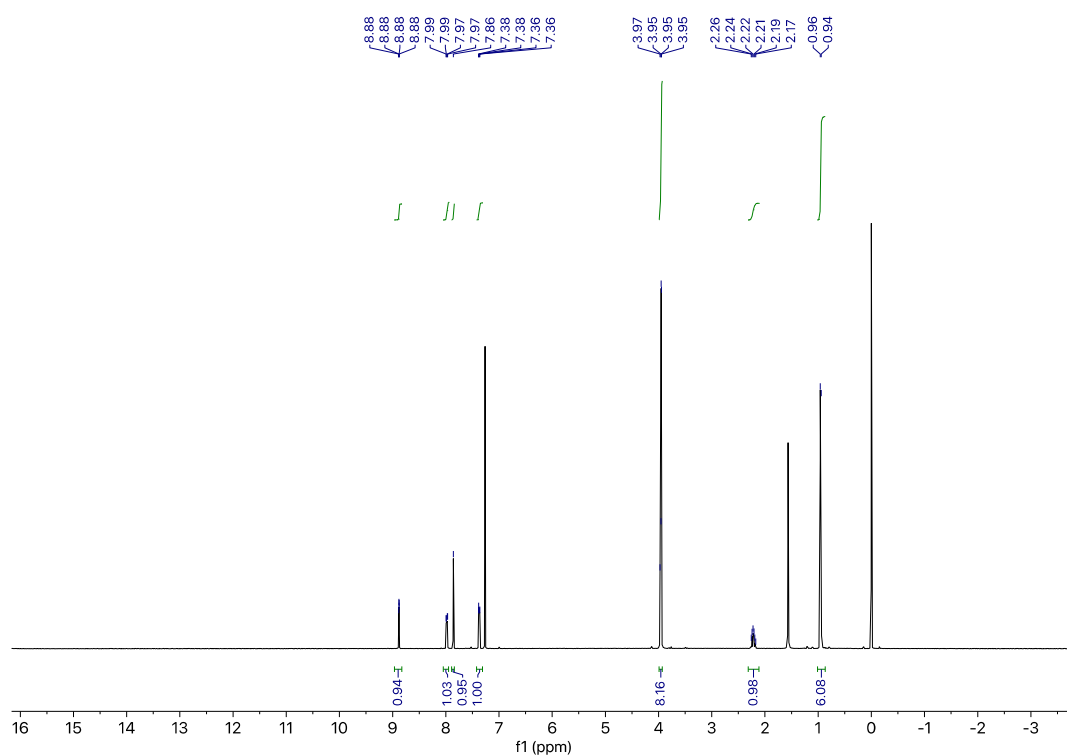
<sup>1</sup>H NMR for dimethyl 1-hexyl-1*H*-indole-3,5-dicarboxylate (**19a**)



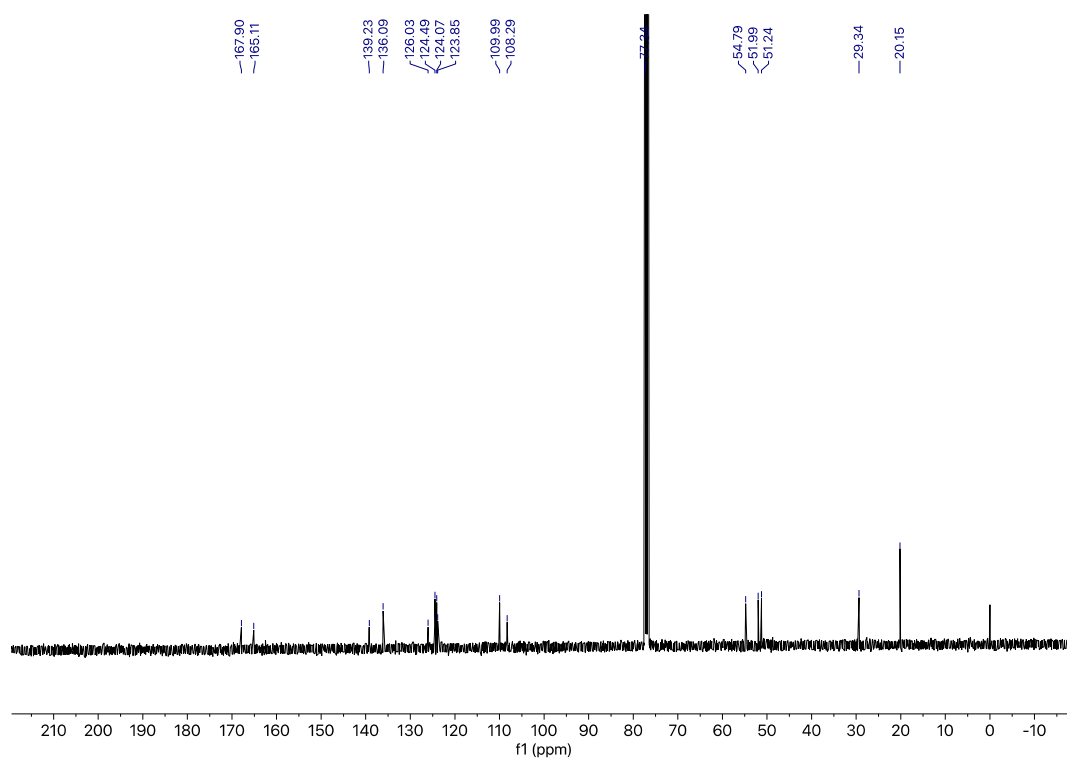
<sup>13</sup>C NMR for dimethyl 1-hexyl-1*H*-indole-3,5-dicarboxylate (**19a**)



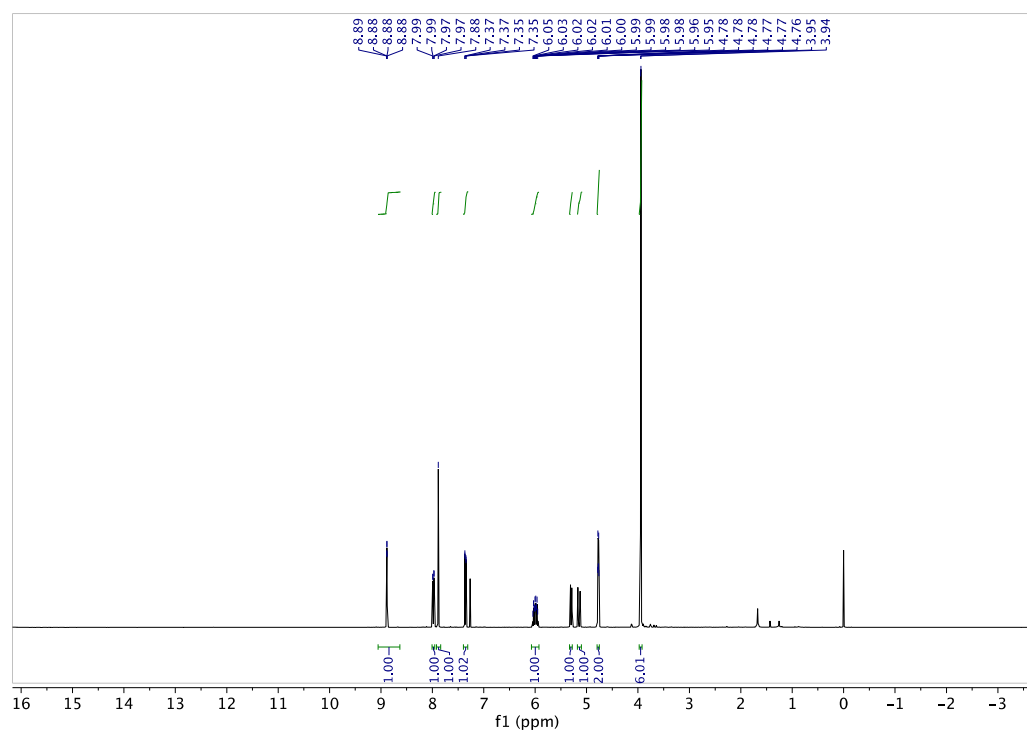
$^1\text{H}$  NMR for dimethyl 1-isobutyl-1*H*-indole-3,5-dicarboxylate (**19b**)



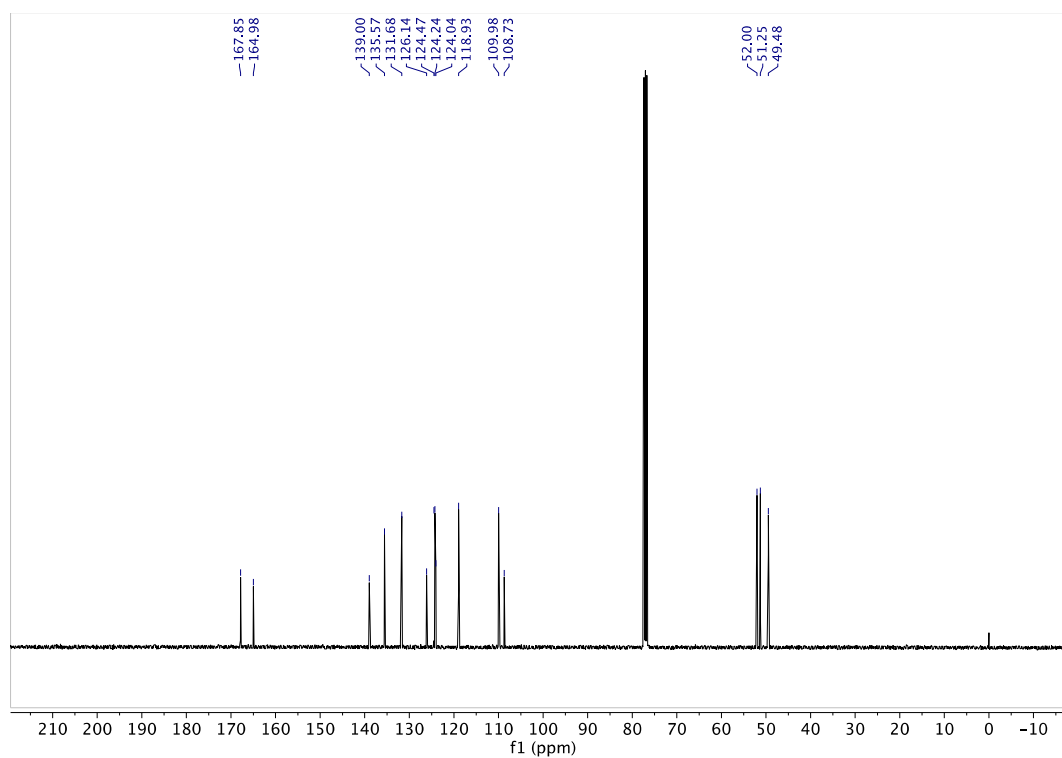
$^{13}\text{C}$  NMR for dimethyl 1-isobutyl-1*H*-indole-3,5-dicarboxylate (**19b**)



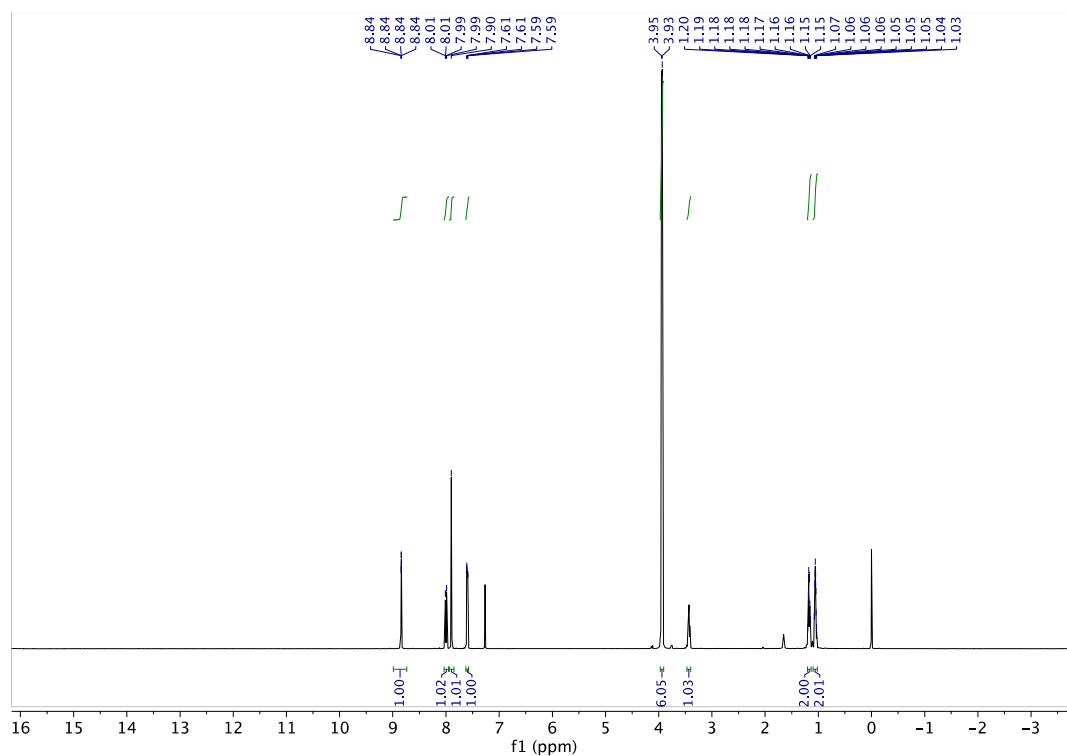
$^1\text{H}$  NMR for dimethyl 1-allyl-1*H*-indole-3,5-dicarboxylate (**19c**)



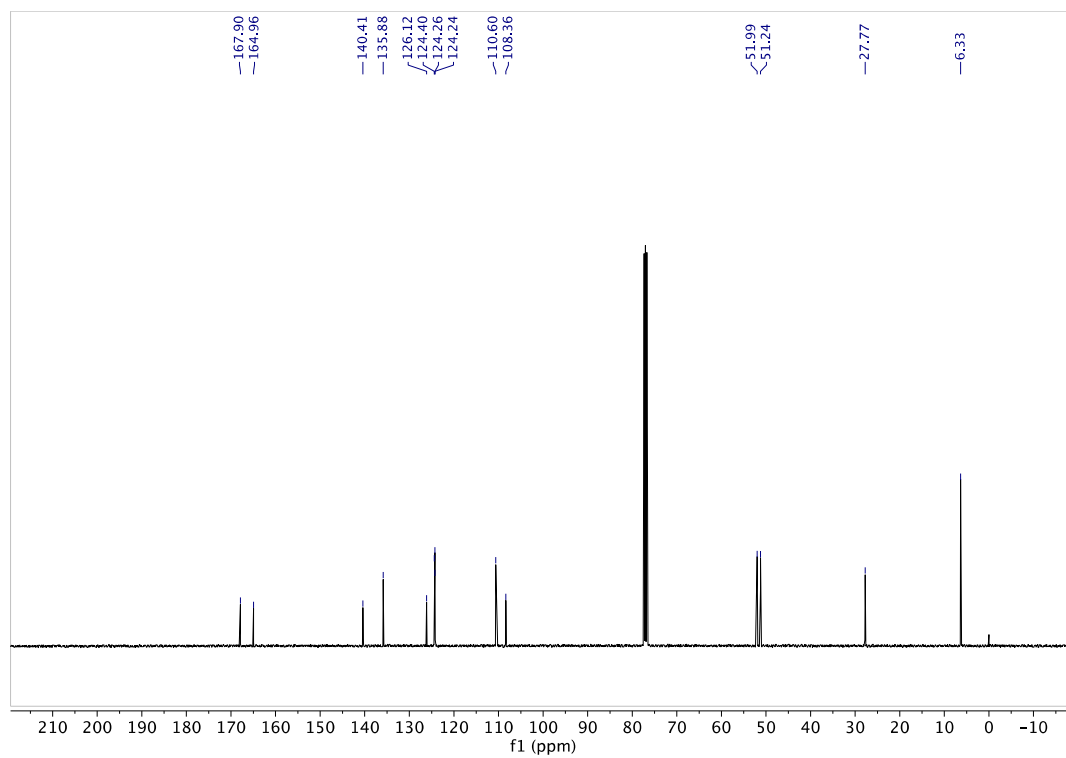
$^{13}\text{C}$  NMR for dimethyl 1-allyl-1*H*-indole-3,5-dicarboxylate (**19c**)



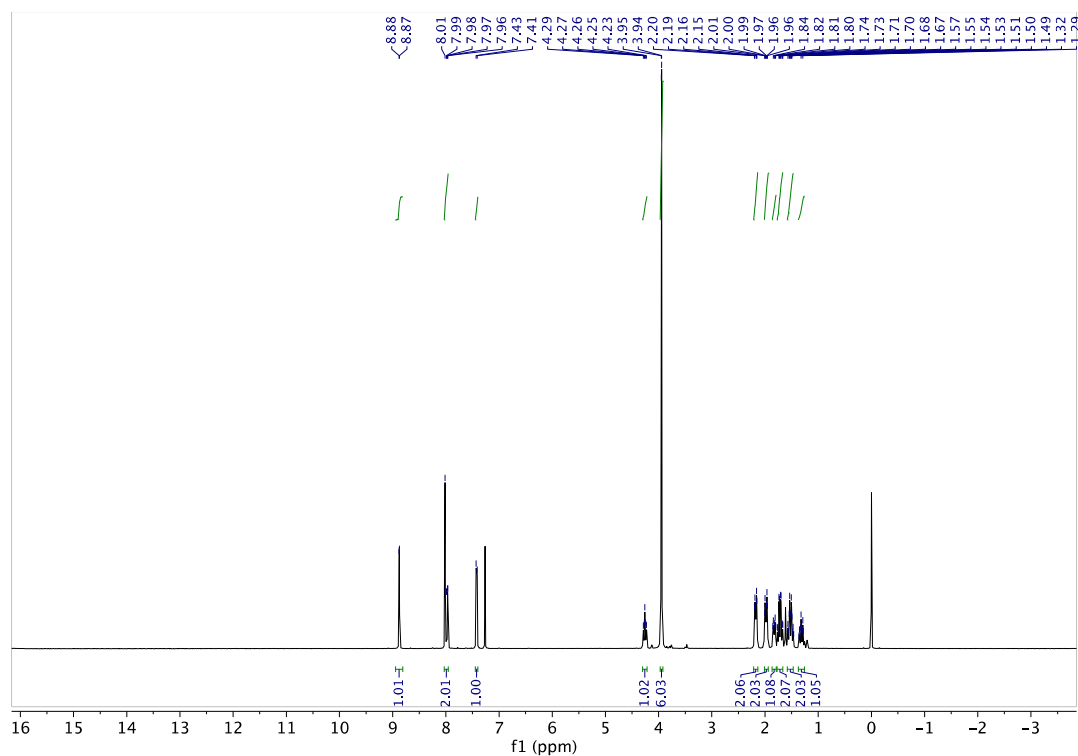
$^1\text{H}$  NMR for dimethyl 1-cyclopropyl-1*H*-indole-3,5-dicarboxylate (**19d**)



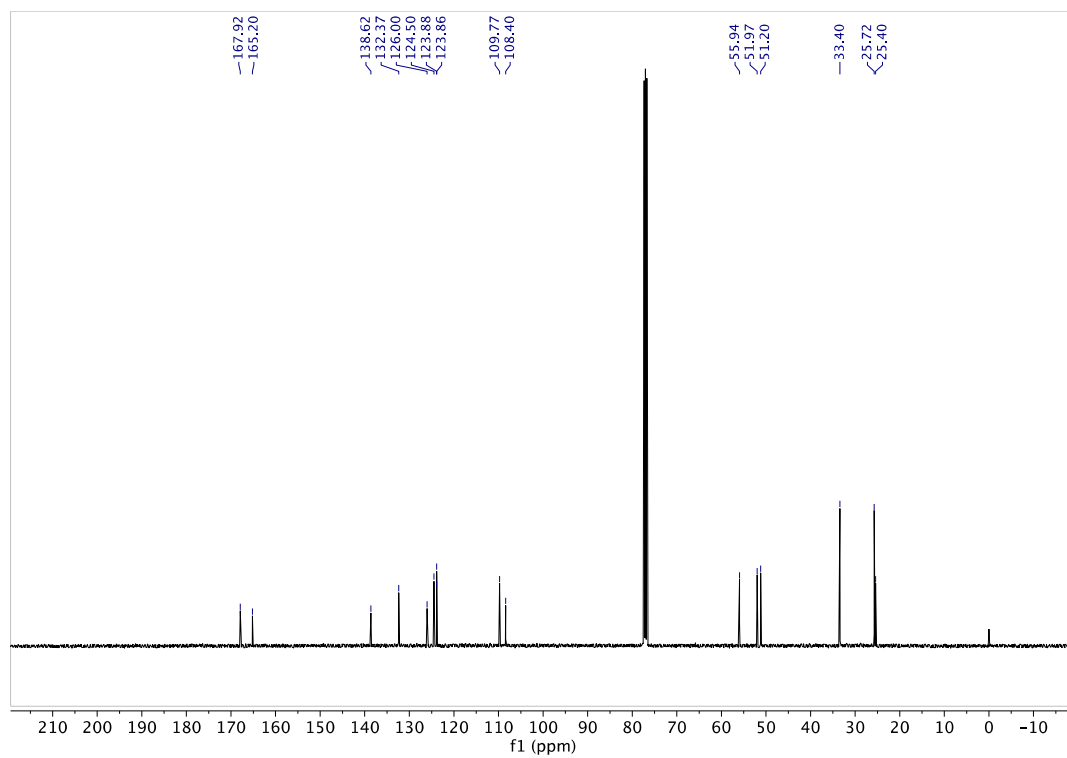
$^{13}\text{C}$  NMR for dimethyl 1-cyclopropyl-1*H*-indole-3,5-dicarboxylate (**19d**)



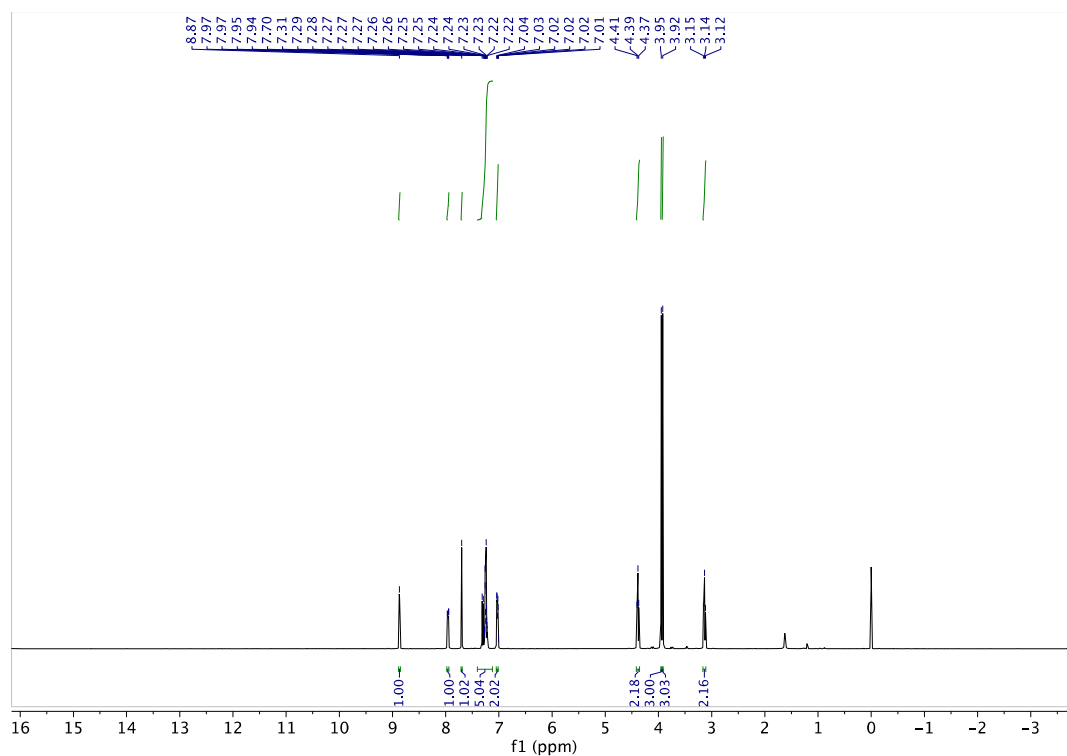
$^1\text{H}$  NMR for dimethyl 1-cyclohexyl-1*H*-indole-3,5-dicarboxylate (**19e**)



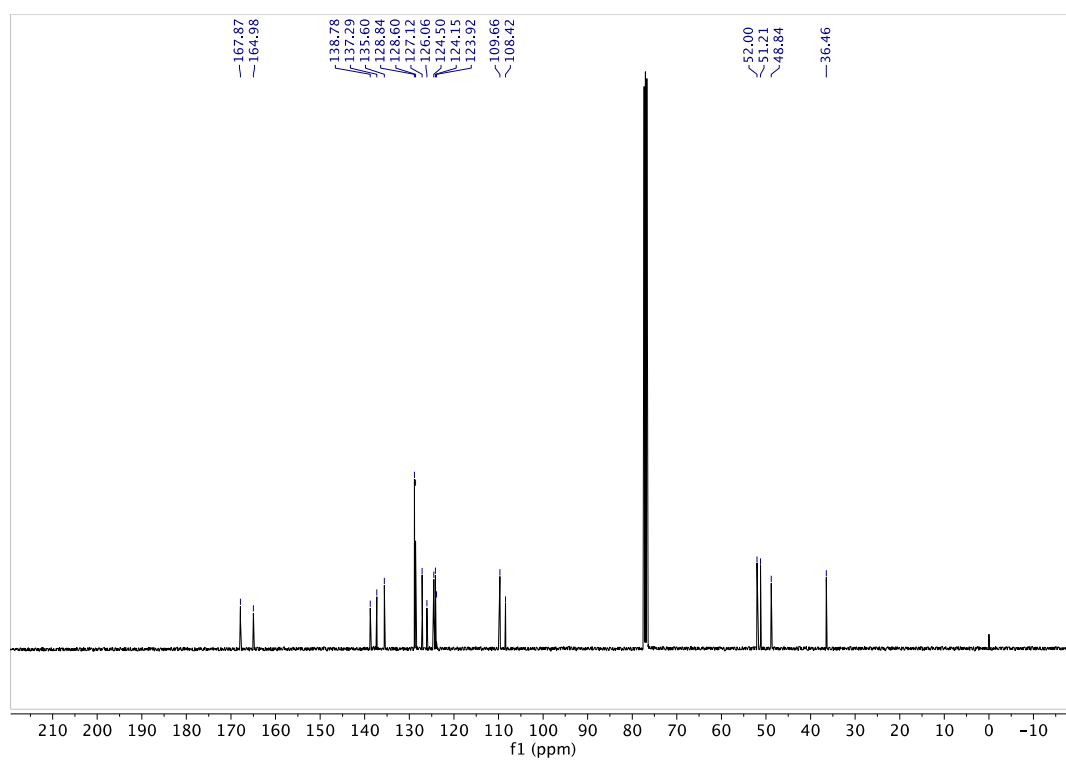
$^{13}\text{C}$  NMR for dimethyl 1-cyclohexyl-1*H*-indole-3,5-dicarboxylate (**19e**)



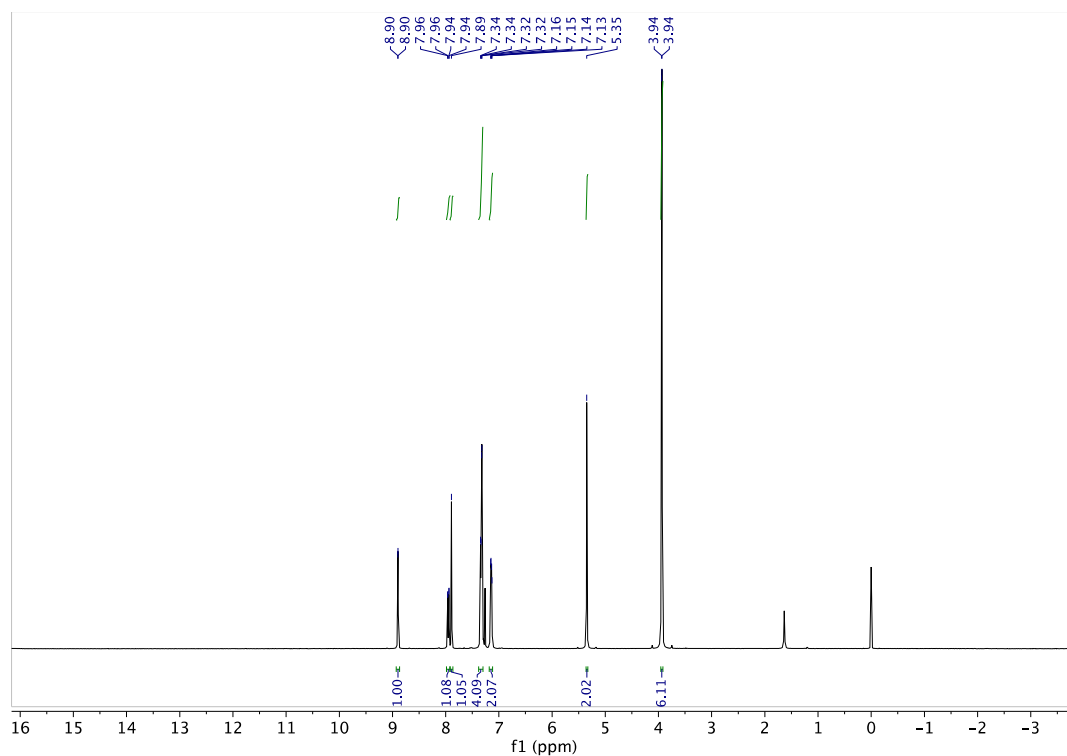
$^1\text{H}$  NMR for dimethyl 1-phenethyl-1*H*-indole-3,5-dicarboxylate (**19g**)



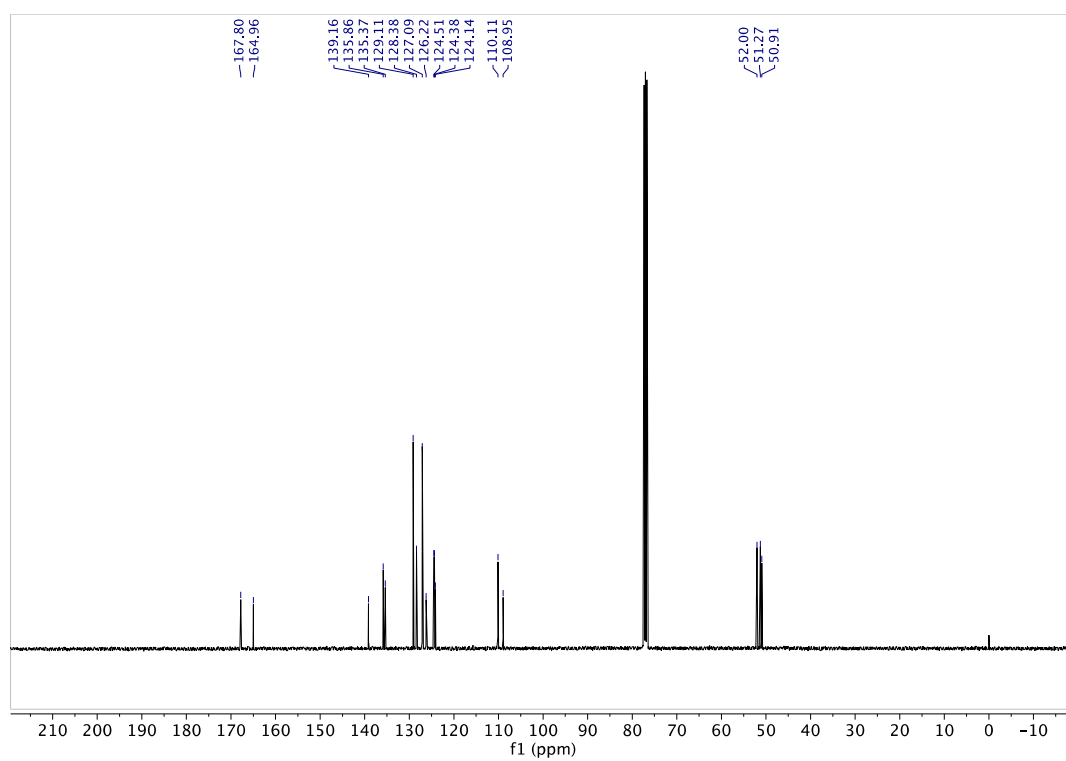
$^{13}\text{C}$  NMR for dimethyl 1-phenethyl-1*H*-indole-3,5-dicarboxylate (**19g**)



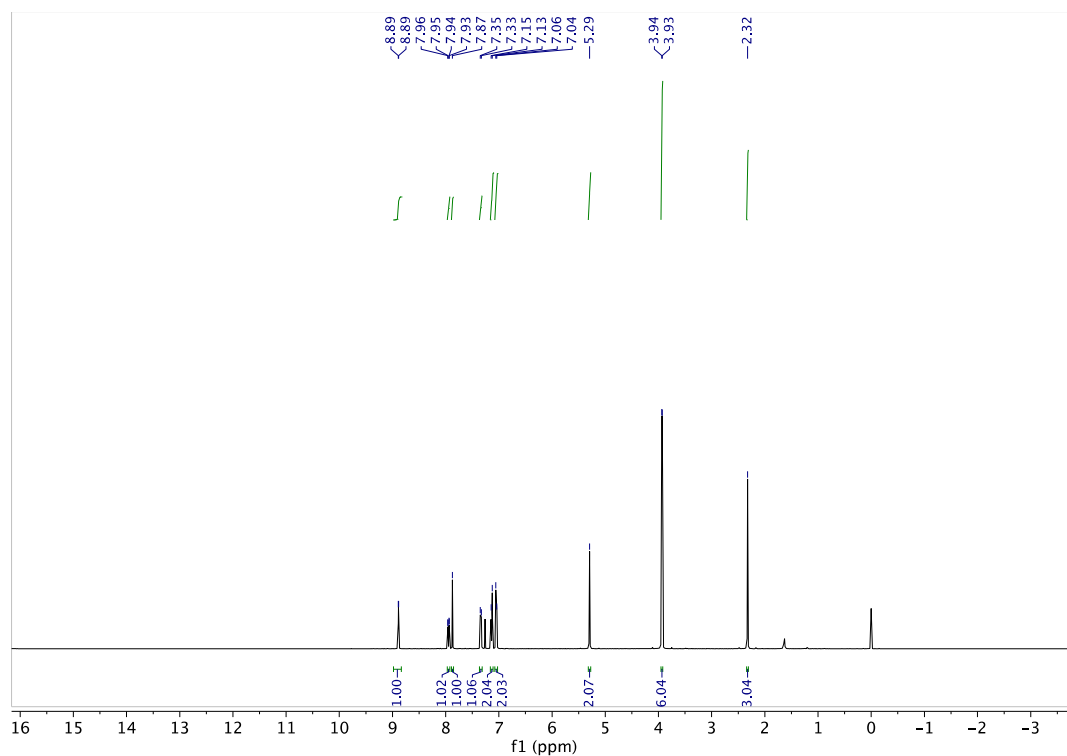
$^1\text{H}$  NMR for dimethyl 1-benzyl-1*H*-indole-3,5-dicarboxylate (**19h**)



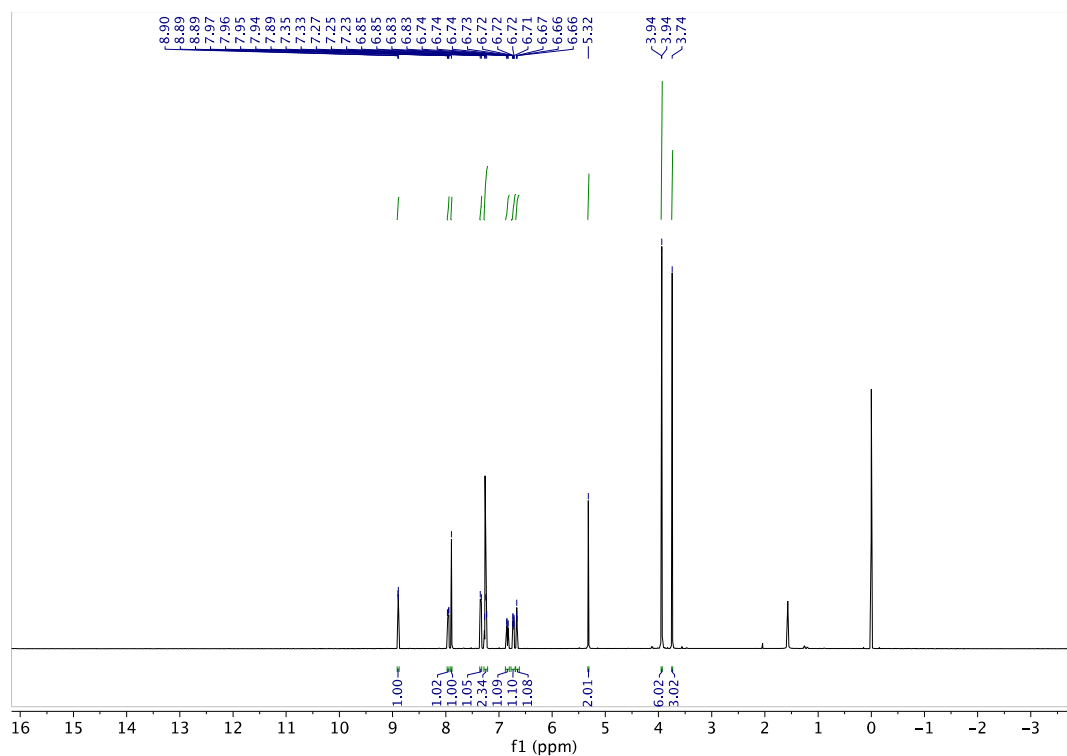
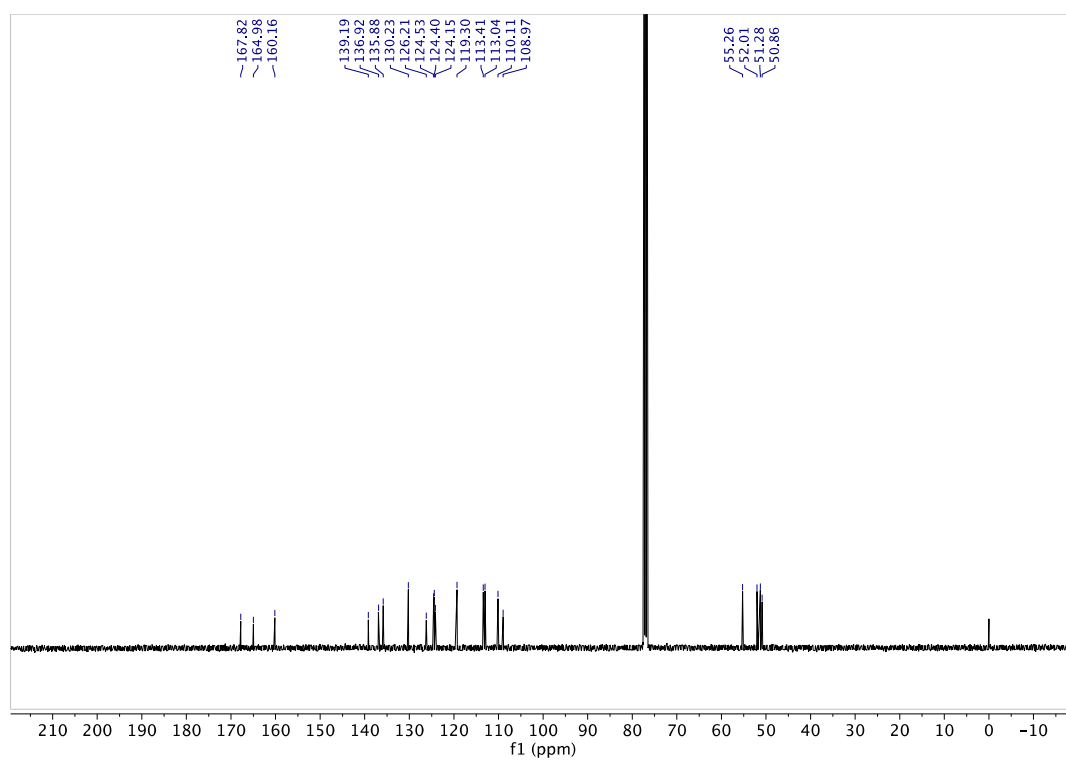
$^{13}\text{C}$  NMR for dimethyl 1-benzyl-1*H*-indole-3,5-dicarboxylate (**19h**)

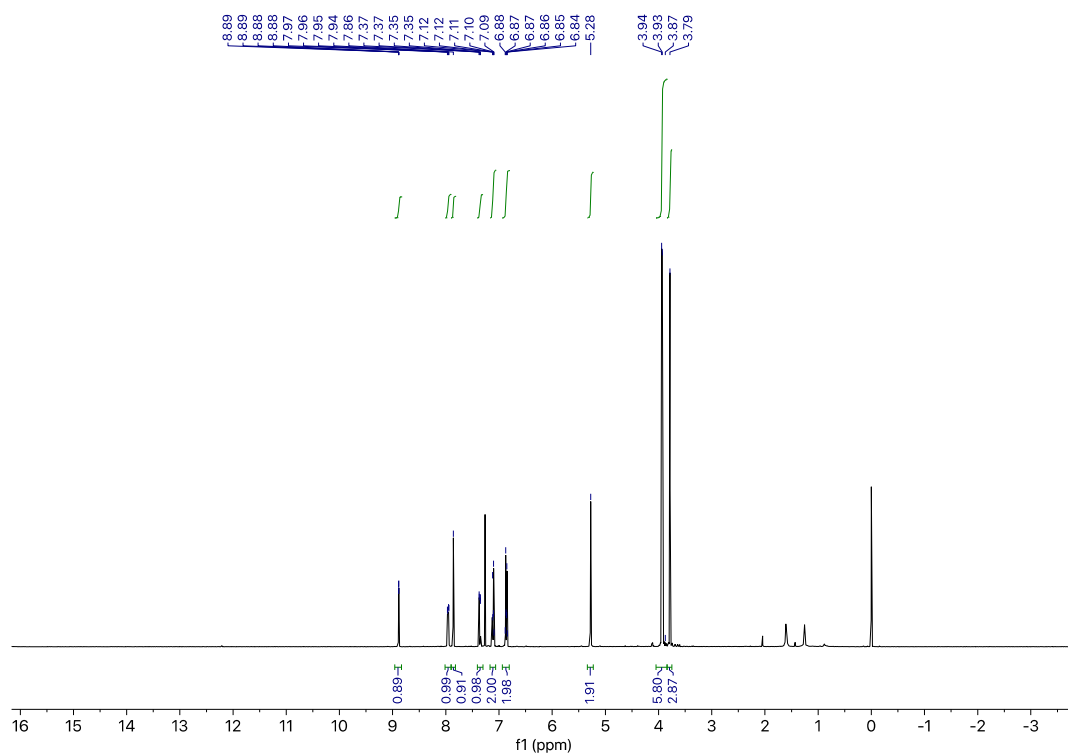
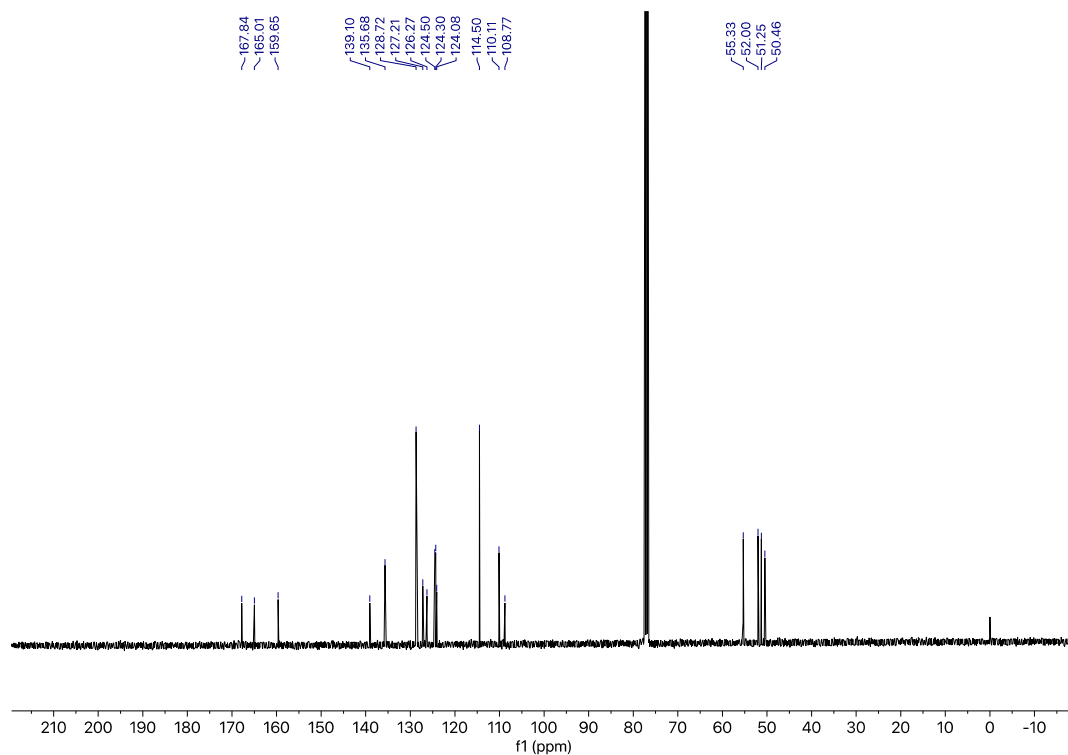


$^1\text{H}$  NMR for dimethyl 1-(4-methylbenzyl)-1*H*-indole-3,5-dicarboxylate (**19i**)

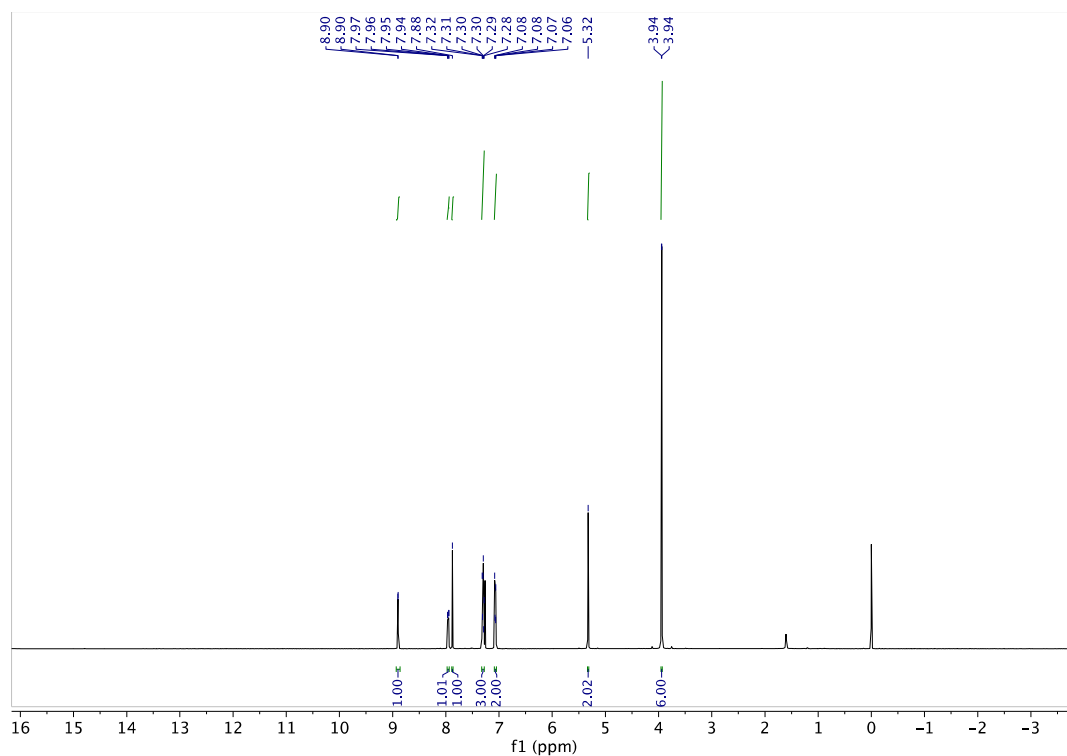




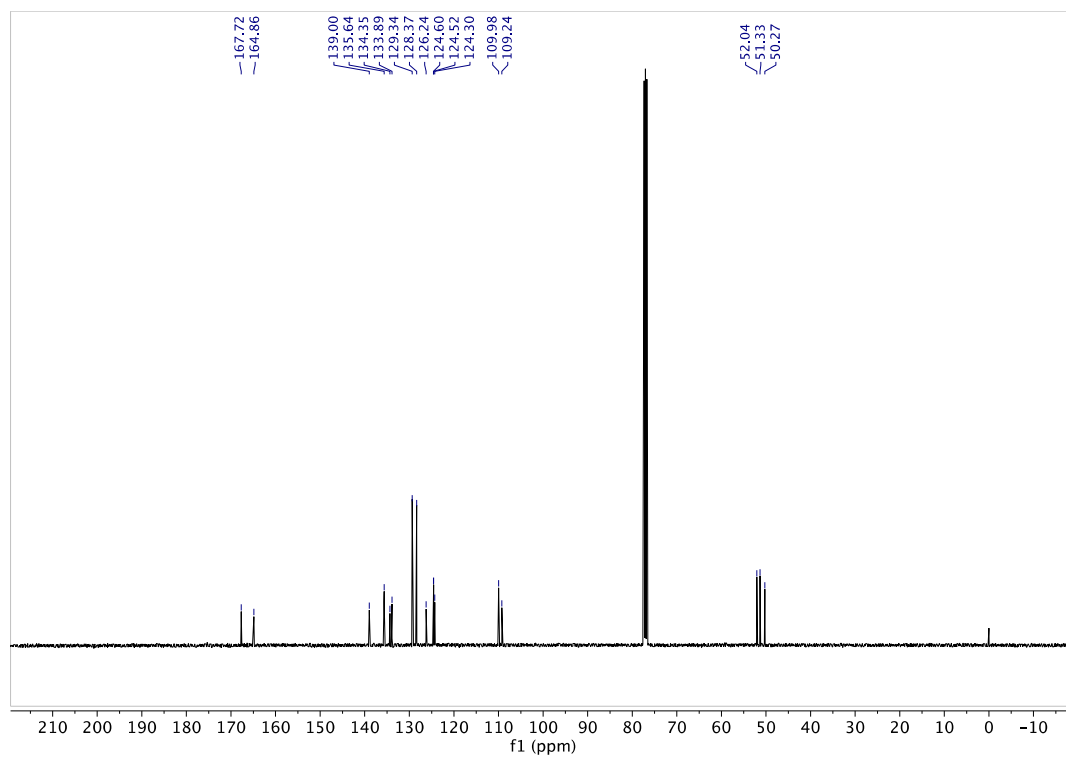
<sup>1</sup>H NMR for dimethyl 1-(3-methoxybenzyl)-1*H*-indole-3,5-dicarboxylate (**19j**)<sup>13</sup>C NMR for dimethyl 1-(3-methoxybenzyl)-1*H*-indole-3,5-dicarboxylate (**19j**)

<sup>1</sup>H NMR for dimethyl 1-(4-methoxybenzyl)-1*H*-indole-3,5-dicarboxylate (**19k**)<sup>13</sup>C NMR for dimethyl 1-(4-methoxybenzyl)-1*H*-indole-3,5-dicarboxylate (**19k**)

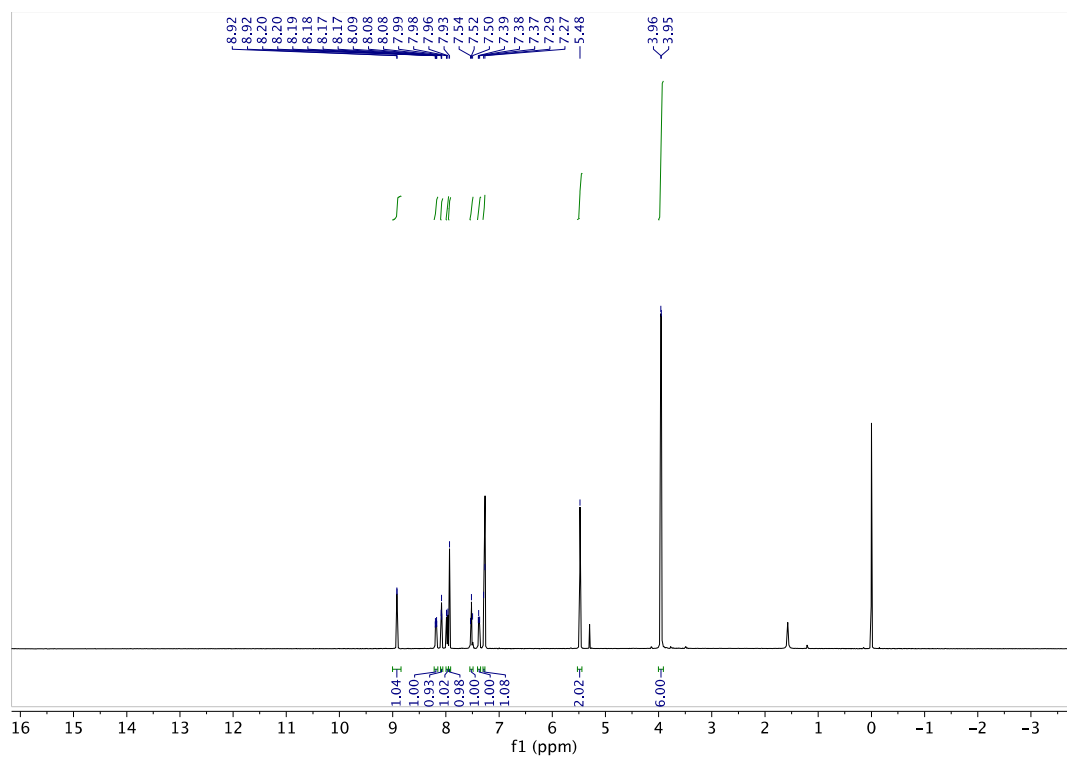
$^1\text{H}$  NMR for dimethyl 1-(4-chlorobenzyl)-1*H*-indole-3,5-dicarboxylate (**19l**)



$^{13}\text{C}$  NMR for dimethyl 1-(4-chlorobenzyl)-1*H*-indole-3,5-dicarboxylate (**19l**)



$^1\text{H}$  NMR for dimethyl 1-(3-nitrobenzyl)-1*H*-indole-3,5-dicarboxylate (**19m**)



$^{13}\text{C}$  NMR for dimethyl 1-(3-nitrobenzyl)-1*H*-indole-3,5-dicarboxylate (**19m**)

