

**Stereoselective β -Mannosylations and β -Rhamnosylations from Glycosyl Hemiacetals
Mediated by Lithium Iodide**

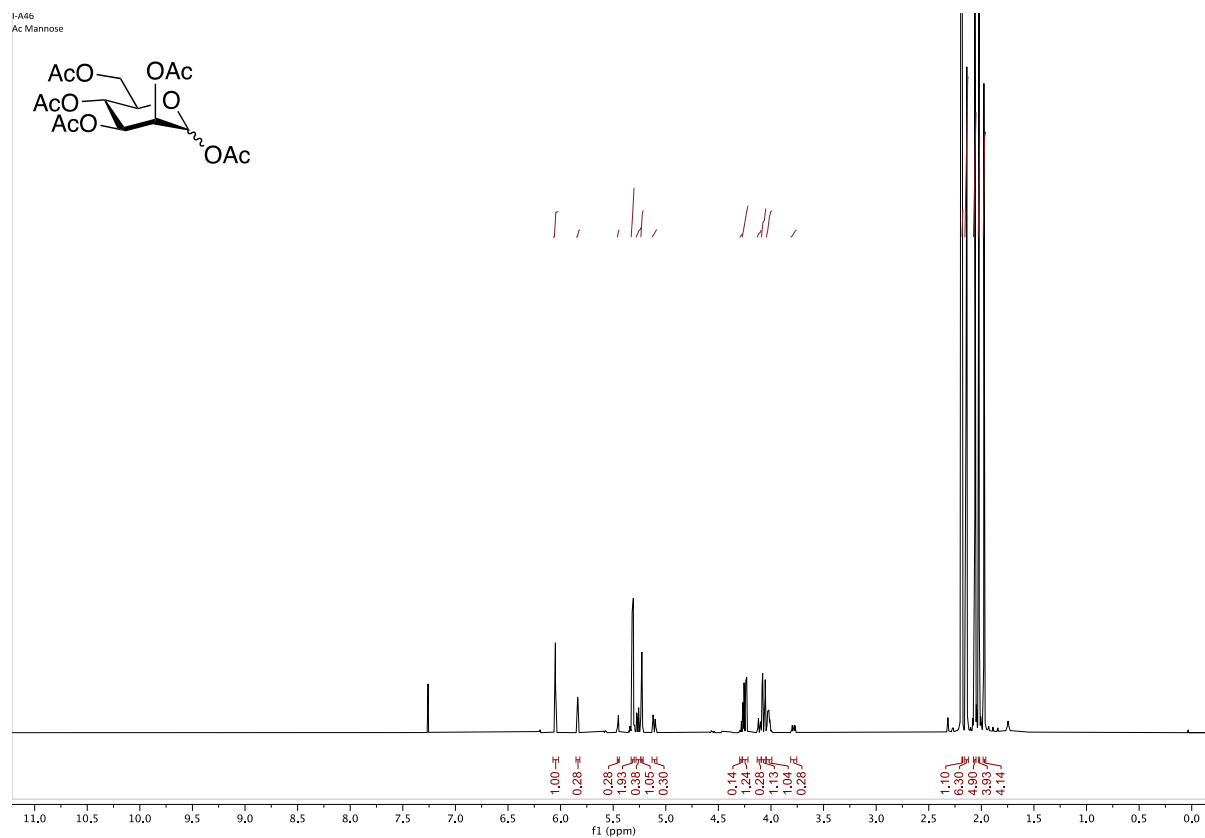
Imlirenla Pongener, Dionissia A. Pepe, Joseph J. Ruddy and Eoghan M. McGarrigle*

Centre for Synthesis & Chemical Biology, UCD School of Chemistry, University College
Dublin, Belfield, Dublin 4, Ireland.

Supporting Information – Part 2
NMR Spectra

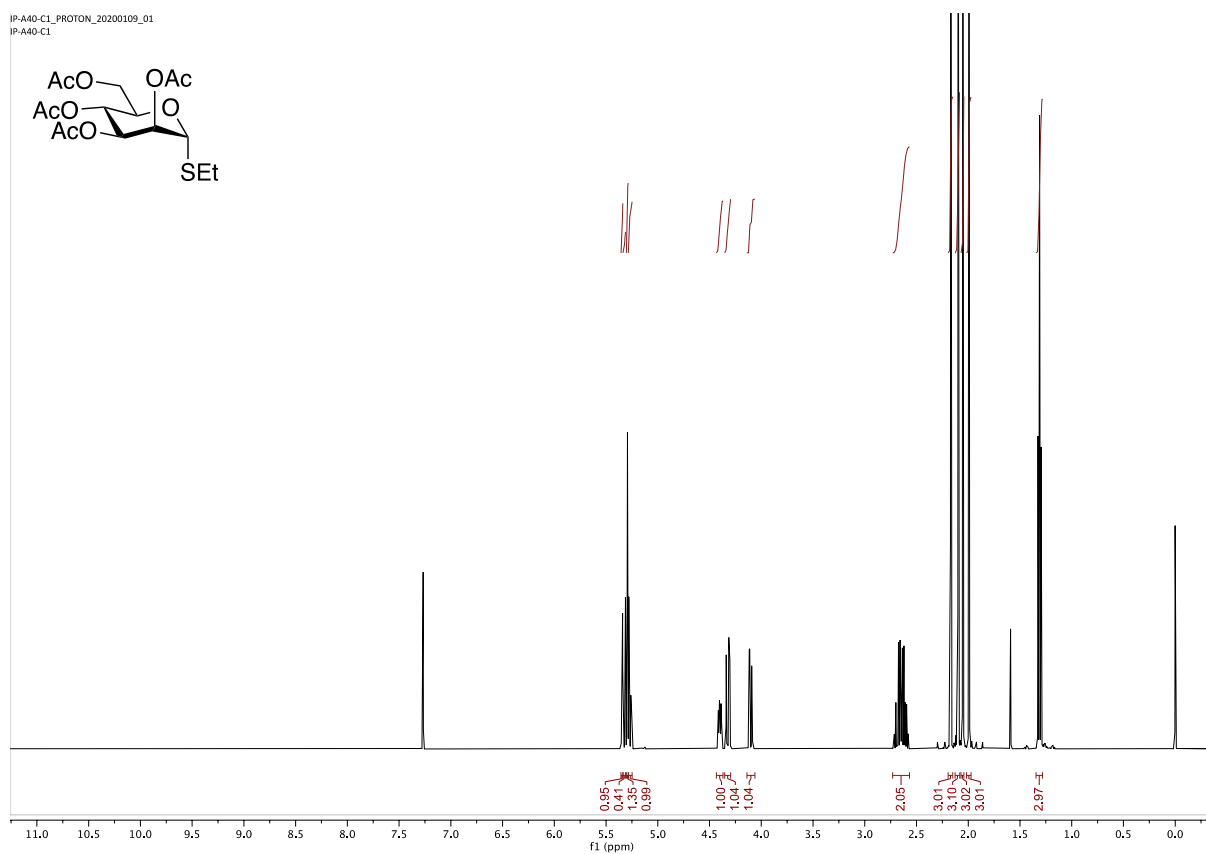
NMR Spectra

¹H NMR (500 MHz, Chloroform-*d*) S1

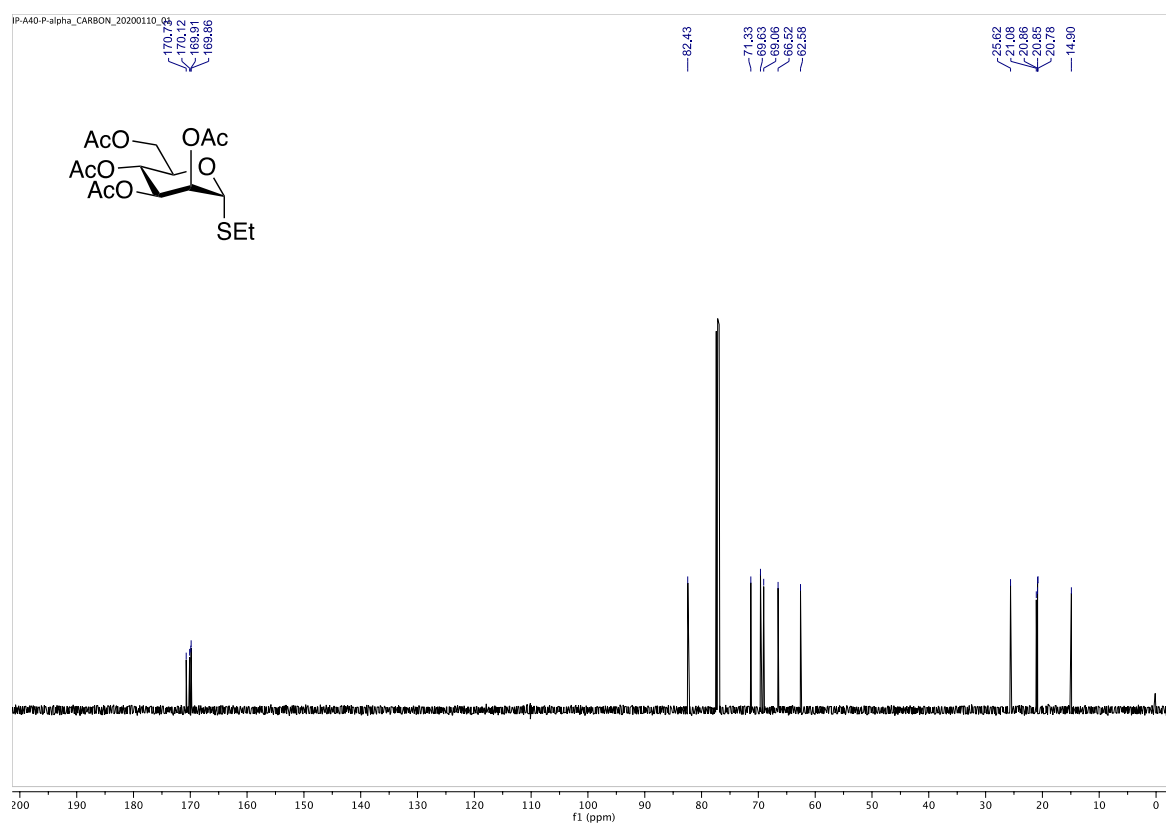


¹H NMR (500 MHz, Chloroform-*d*) S2

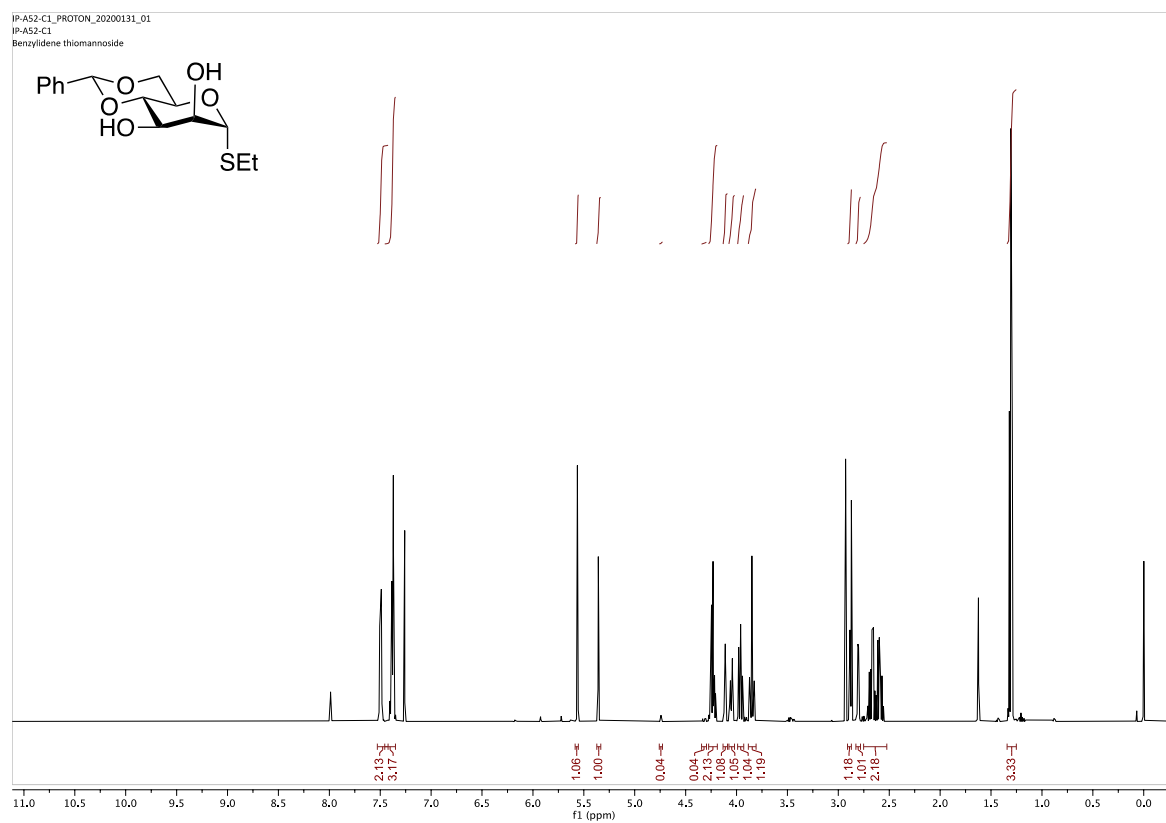
IP-A40-C1_PROTON_20200109_01
IP-A40-C1



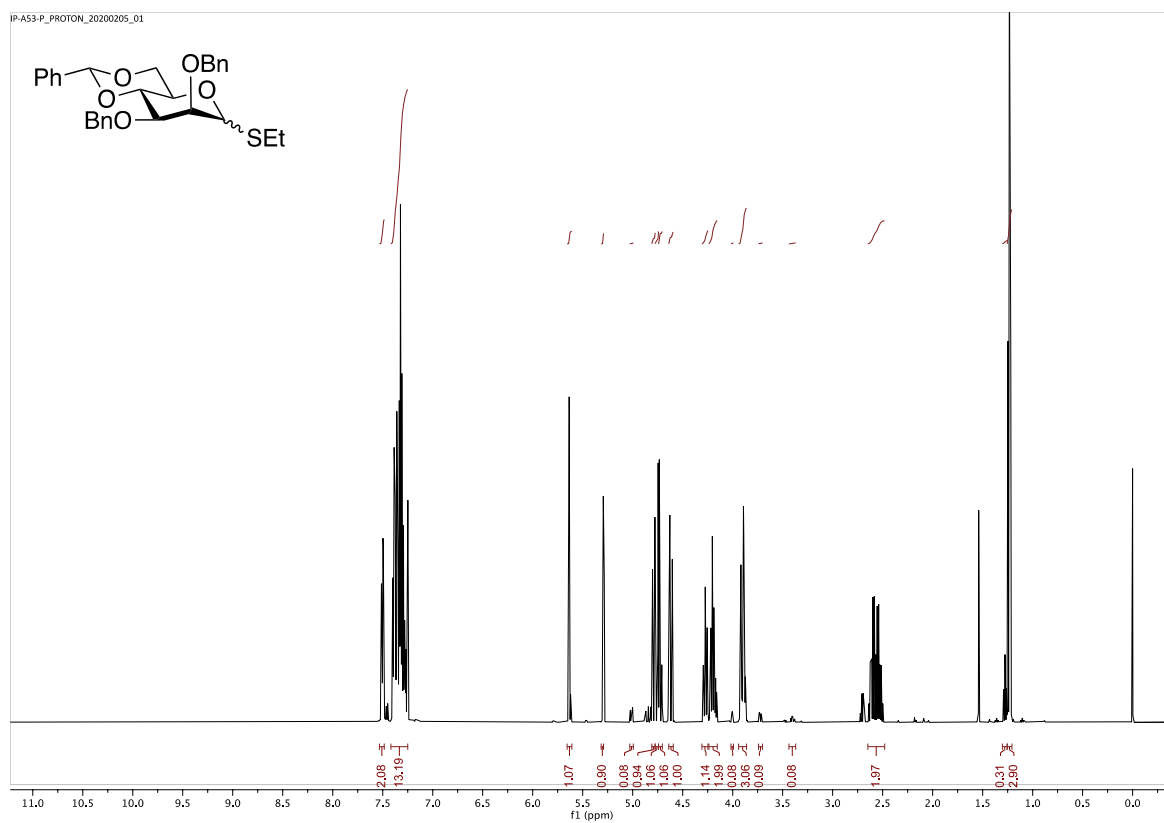
¹³C NMR (126 MHz, Chloroform-*d*) S2



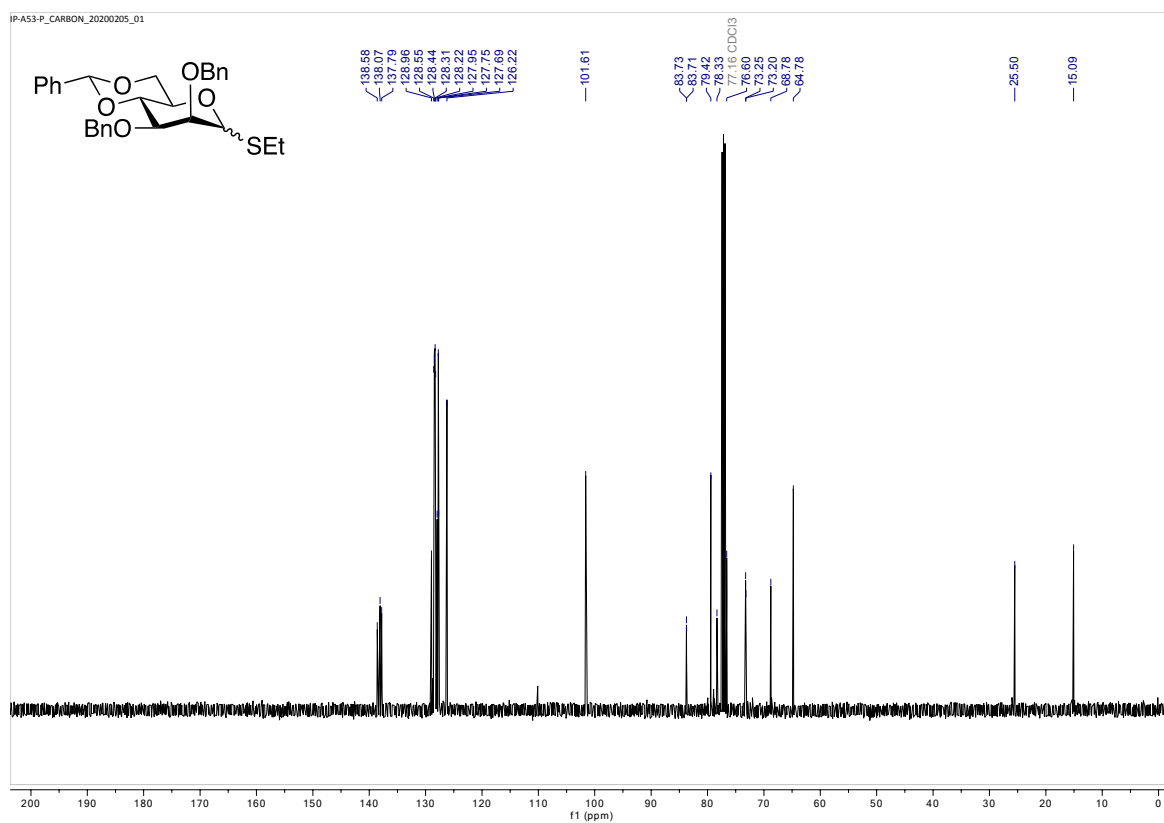
¹H NMR (500 MHz, Chloroform-*d*) S3



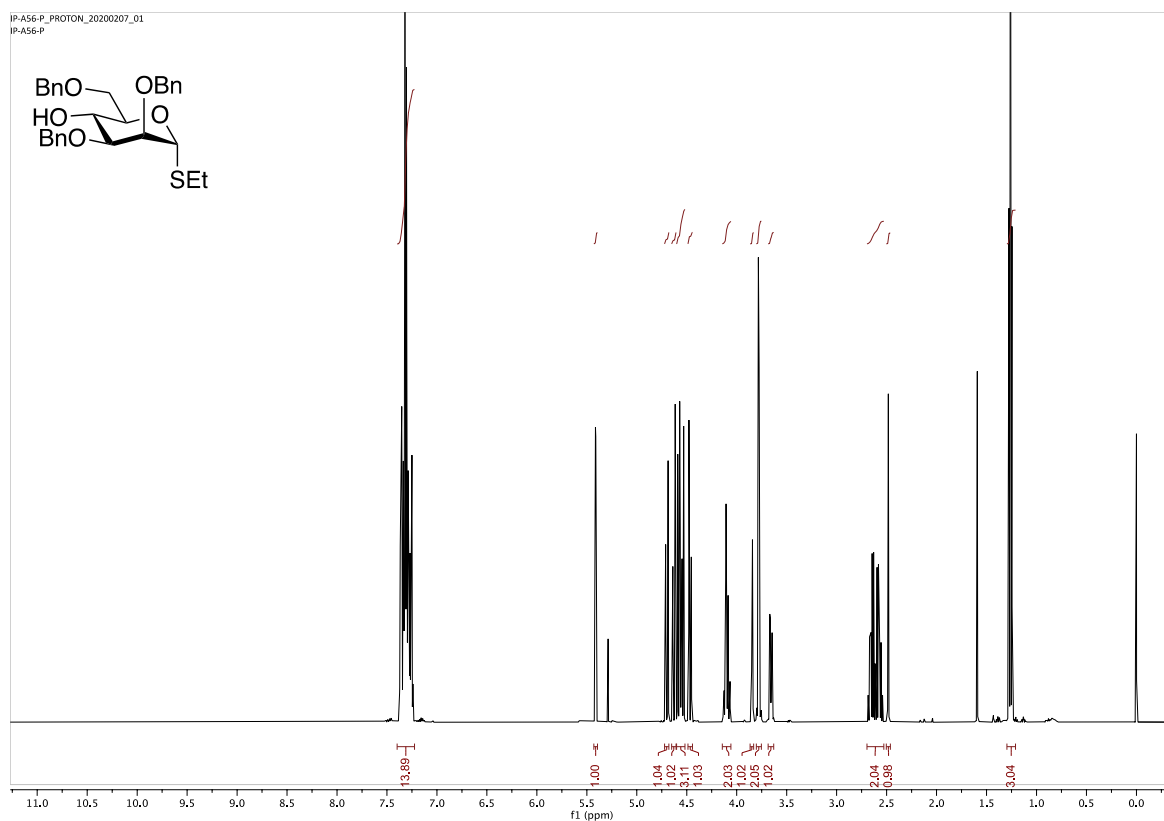
¹H NMR (500 MHz, Chloroform-*d*) S4



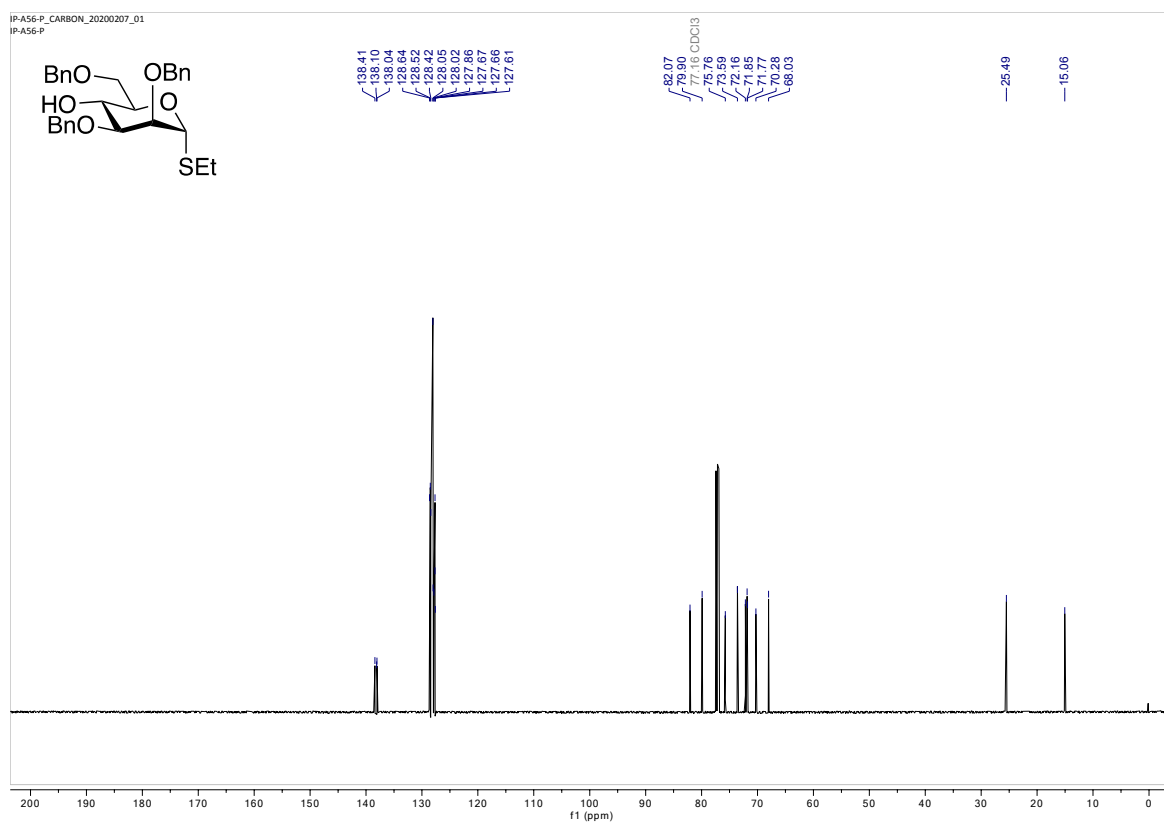
¹³C NMR (126 MHz, Chloroform-*d*) S4



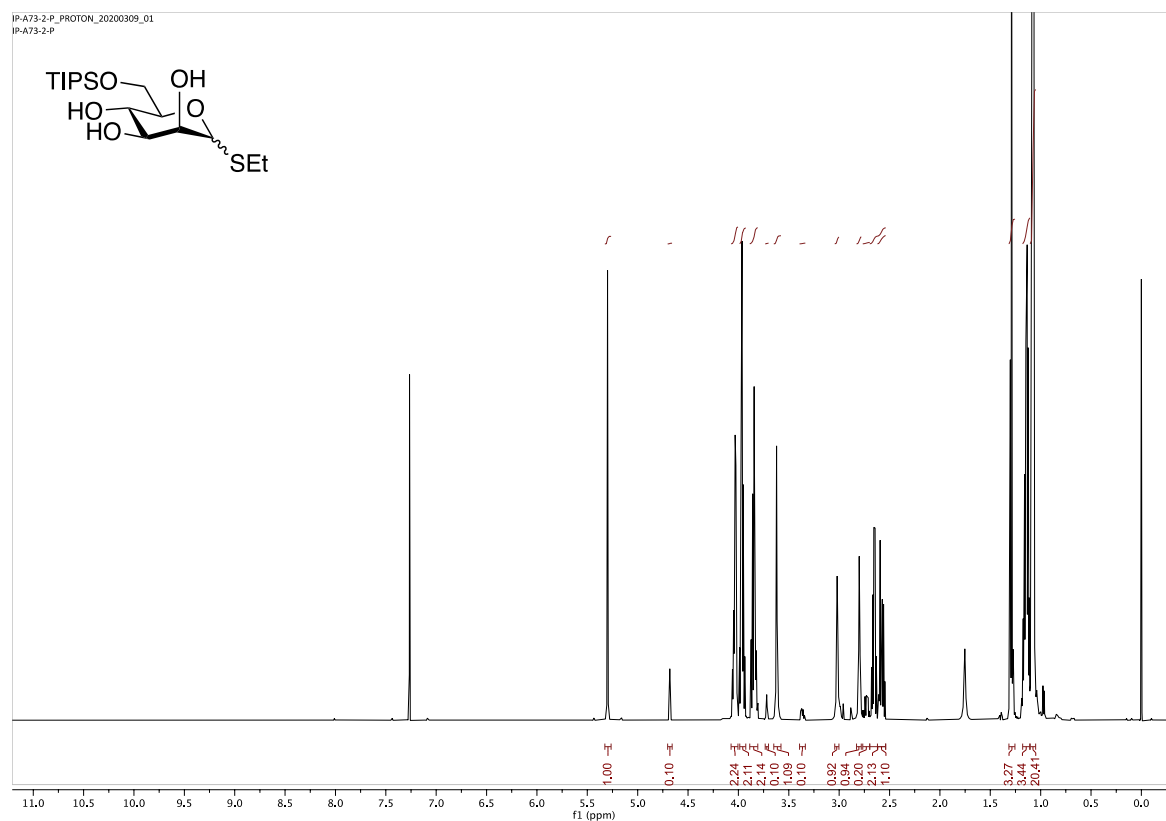
¹H NMR (500 MHz, Chloroform-*d*) S5



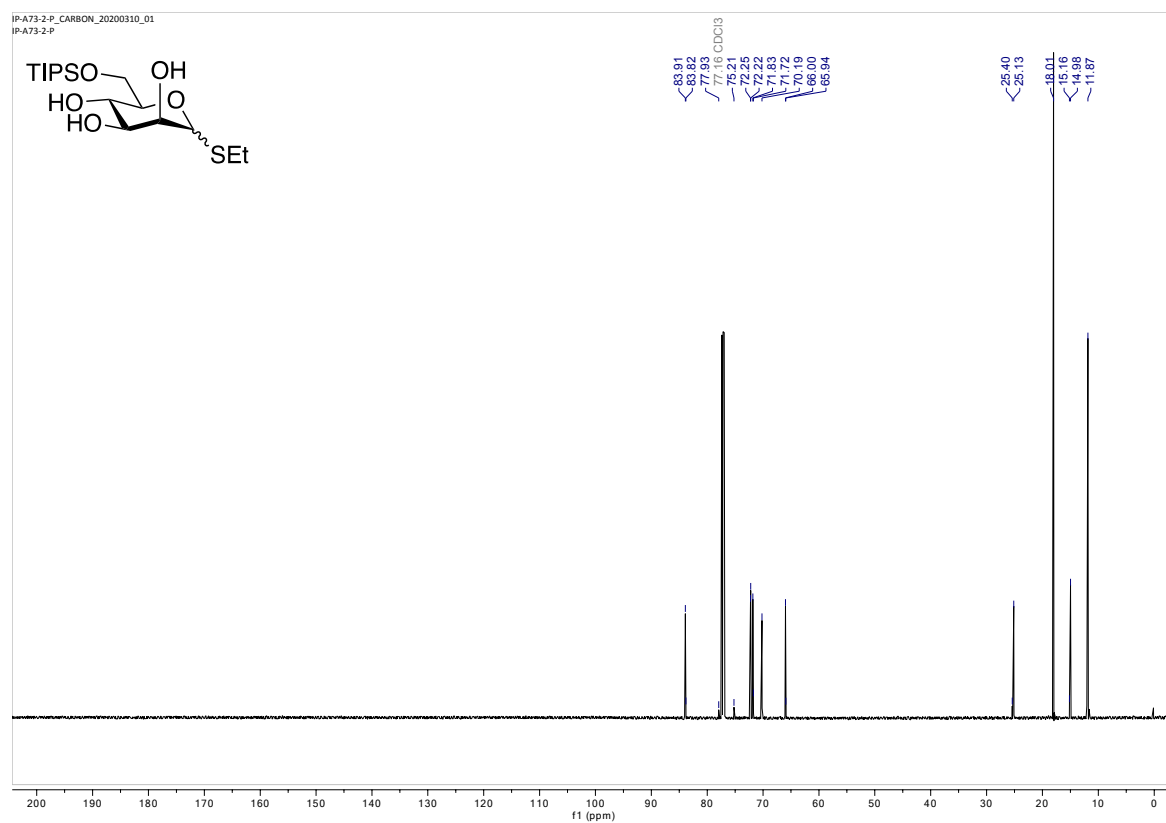
¹³C NMR (126 MHz, Chloroform-*d*) S5



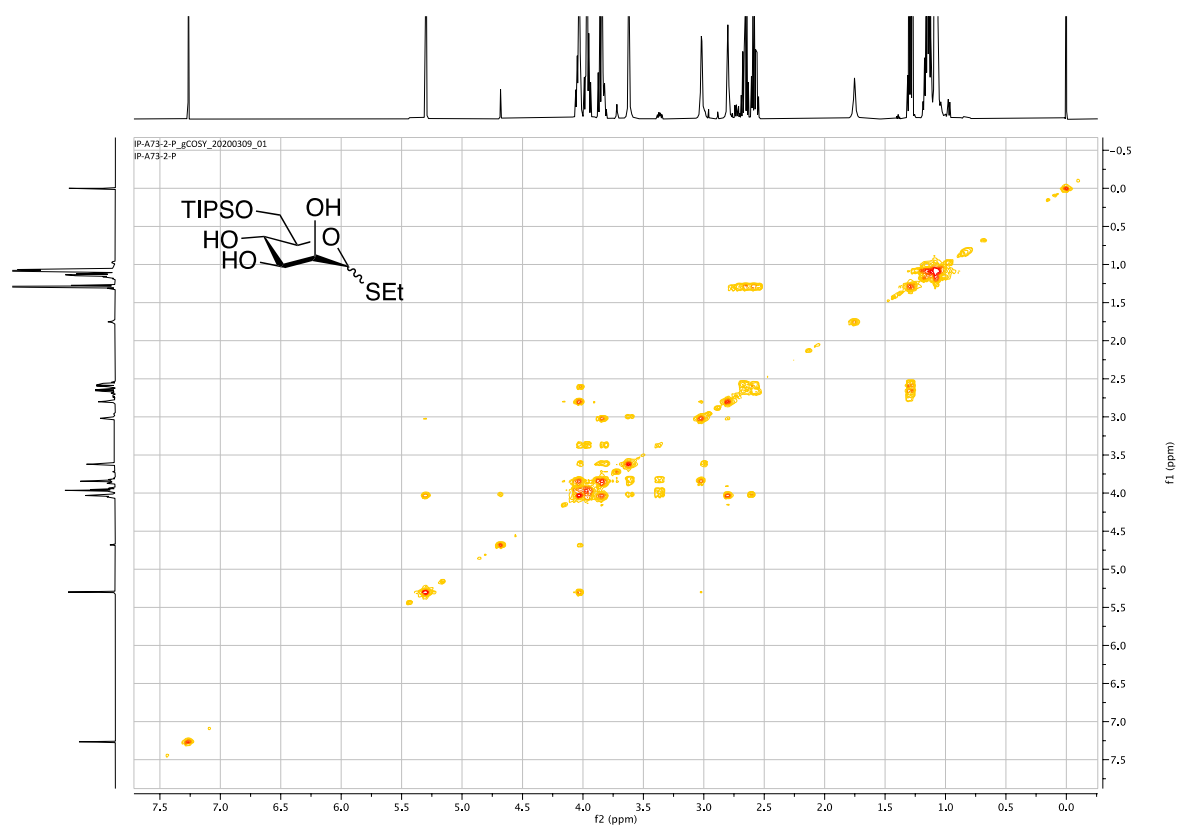
¹H NMR (600 MHz, Chloroform-*d*) S6



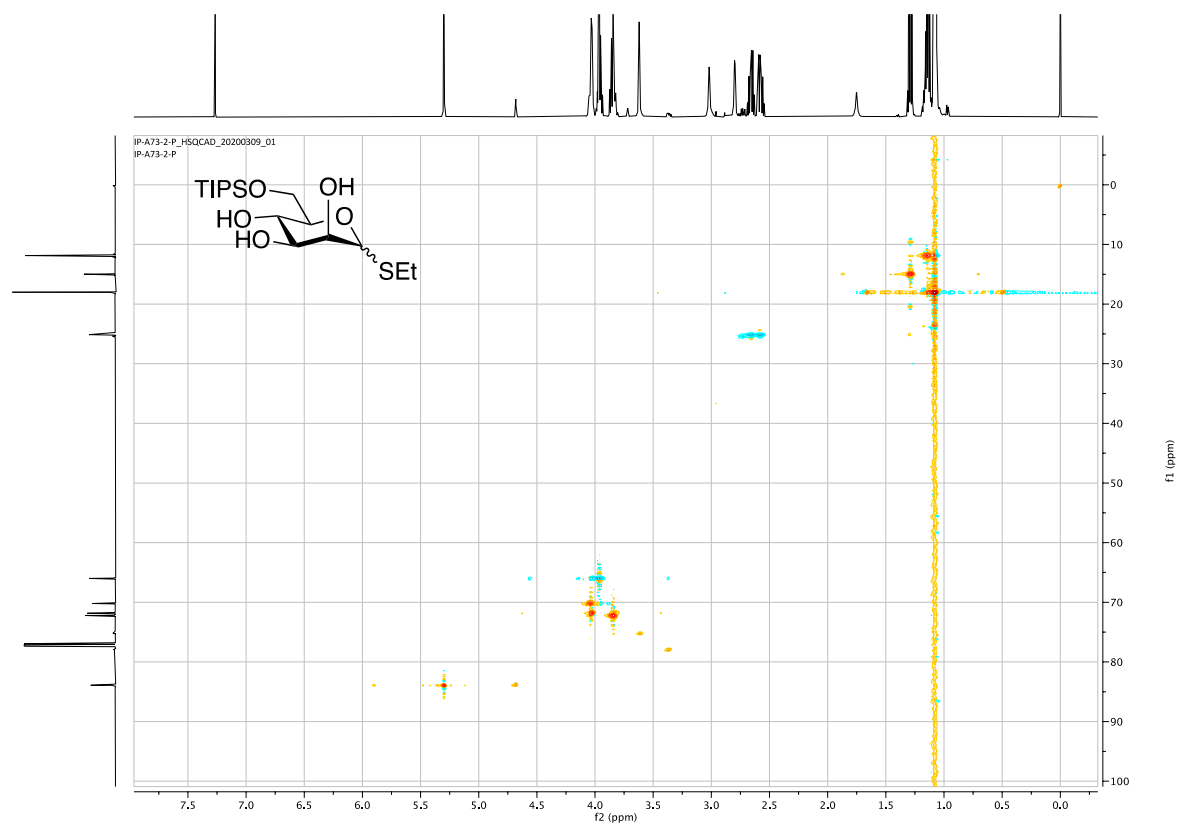
¹³C NMR (151 MHz, Chloroform-*d*) S6



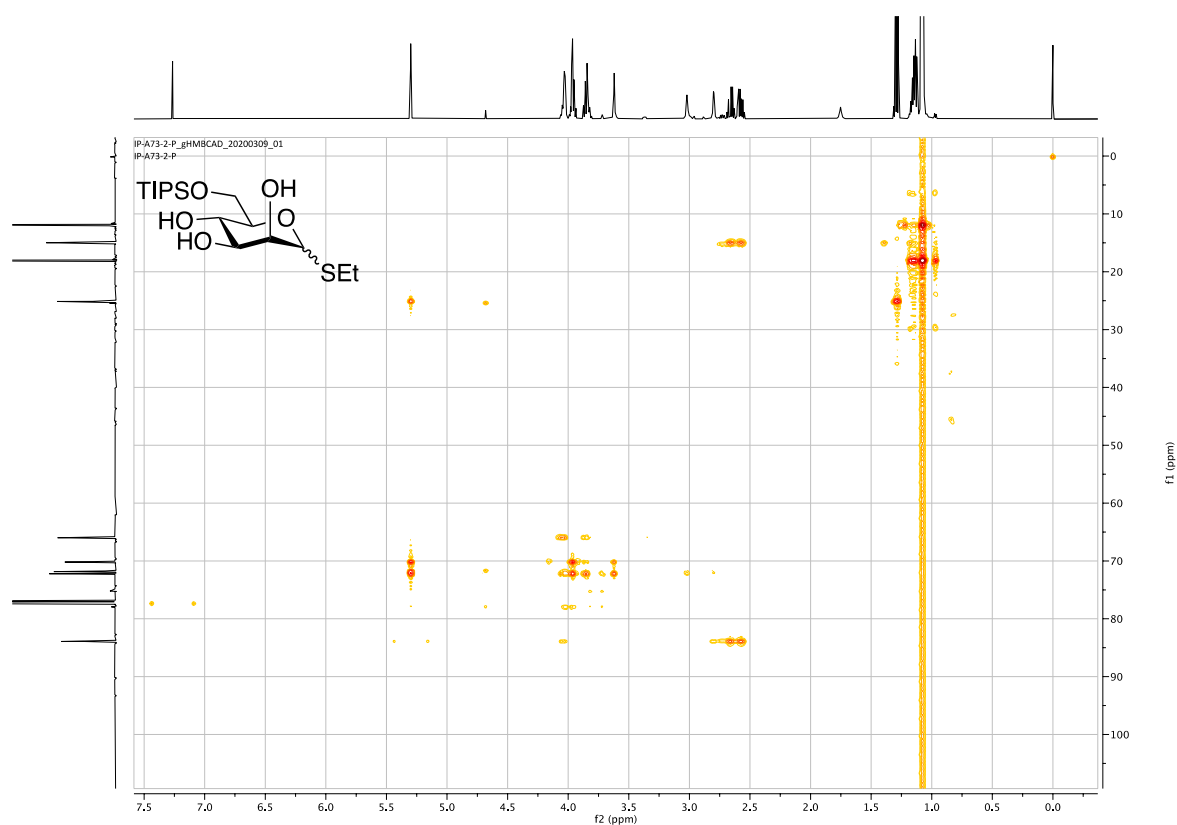
COSY NMR (600 MHz, Chloroform-*d*) S6



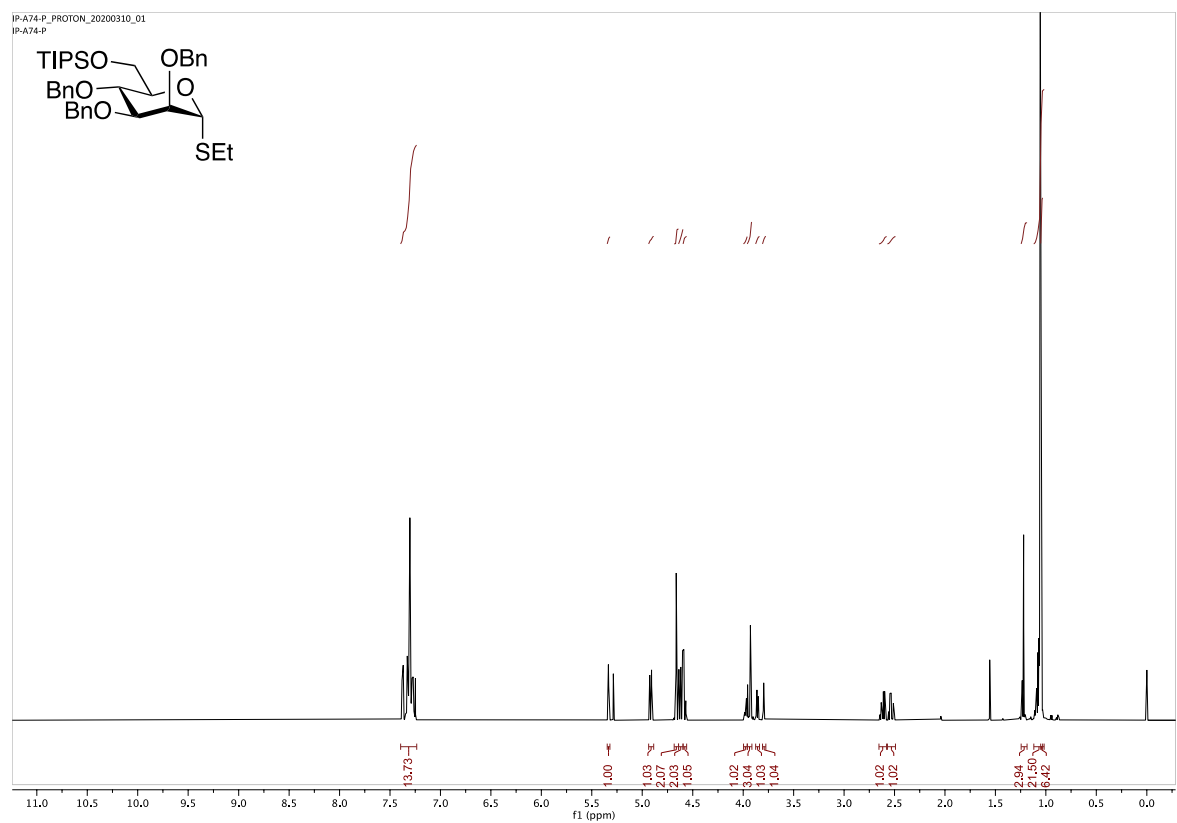
HSQC NMR (600 MHz x 151 MHz, Chloroform-*d*) S6



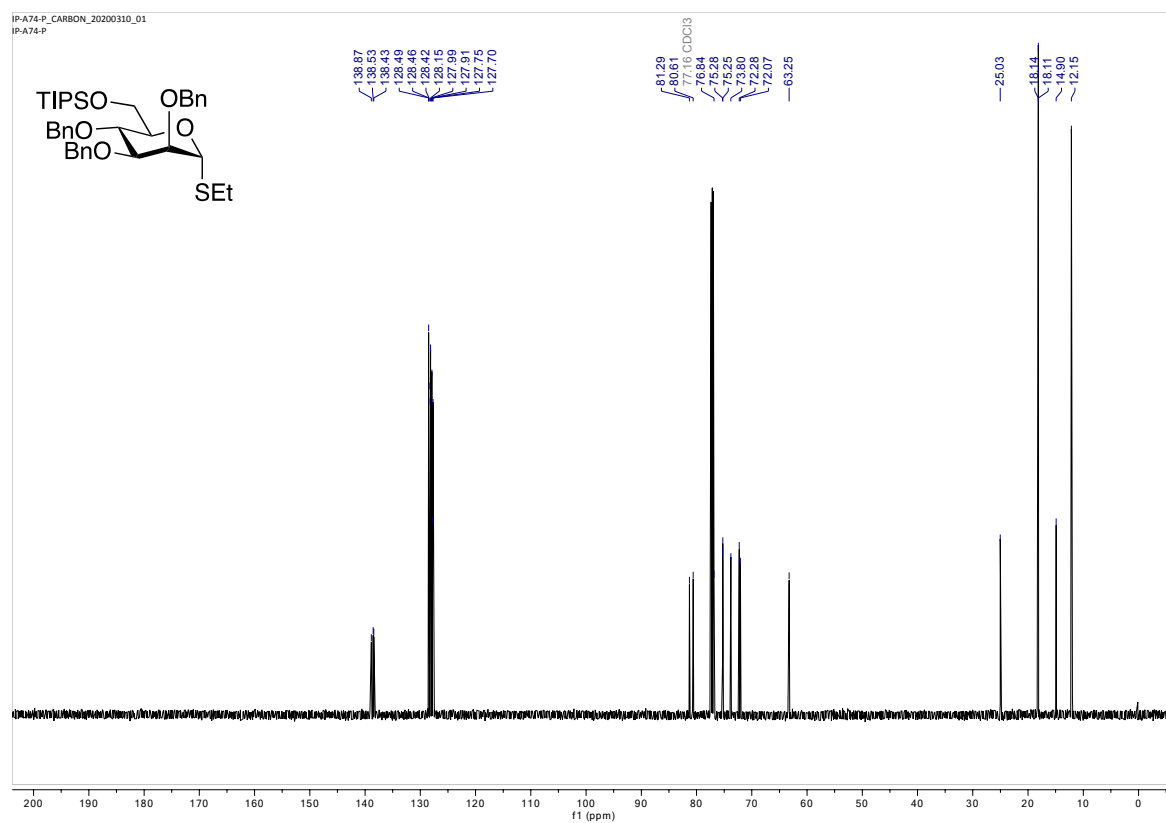
HMBC NMR (600 MHz x 151 MHz, Chloroform-*d*) S6



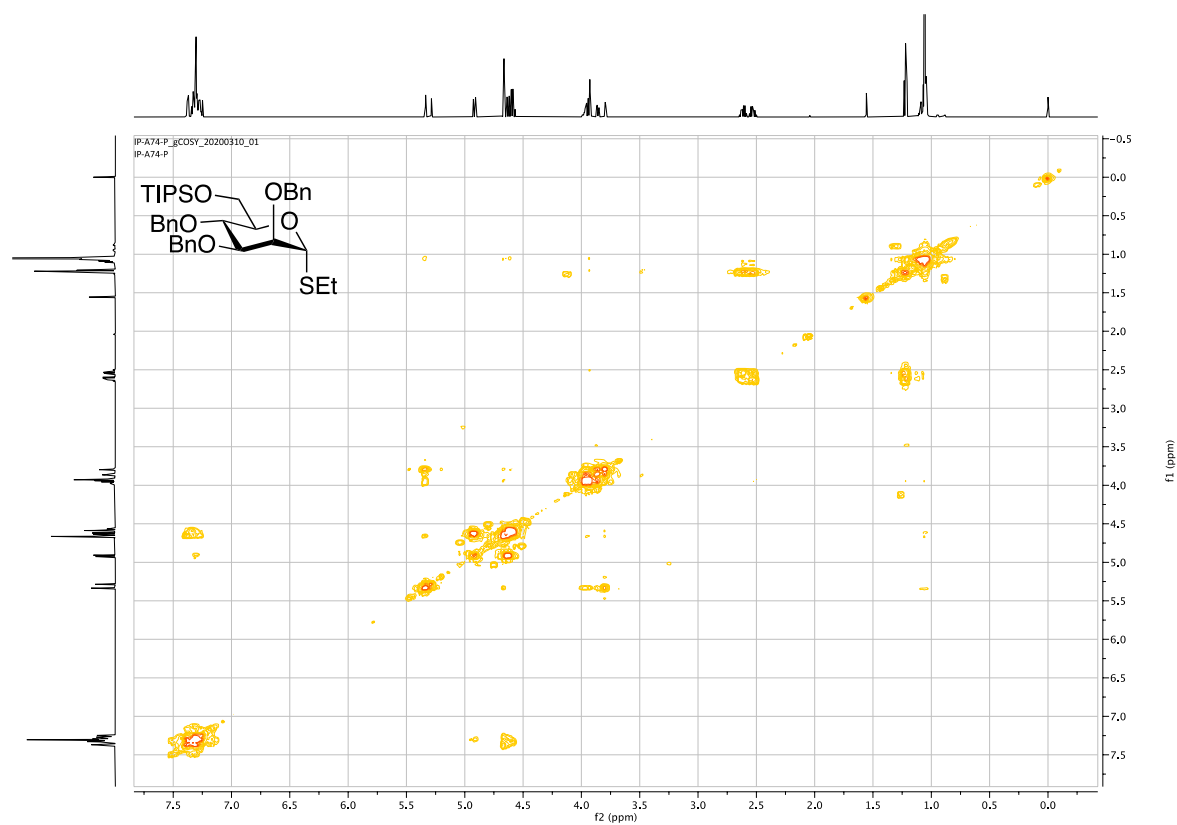
¹H NMR (600 MHz, Chloroform-*d*) S7



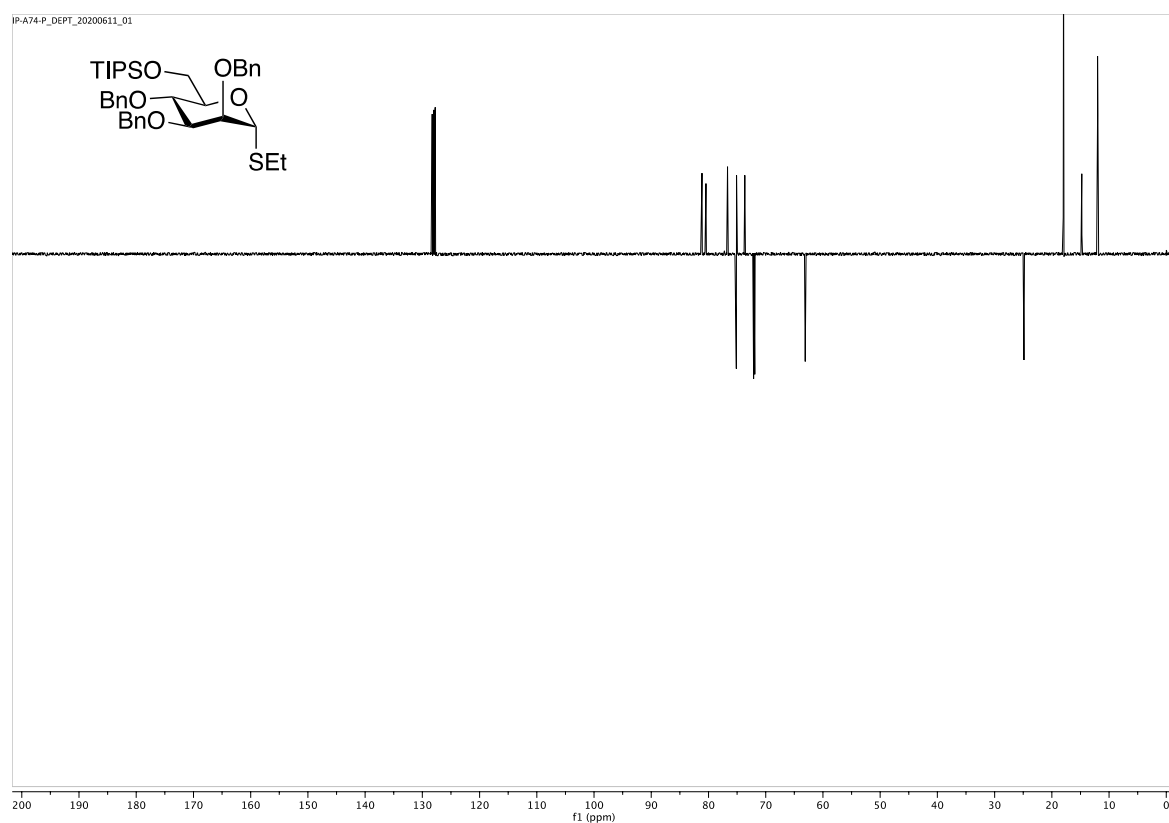
¹³C NMR (151 MHz, Chloroform-*d*) S7



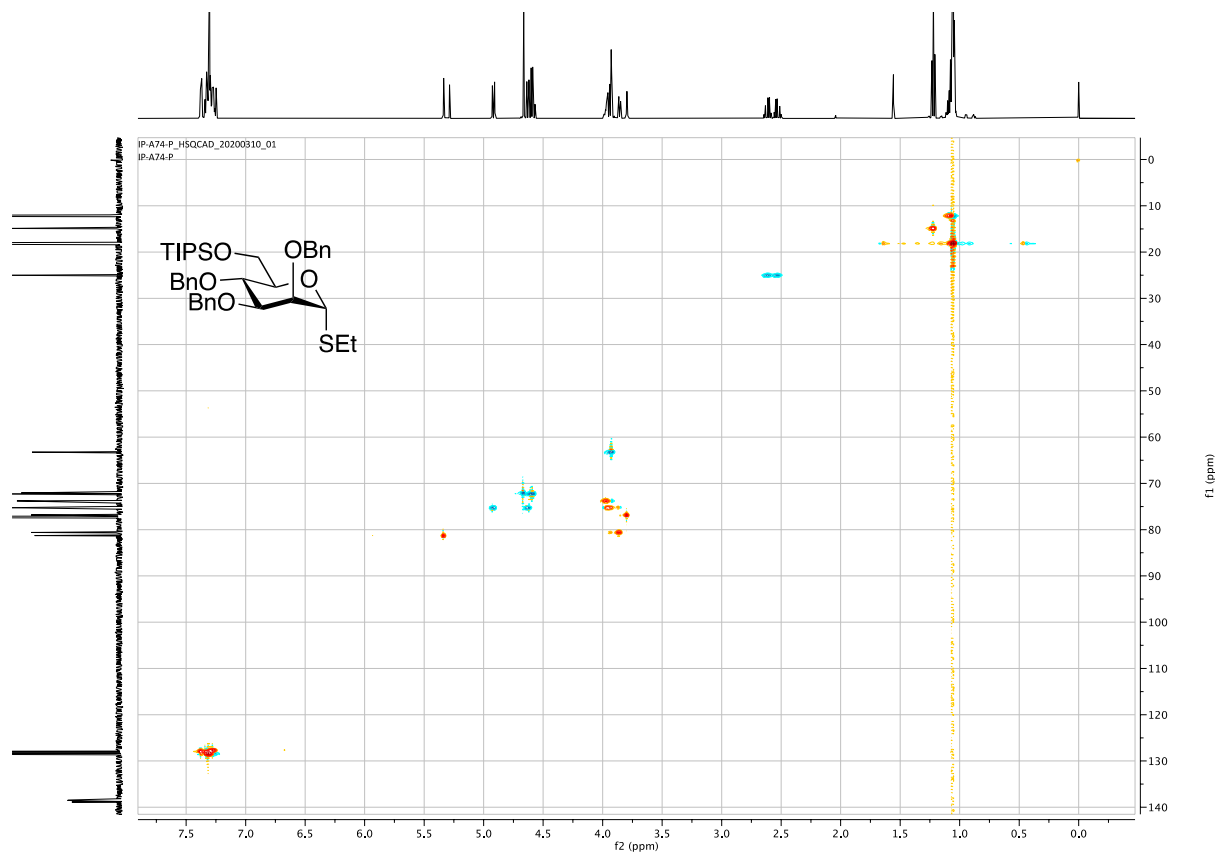
COSY NMR (600 MHz, Chloroform-*d*) S7



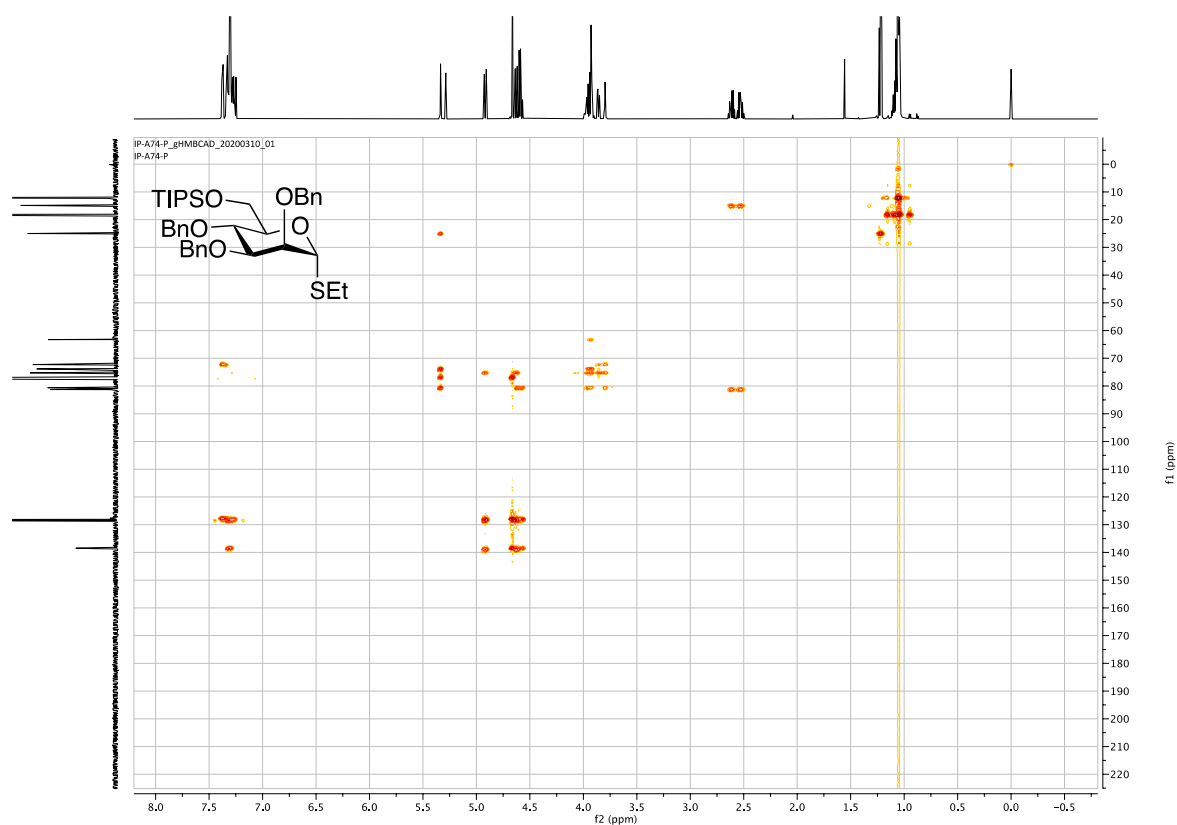
DEPT NMR (151 MHz, Chloroform-*d*) S7



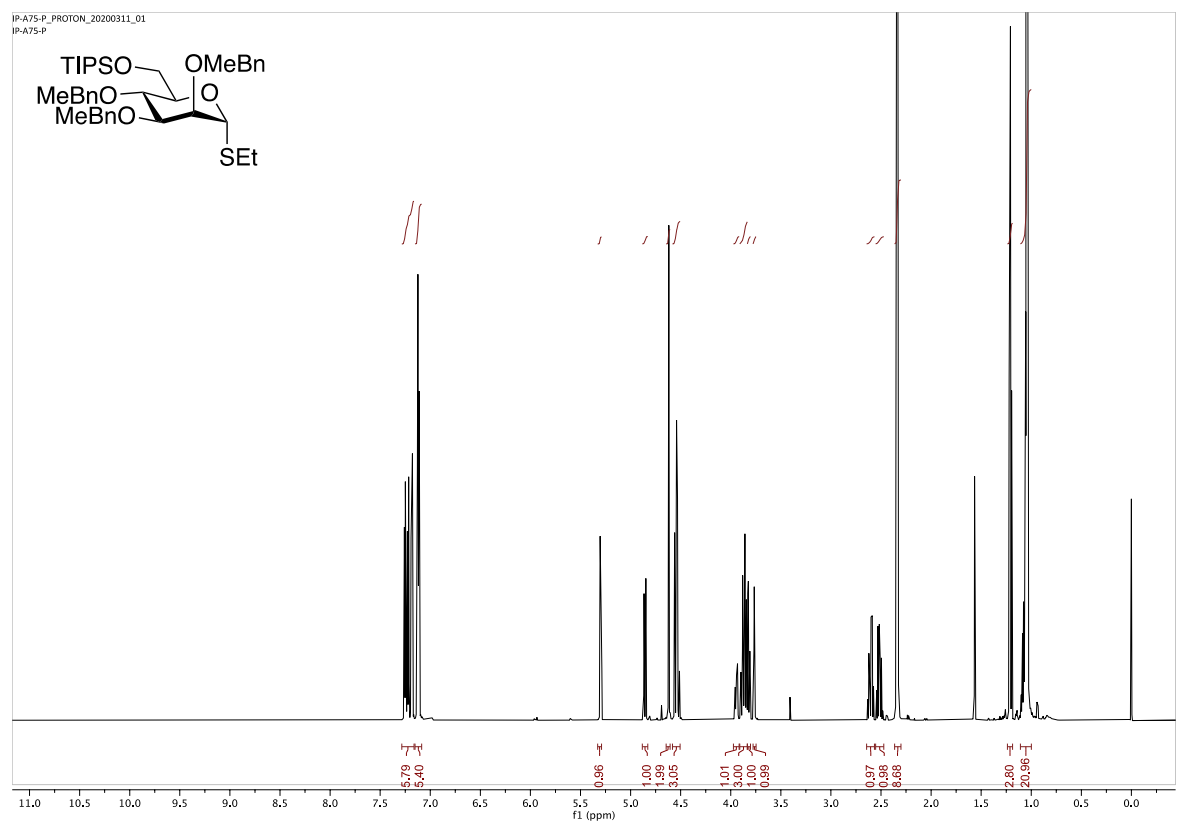
HSQC NMR (600 MHz x 151 MHz, Chloroform-*d*) S7



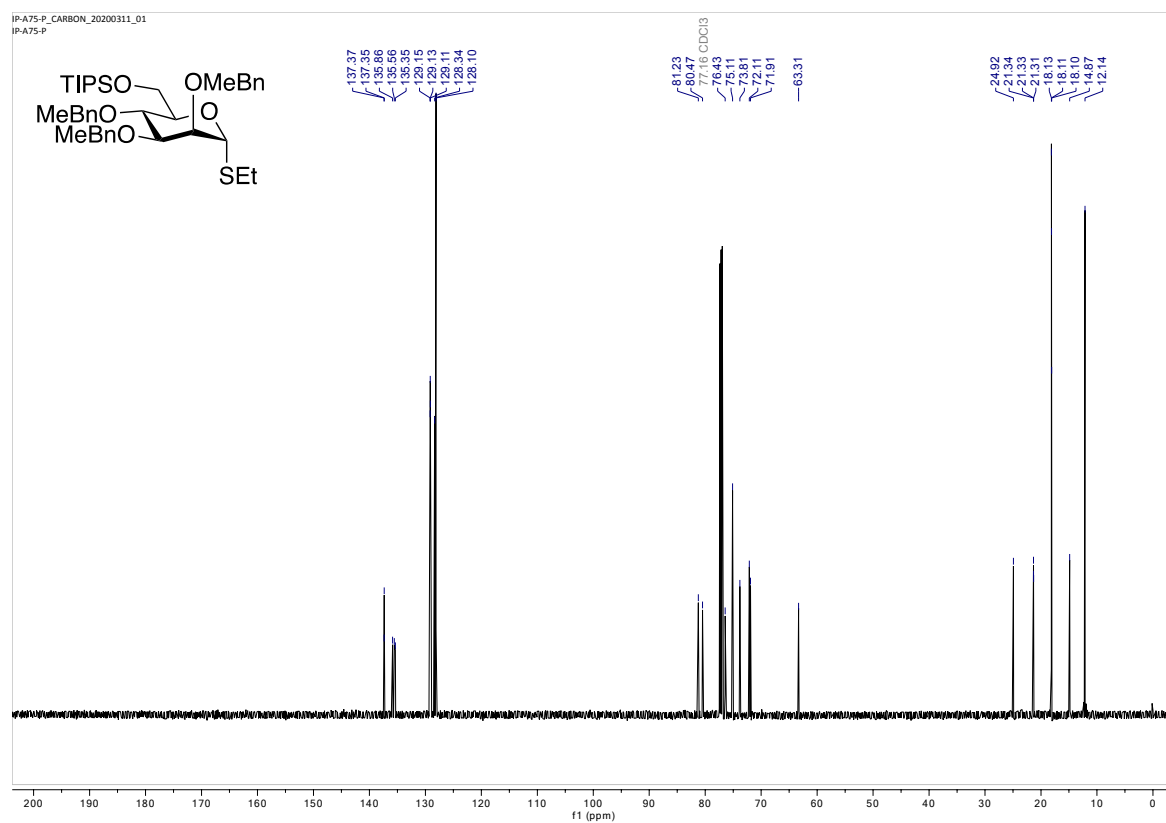
HMBC NMR (600 MHz x 151 MHz, Chloroform-*d*) S7



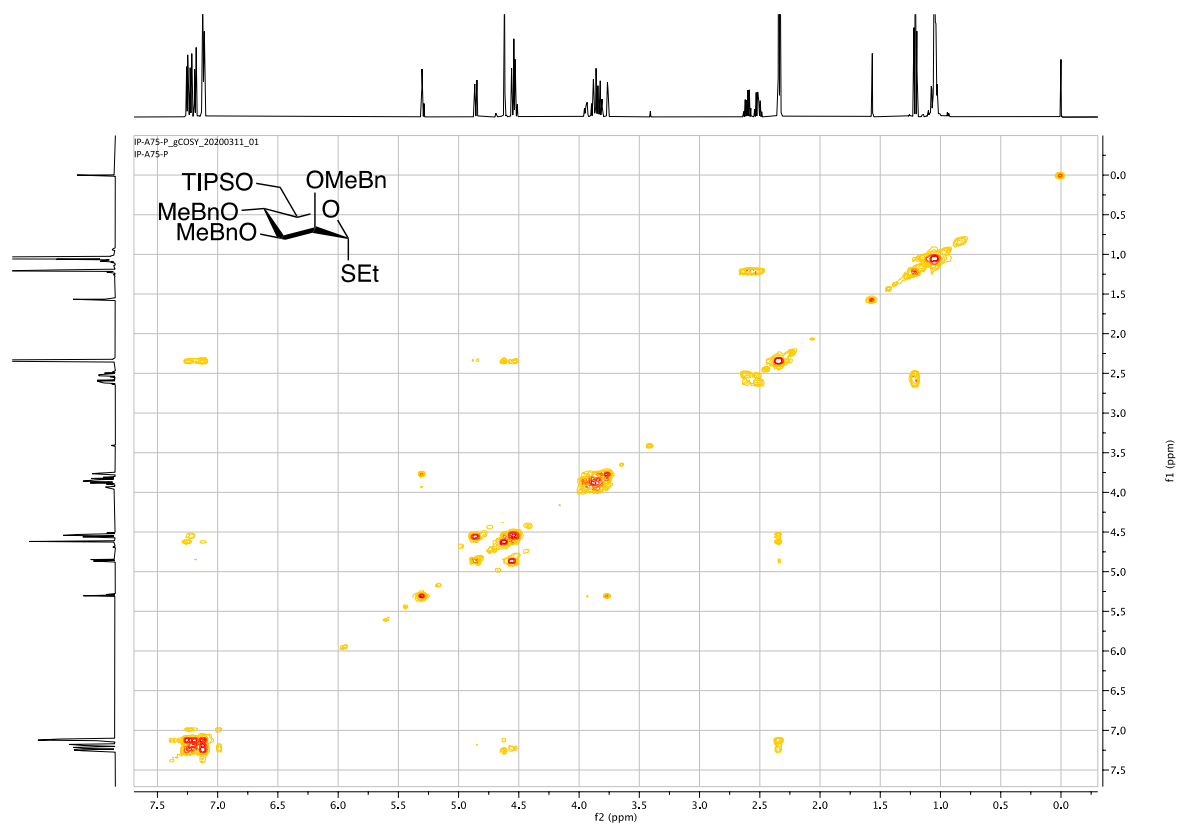
¹H NMR (600 MHz, Chloroform-*d*) S8



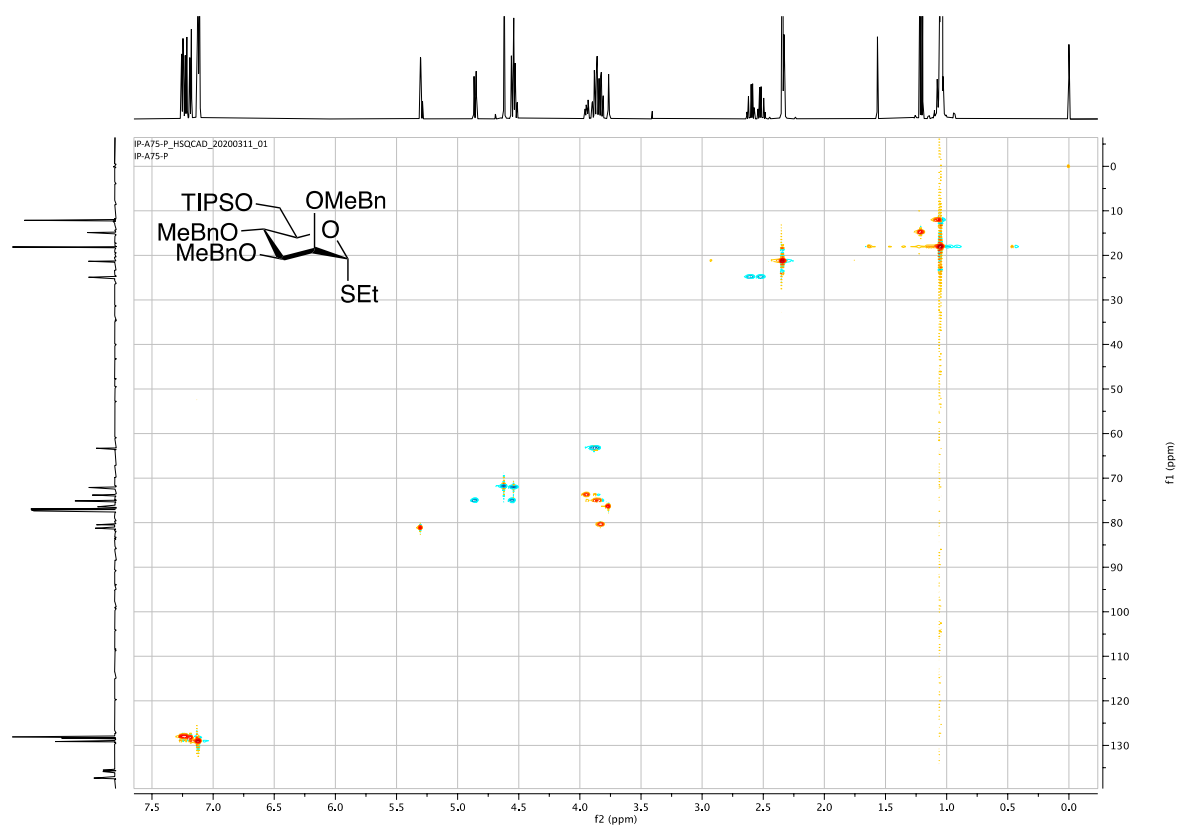
¹³C NMR (151 MHz, Chloroform-*d*) S8



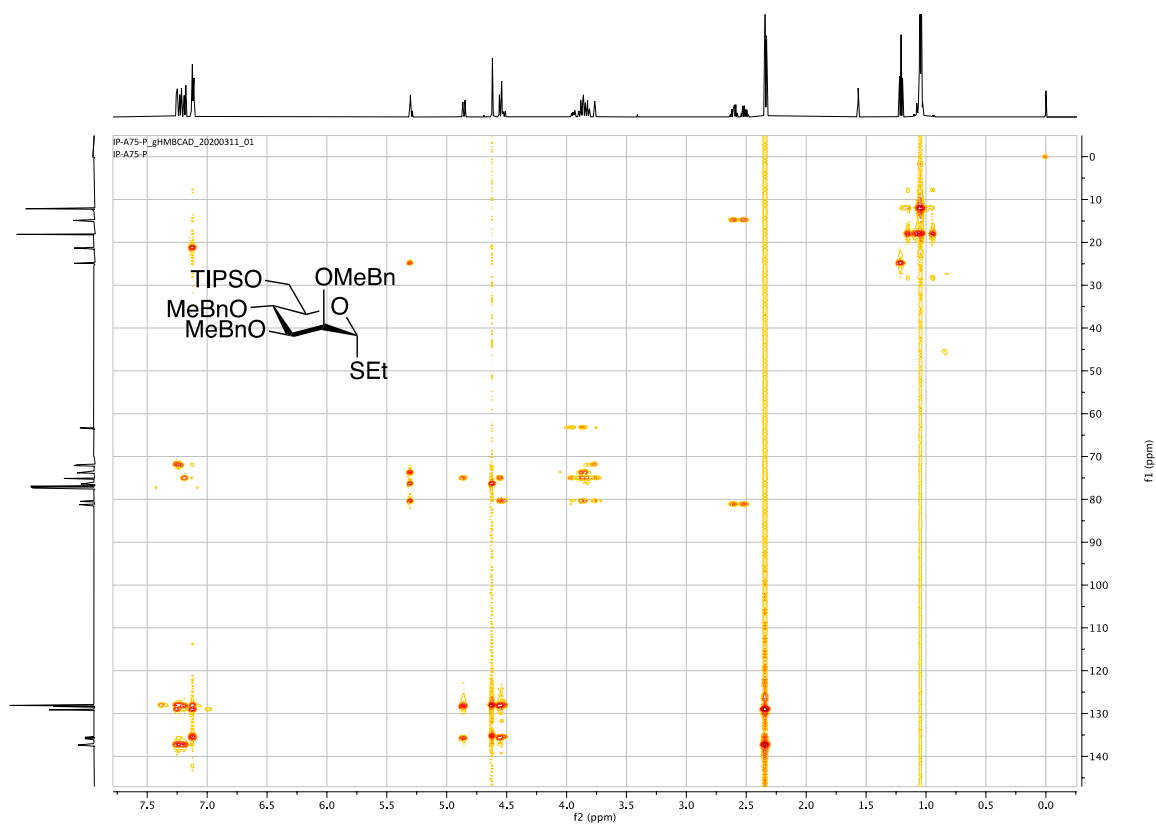
COSY NMR (600 MHz, Chloroform-*d*) S8



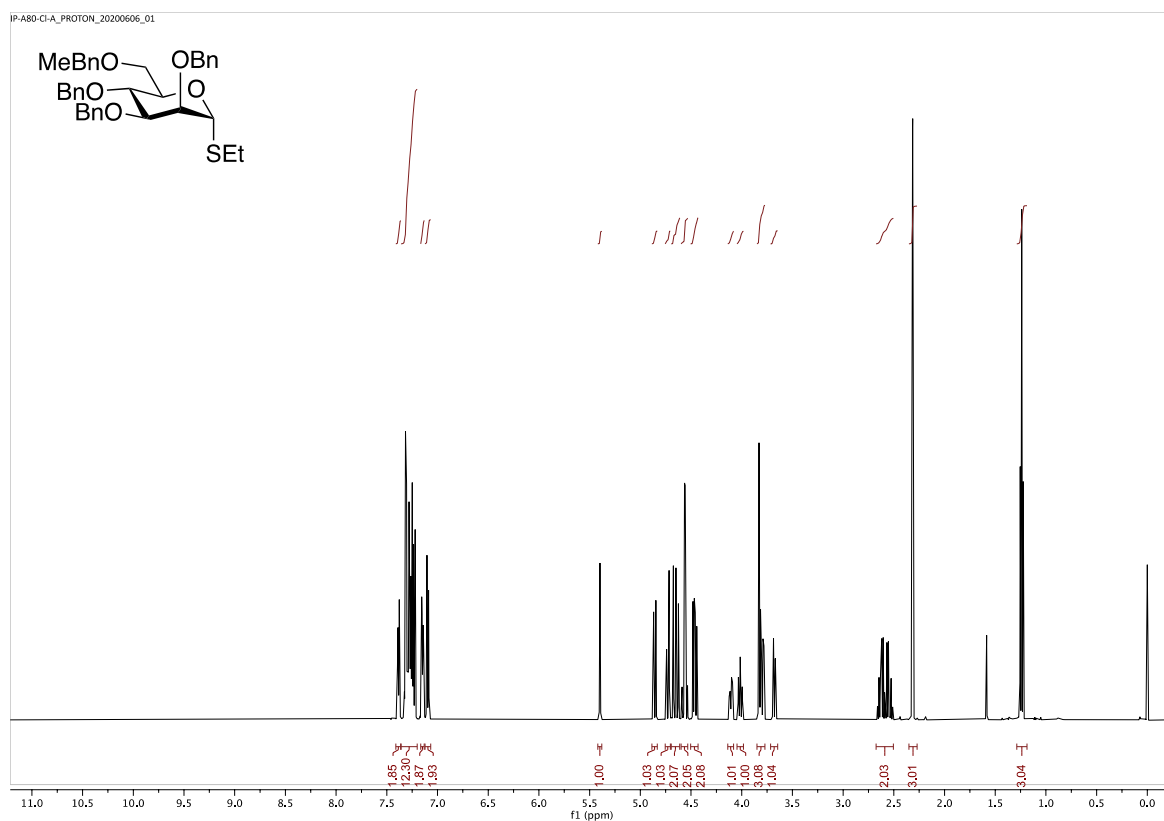
HSQC NMR (600 MHz x 151 MHz, Chloroform-*d*) S8



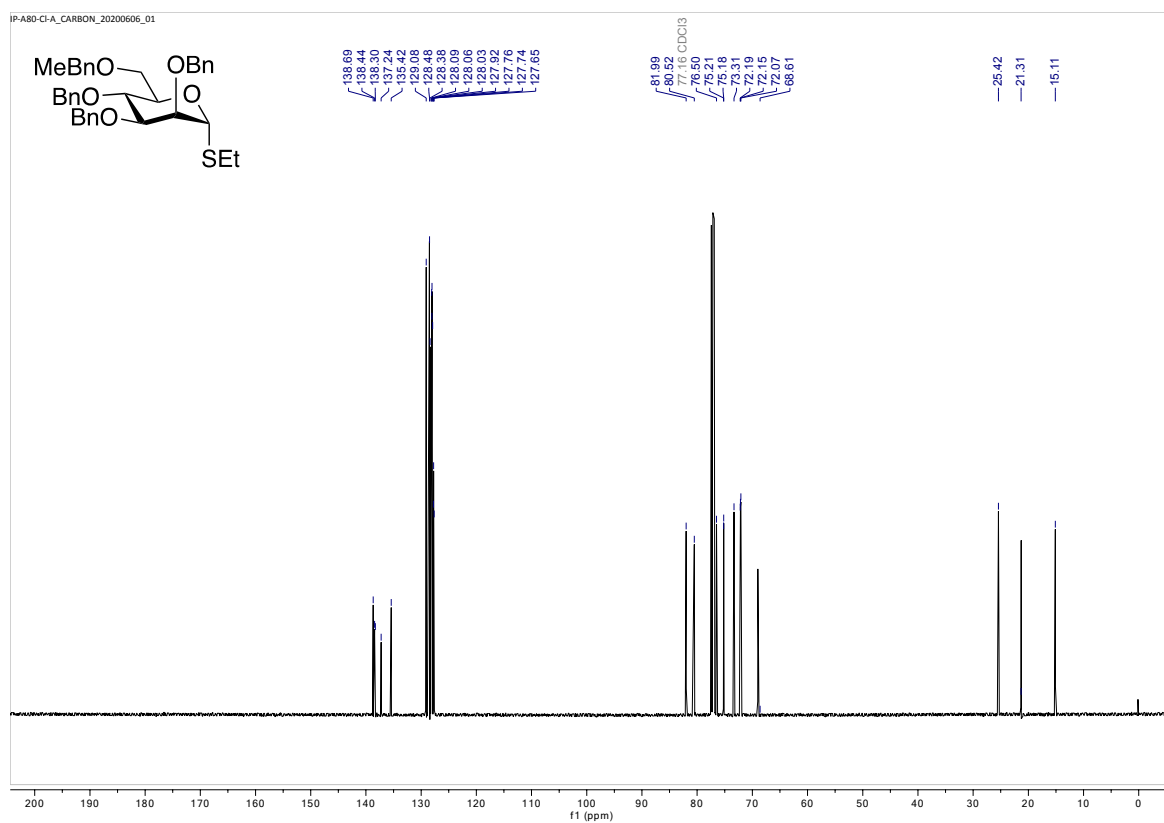
HMBC NMR (600 MHz x 151 MHz, Chloroform-*d*) S8



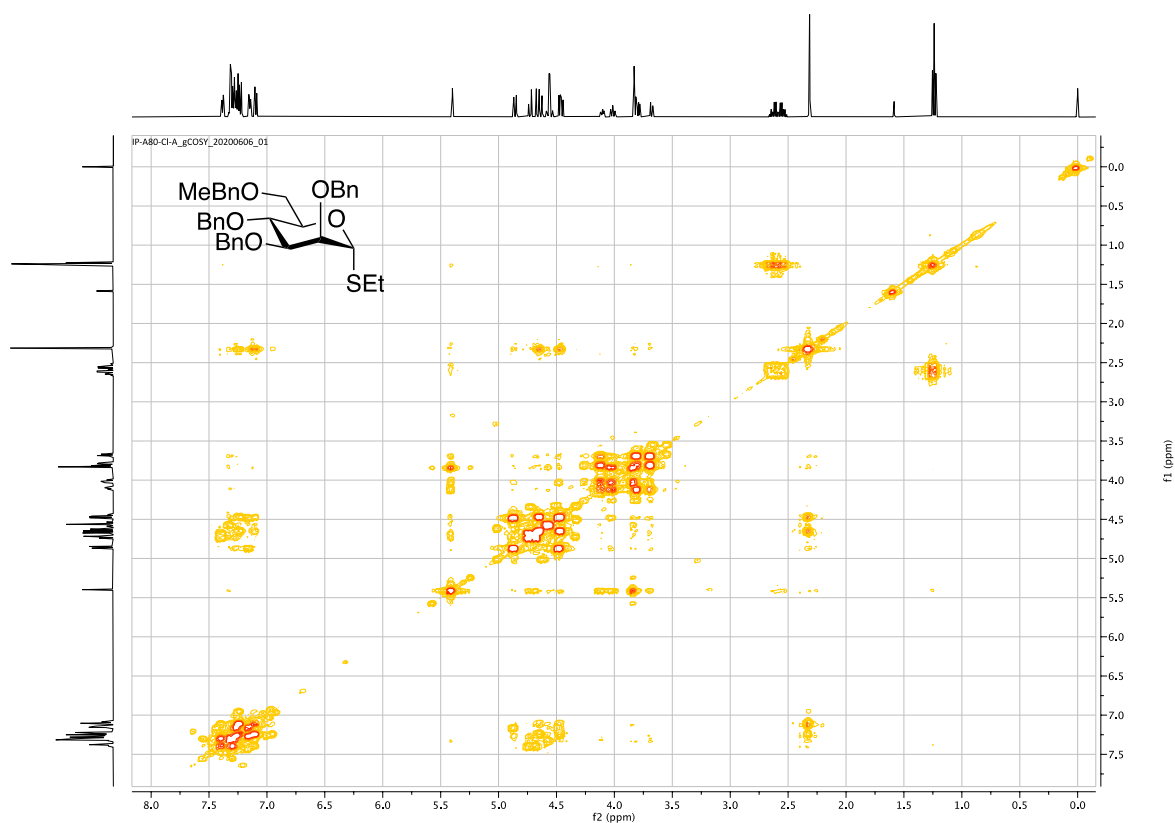
¹H NMR (500 MHz, Chloroform-*d*) S9



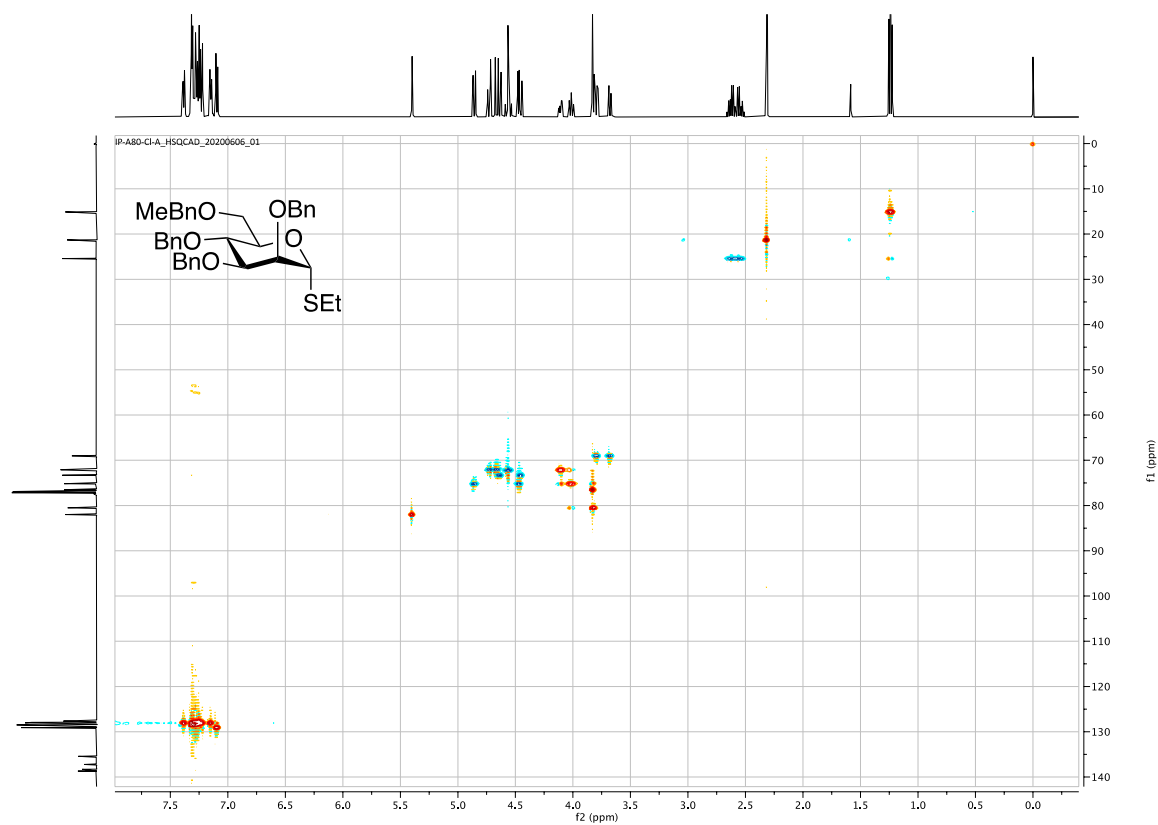
¹³C NMR (126 MHz, Chloroform-*d*) S9



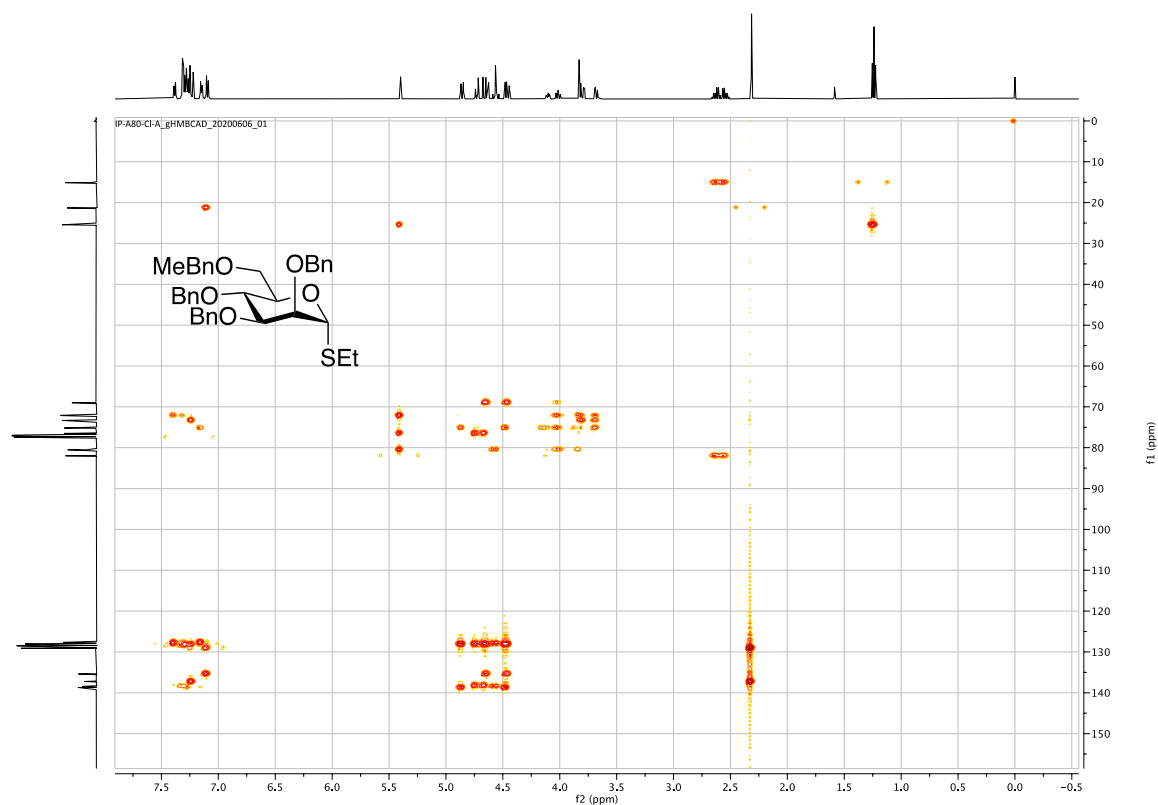
COSY NMR (500 MHz, Chloroform-*d*) S9



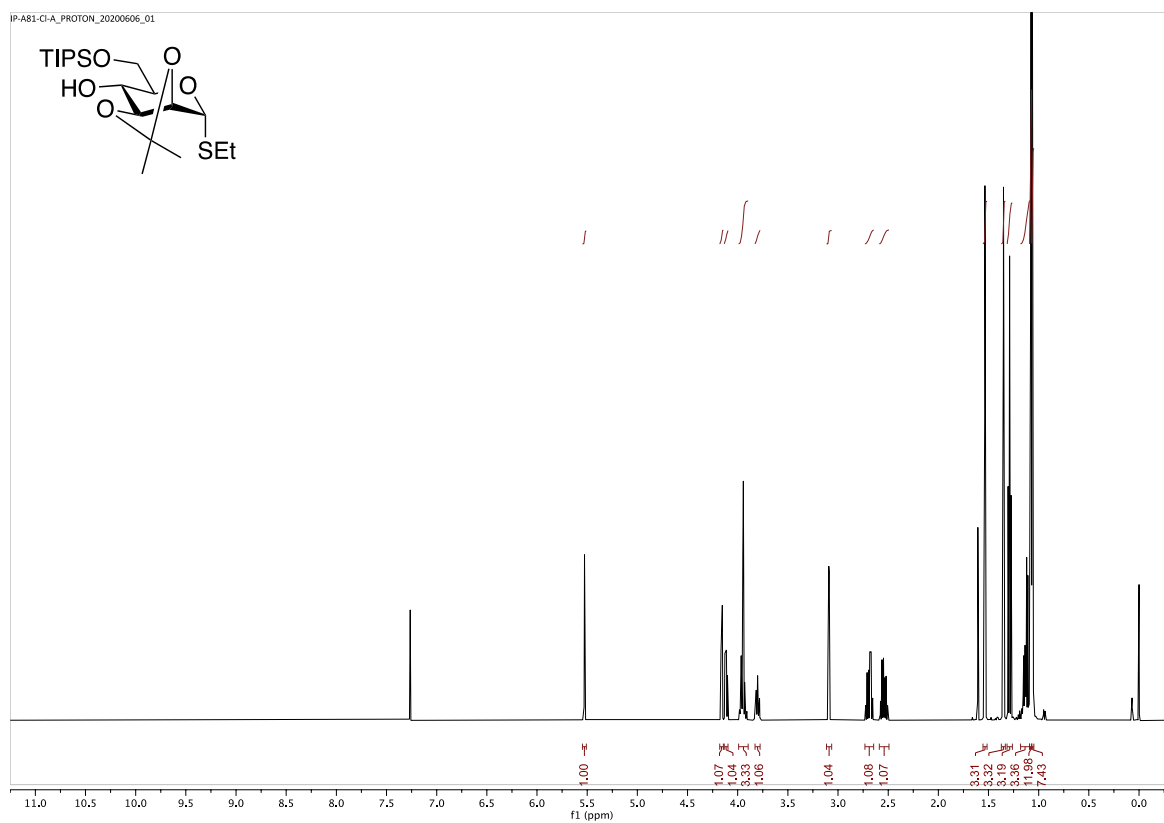
HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) S9



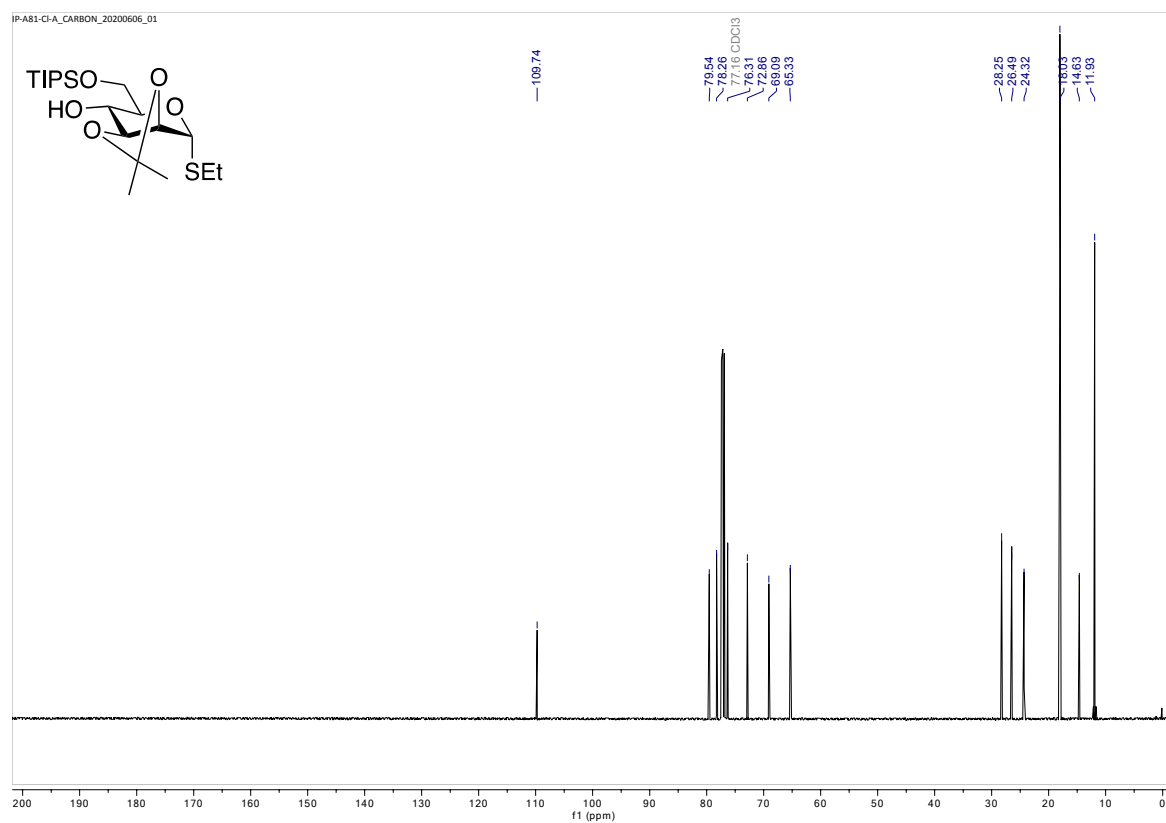
HMBC NMR (500 MHz x 126 MHz, Chloroform-*d*) S9



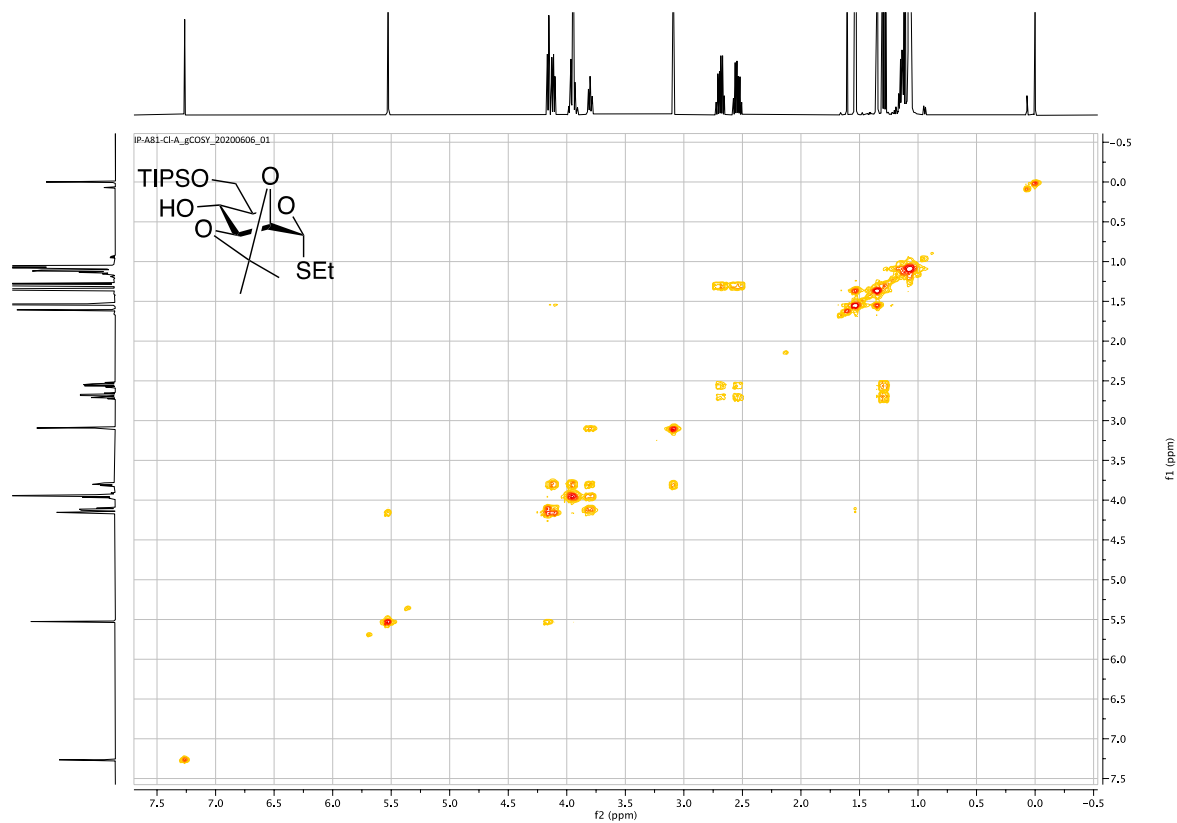
¹H NMR (500 MHz, Chloroform-*d*) S10



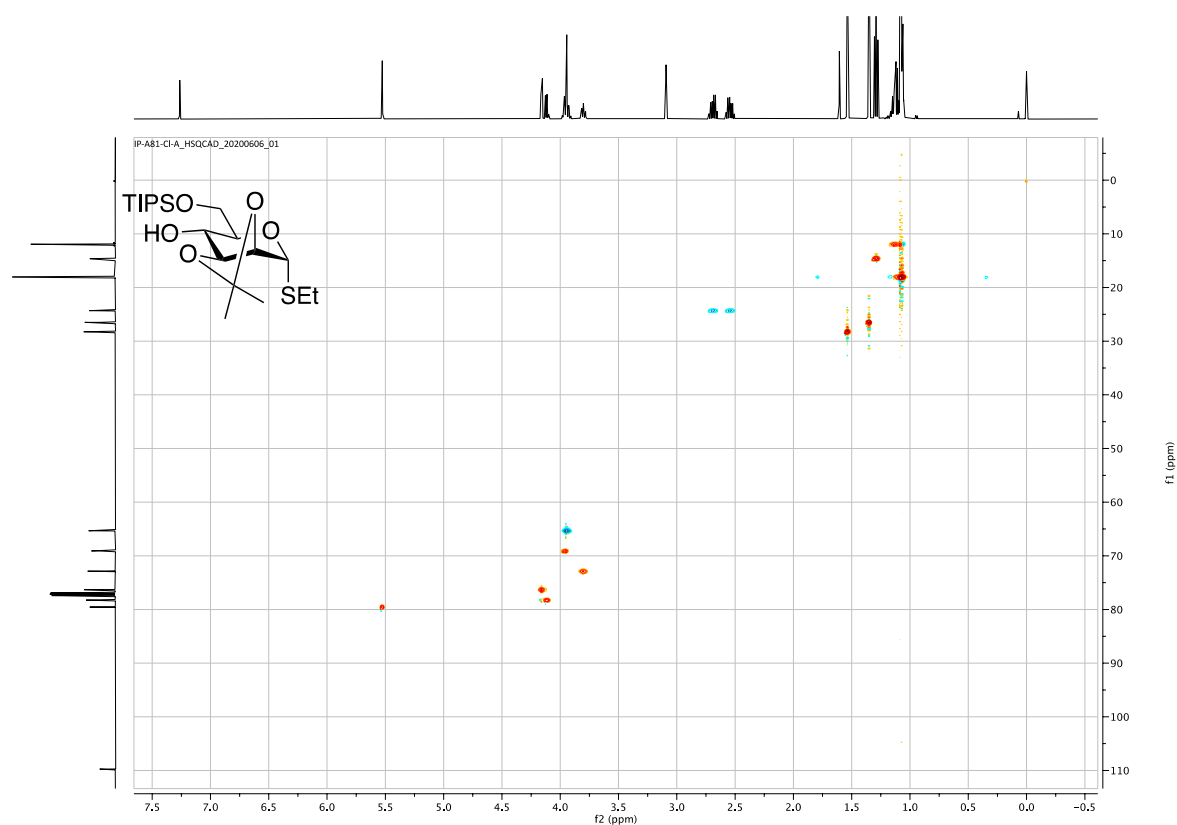
¹³C NMR (126 MHz, Chloroform-*d*) S10



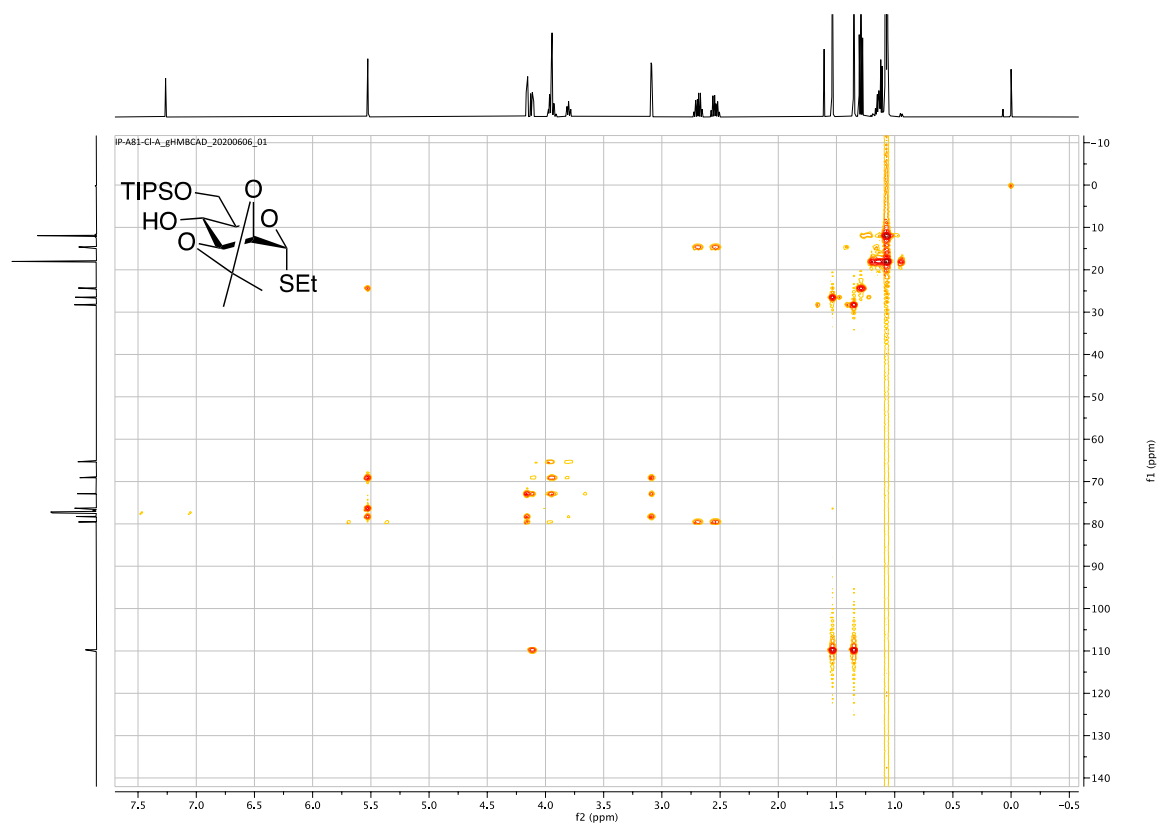
COSY NMR (500 MHz, Chloroform-*d*) S10



HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) S10

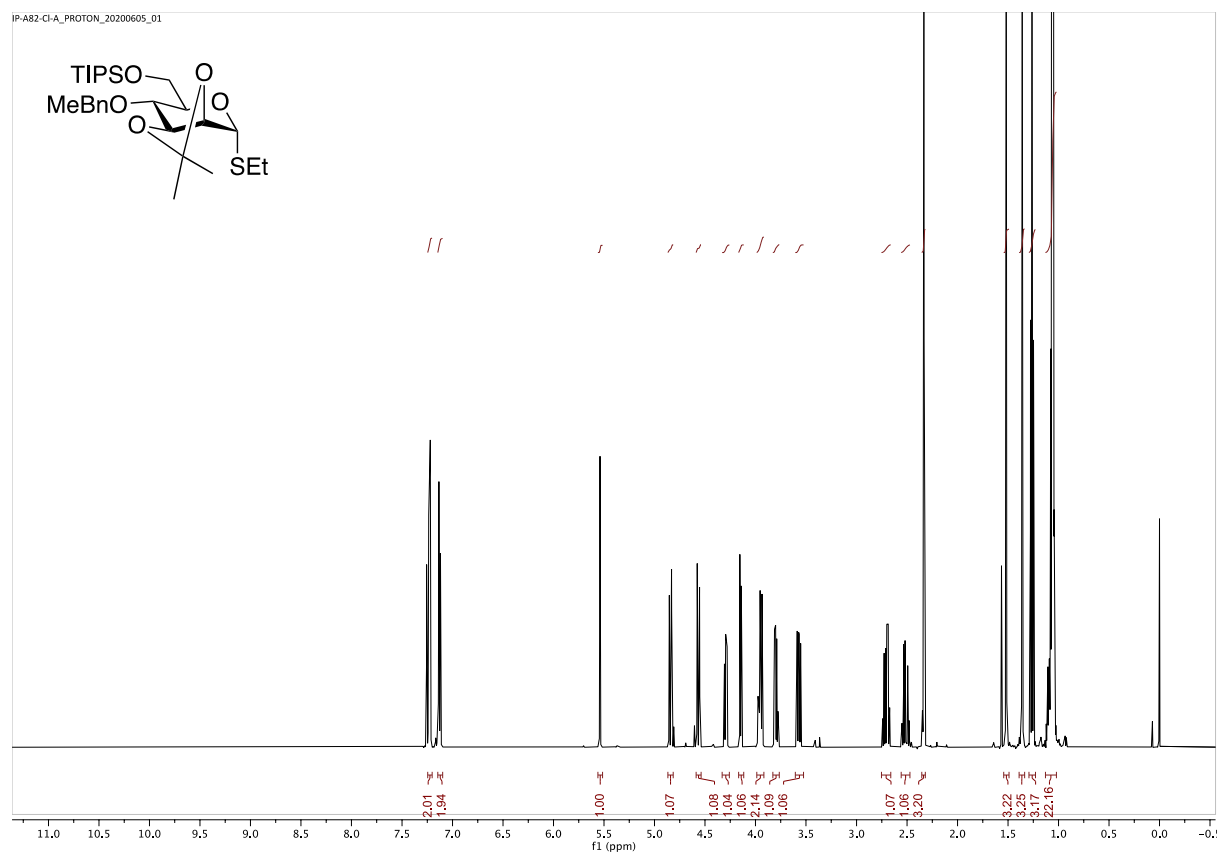


HMBC NMR (500 MHz x 126 MHz, Chloroform-*d*) S10



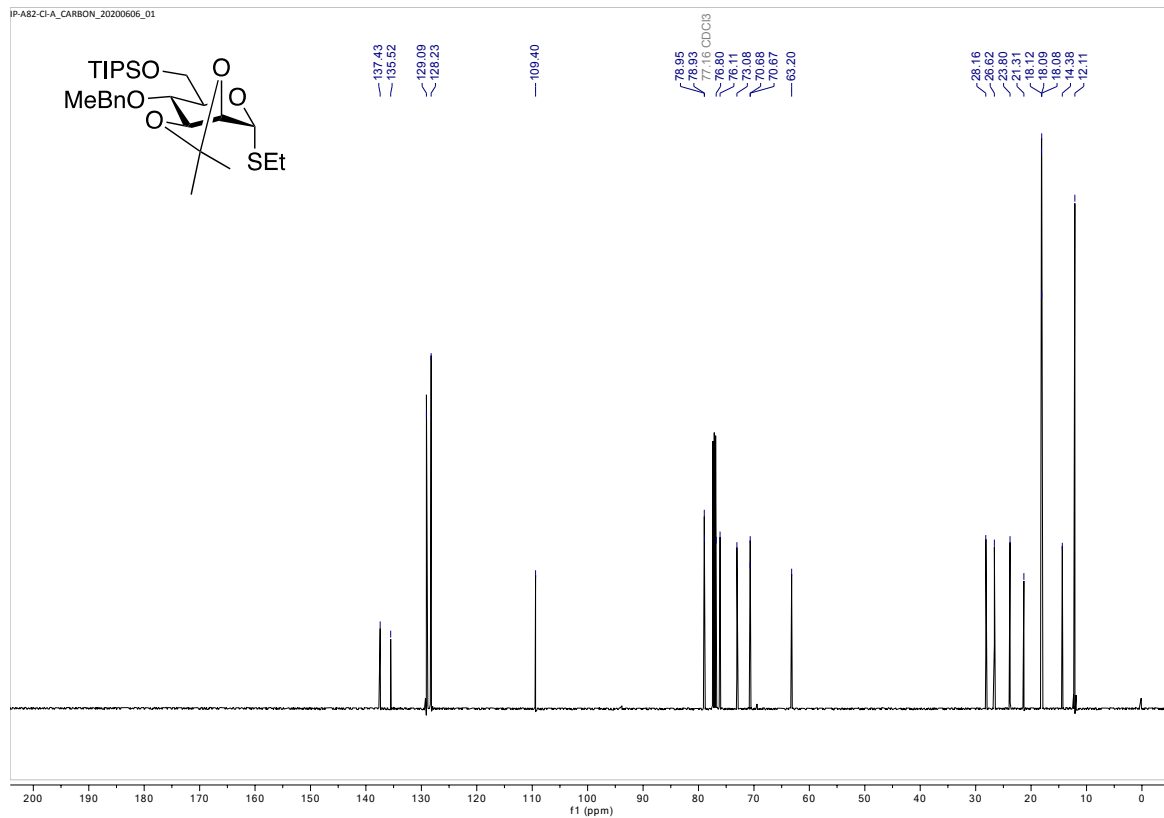
¹H NMR (500 MHz, Chloroform-*d*) S11

IP-A82-CI-A_PROTON_20200605_01

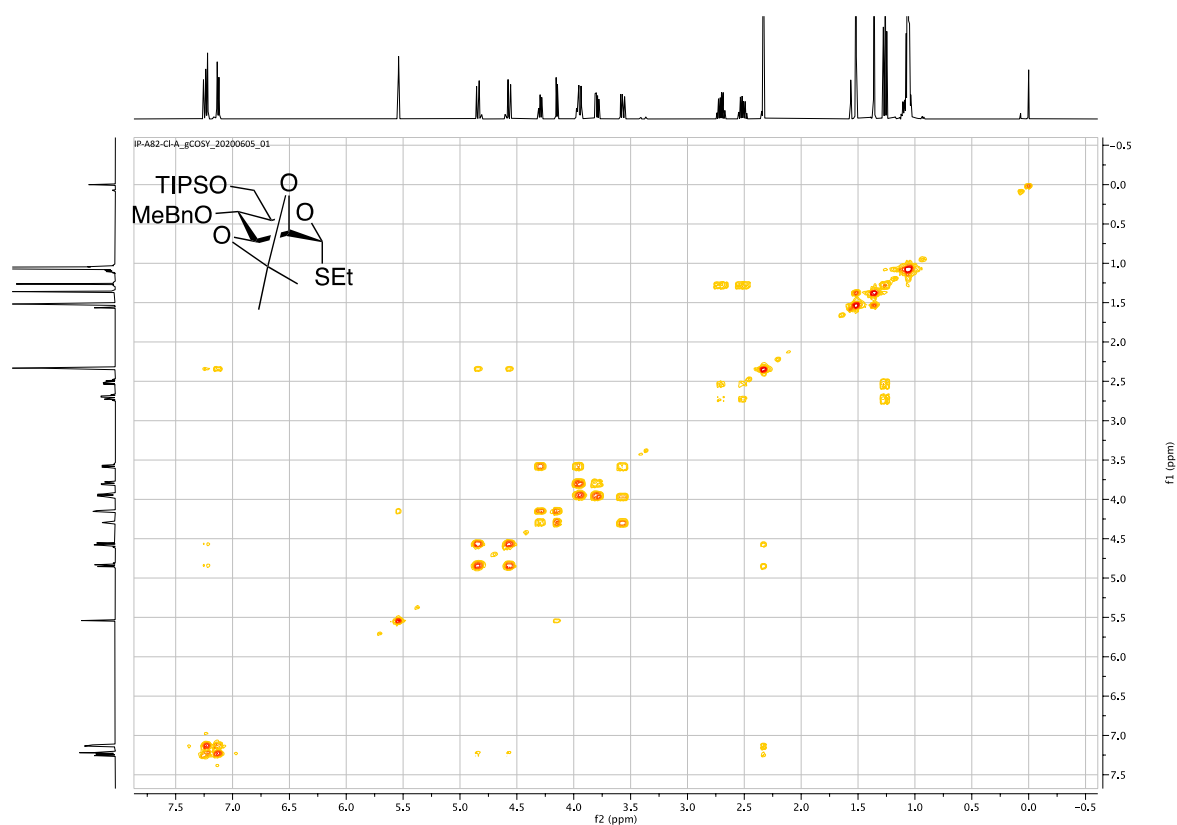


¹³C NMR (126 MHz, Chloroform-*d*) S11

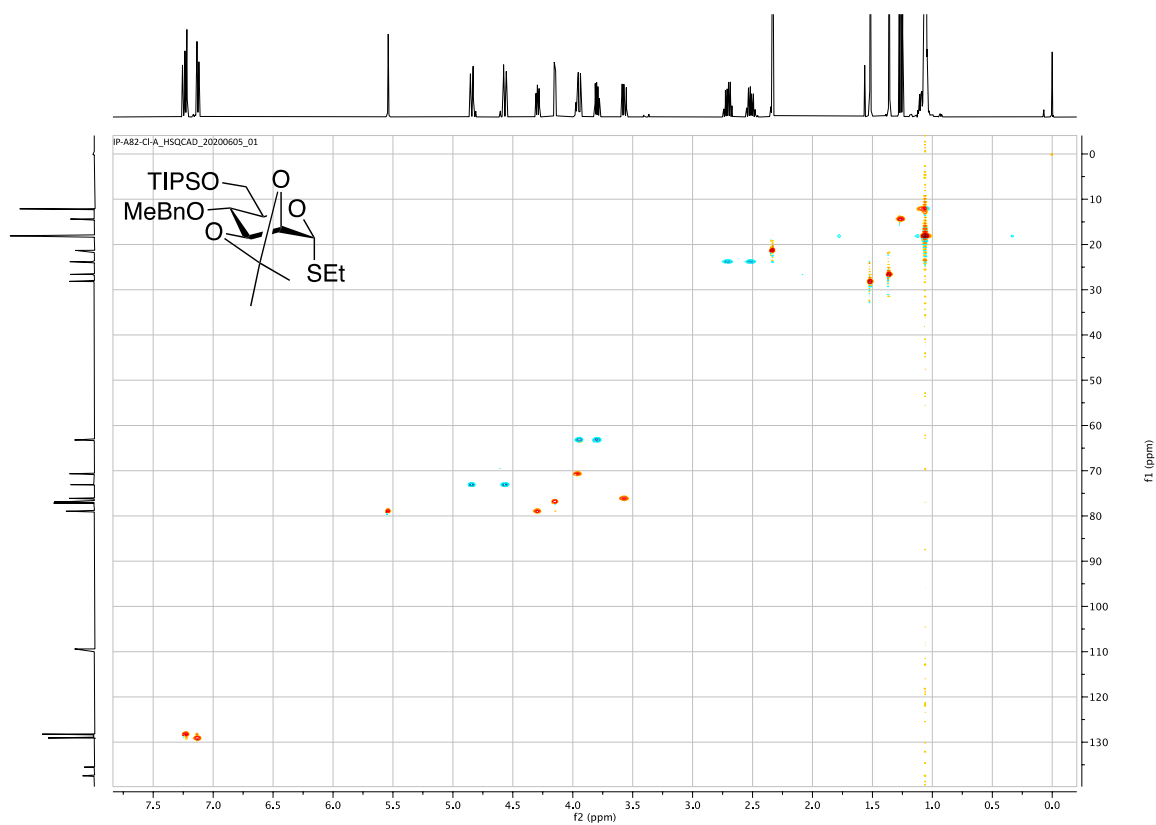
IP-A82-CI-A_CARBON_20200605_01



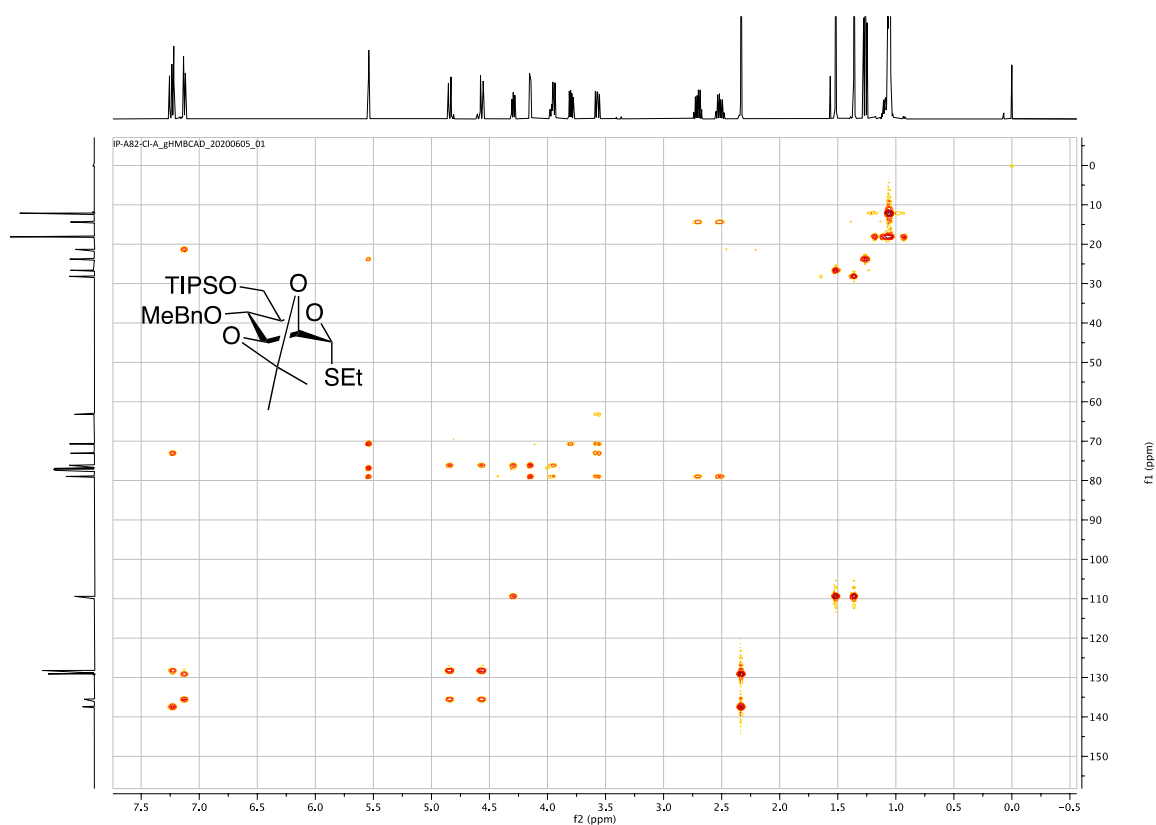
COSY NMR (500 MHz, Chloroform-*d*) S11



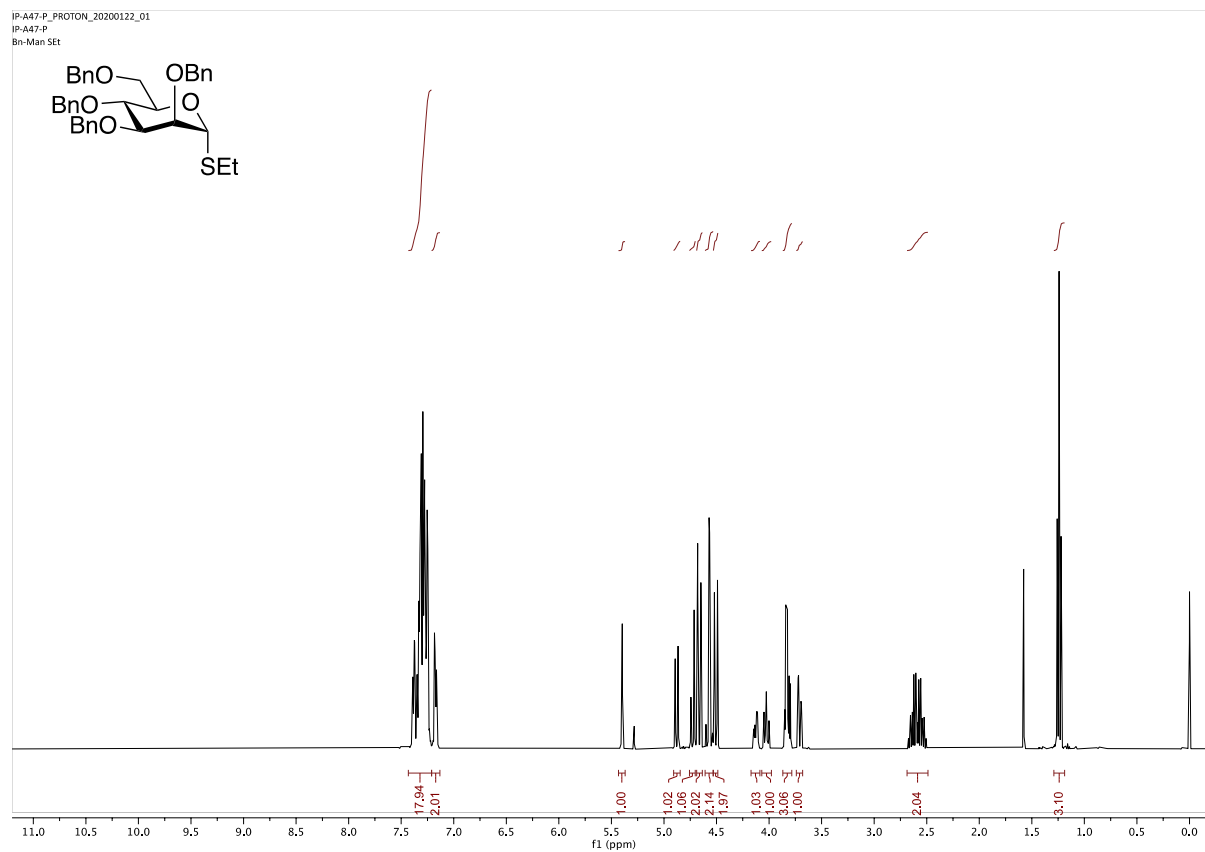
HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) S11



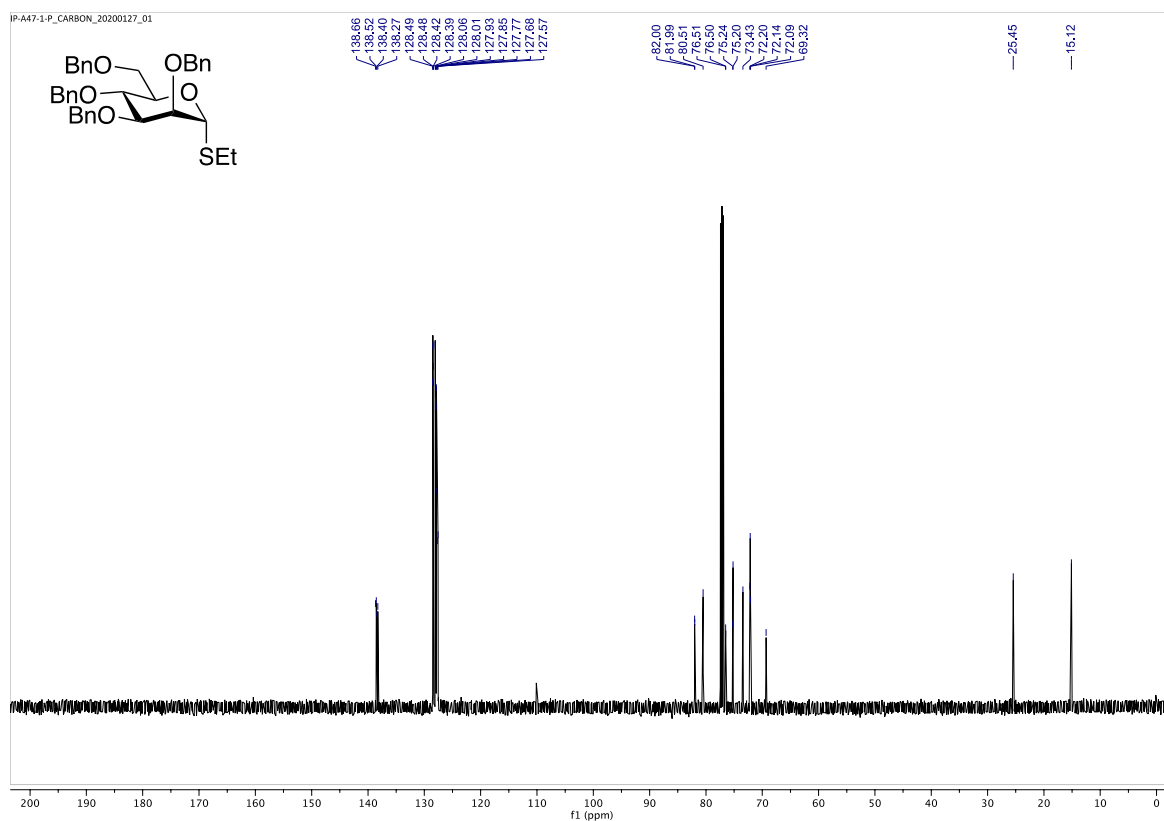
HMBC NMR (500 MHz x 126 MHz, Chloroform-*d*) S11



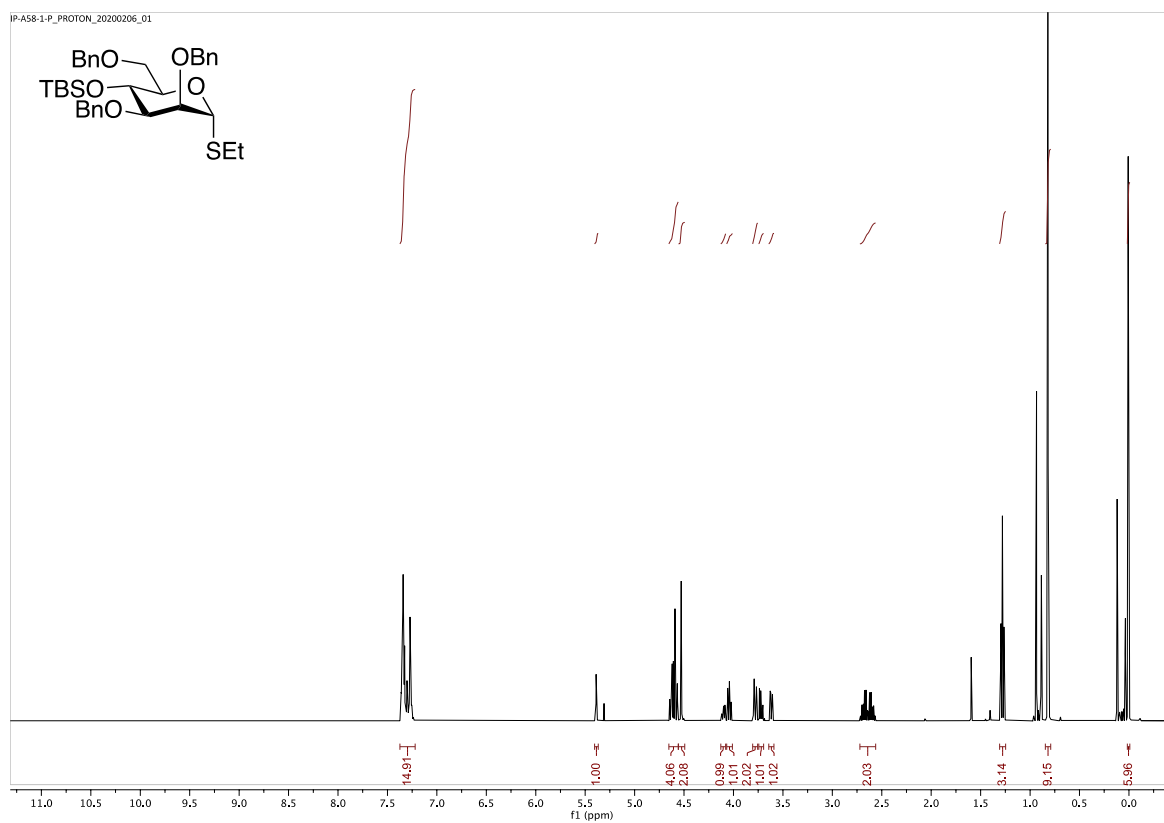
¹H NMR (400 MHz, Chloroform-*d*) S12



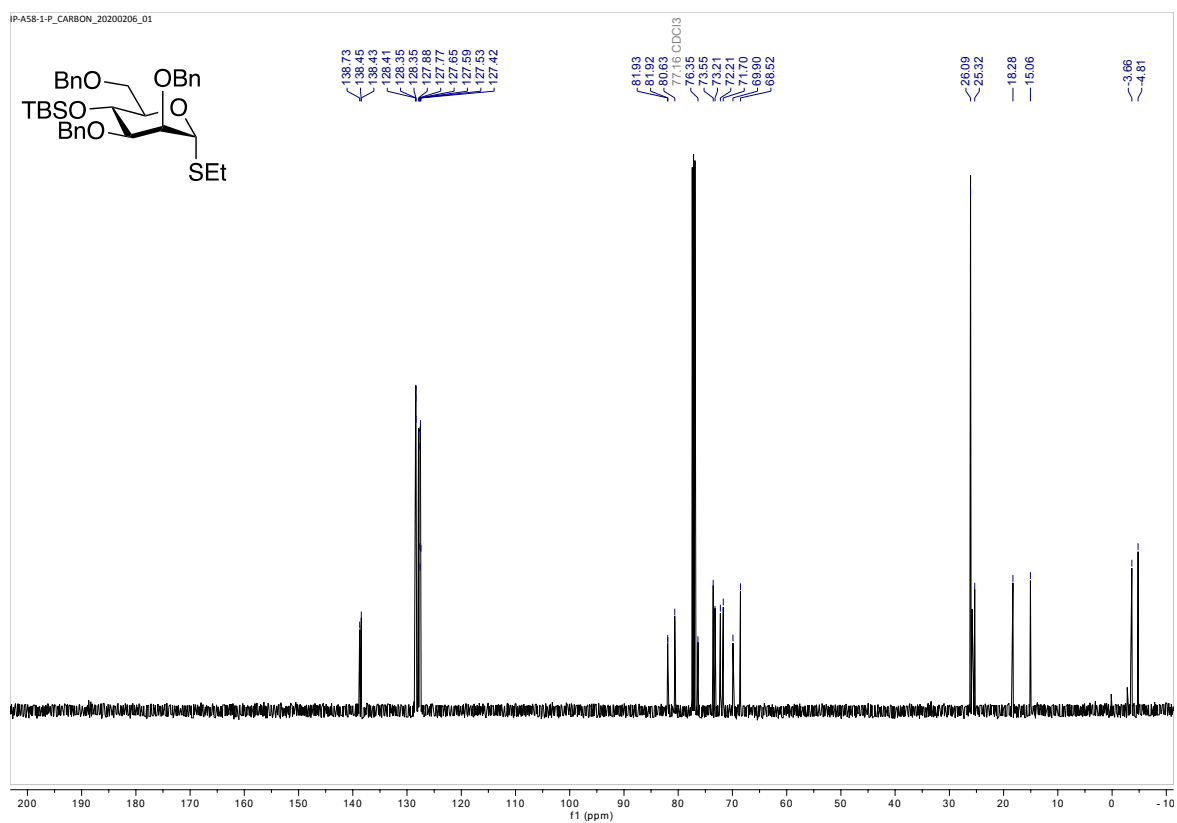
^{13}C NMR (126 MHz, Chloroform-*d*) S12



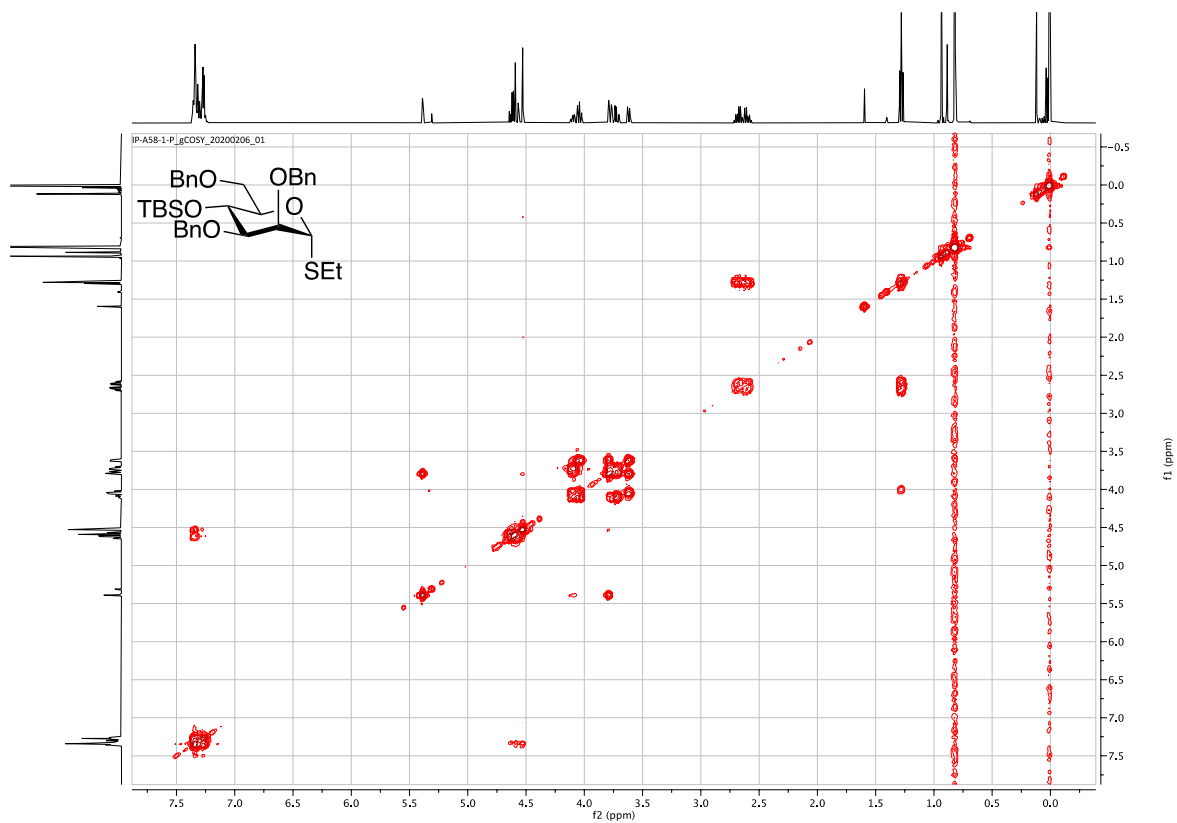
^1H NMR (500 MHz, Chloroform-*d*) S19



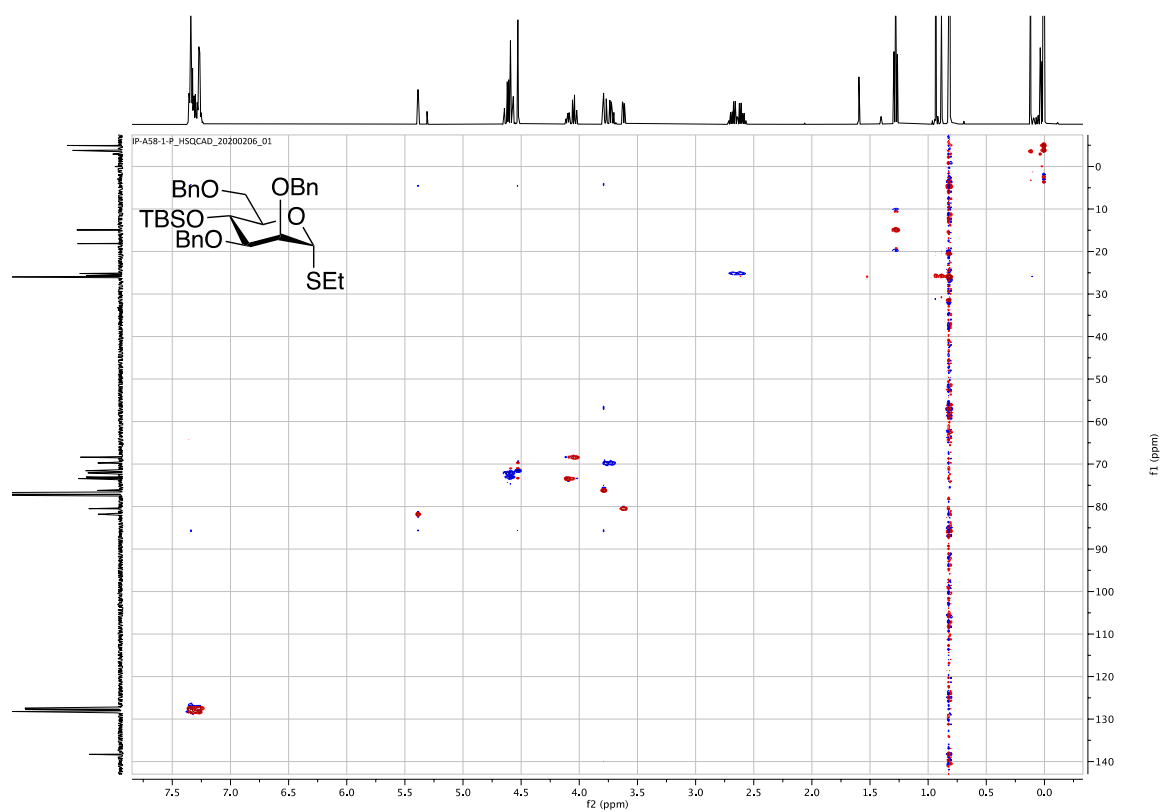
^{13}C NMR (126 MHz, Chloroform-*d*) S19



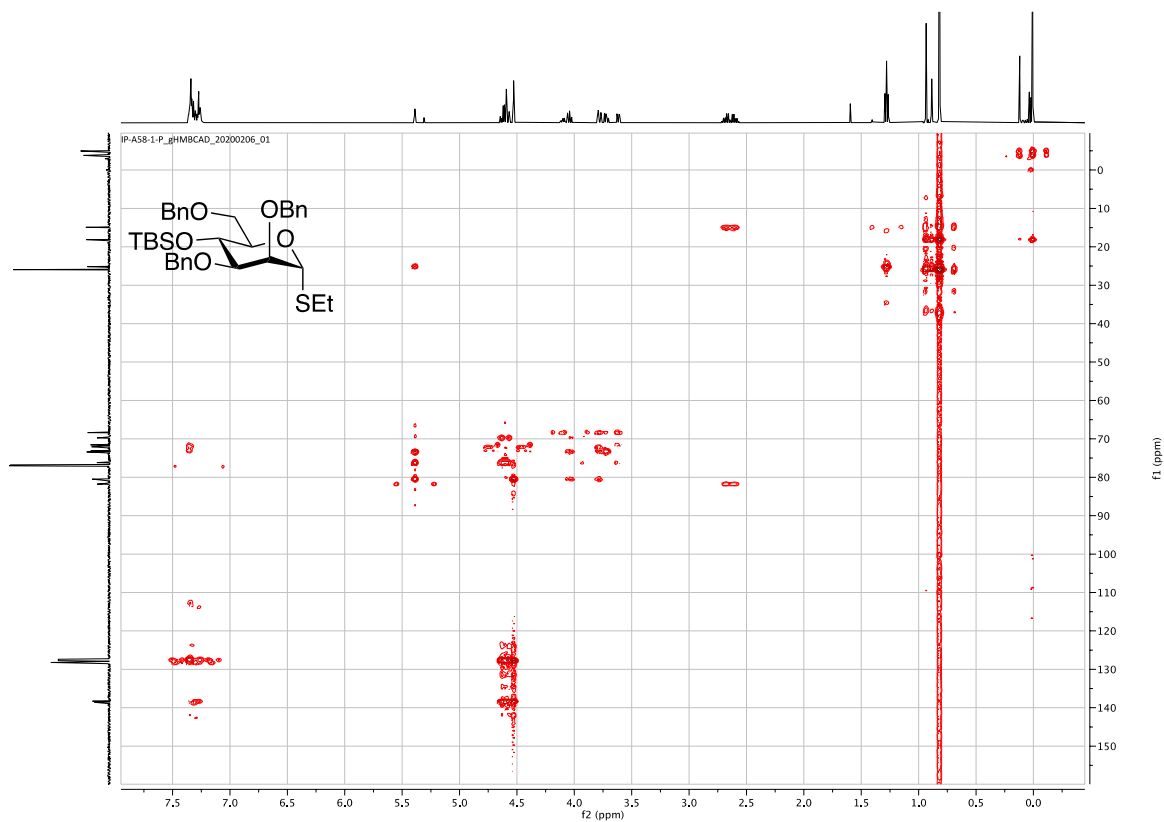
COSY NMR (500 MHz, Chloroform-*d*) S19



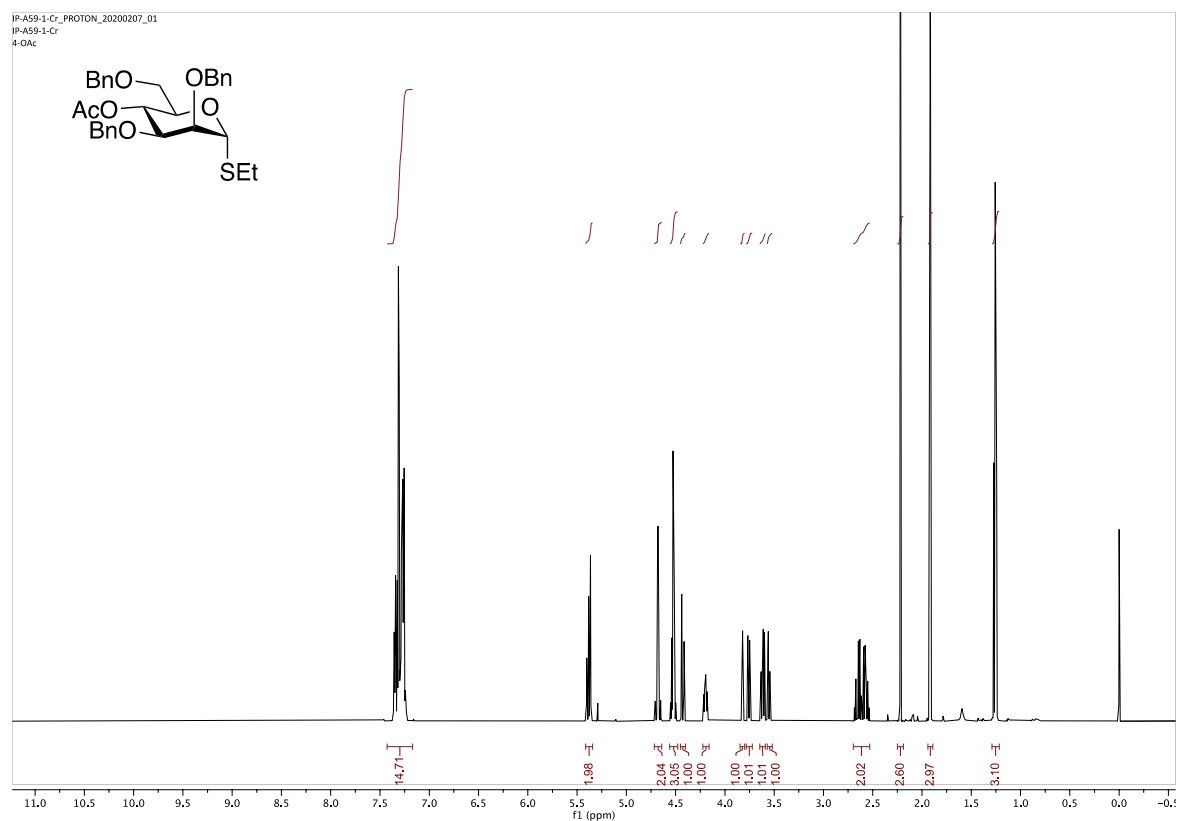
HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) S19



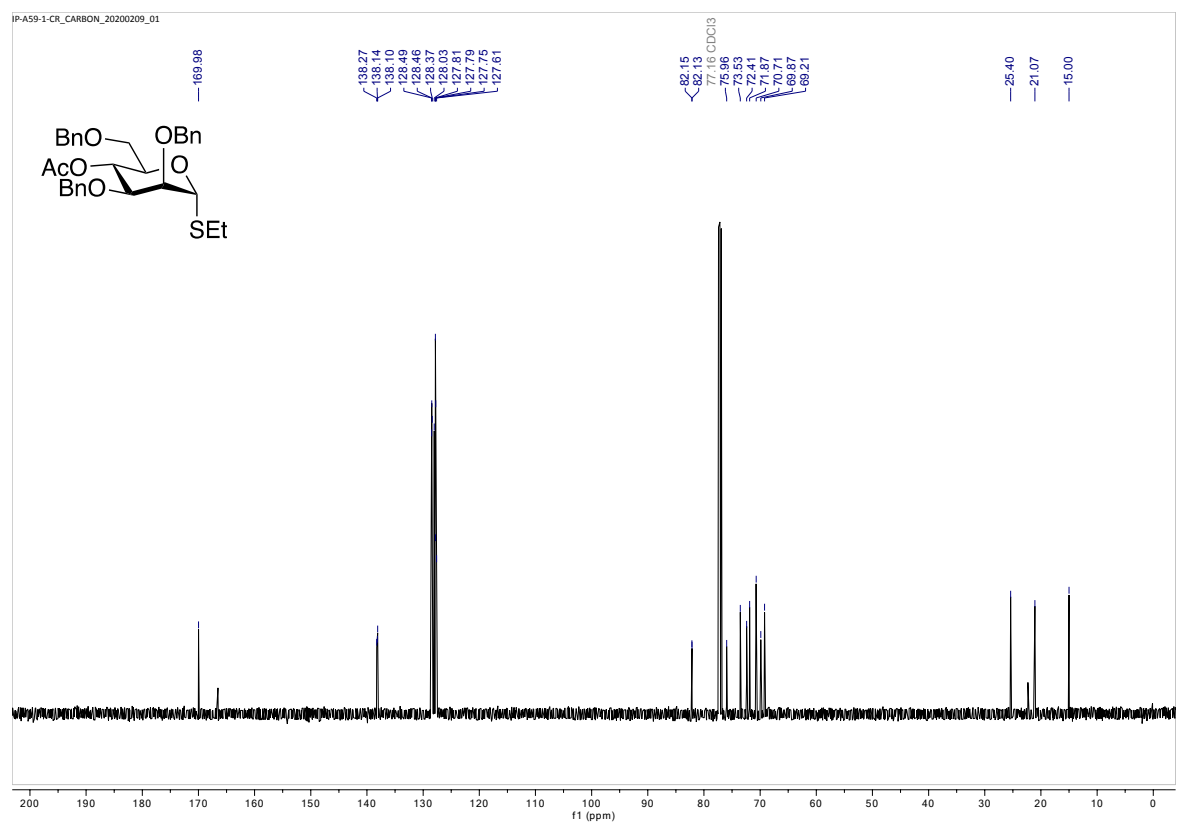
HMBC NMR (500 MHz x 126 MHz, Chloroform-*d*) S19



¹H NMR (500 MHz, Chloroform-*d*) S21



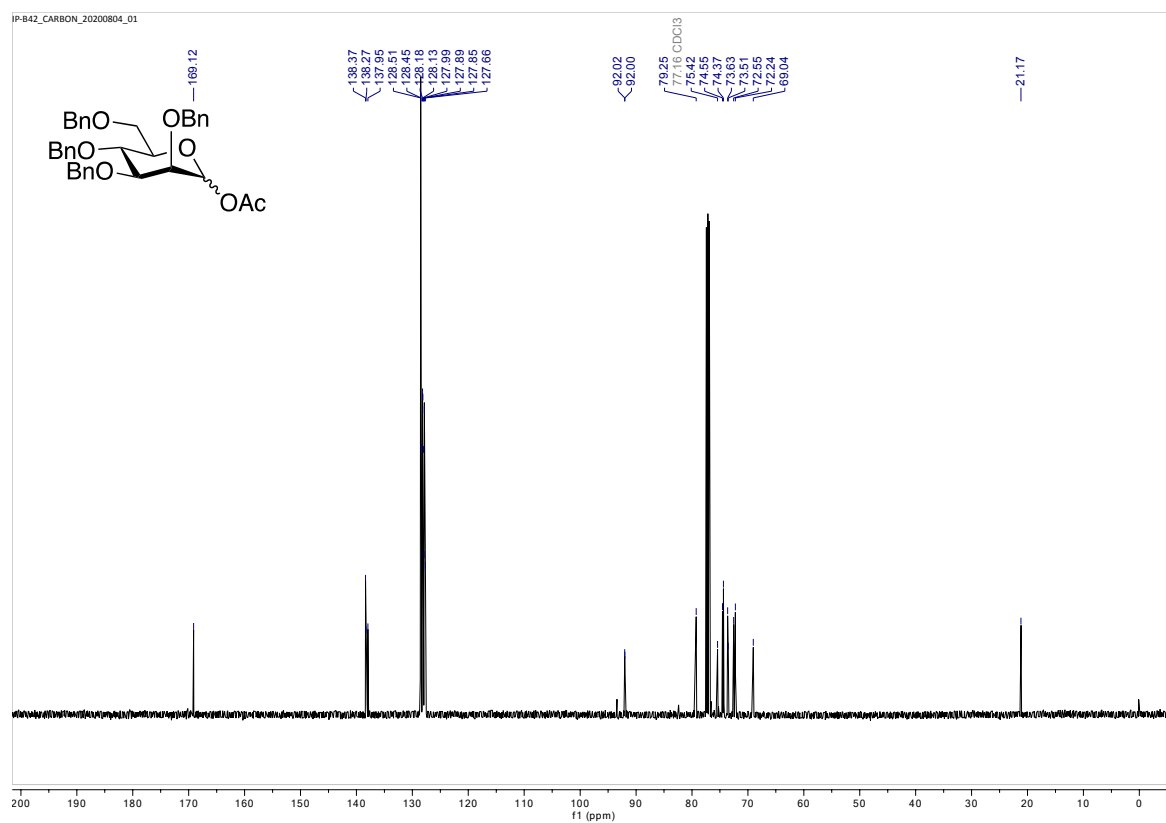
¹³C NMR (126 MHz, Chloroform-*d*) S21



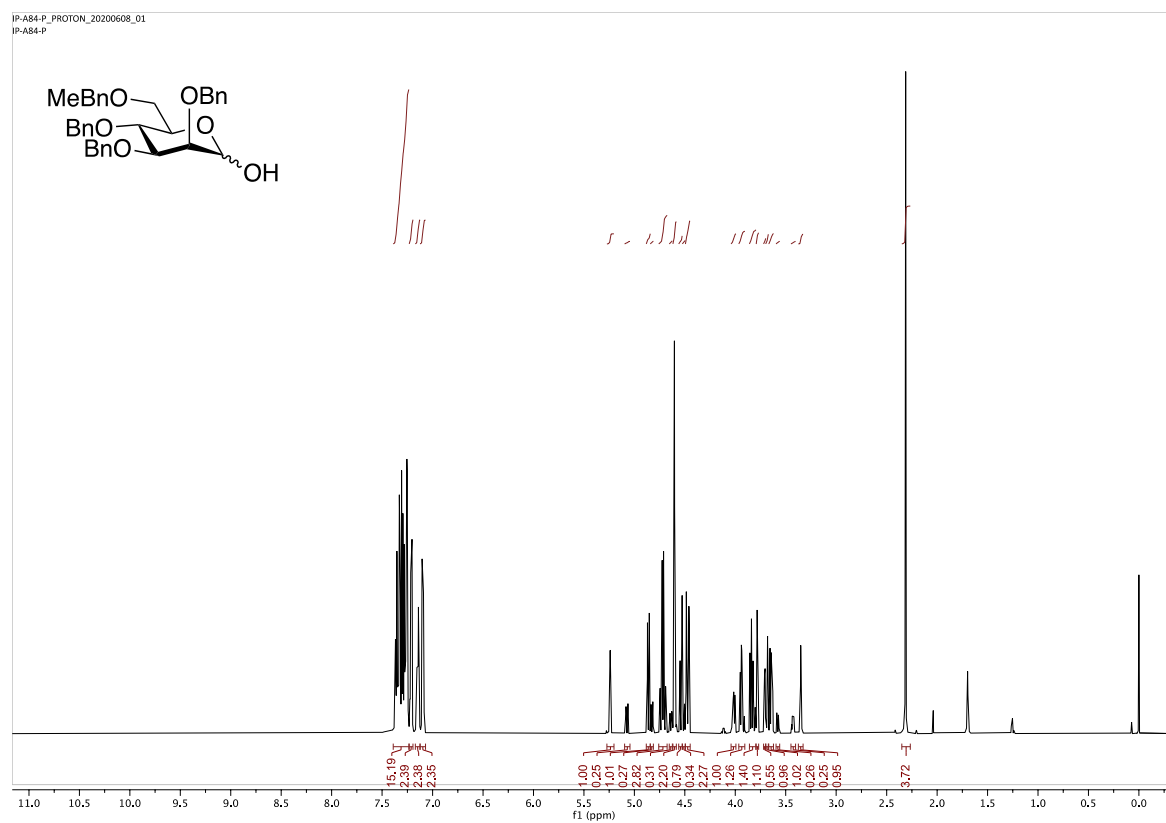
IP-A47-2-E2 PROTON 20200127 01



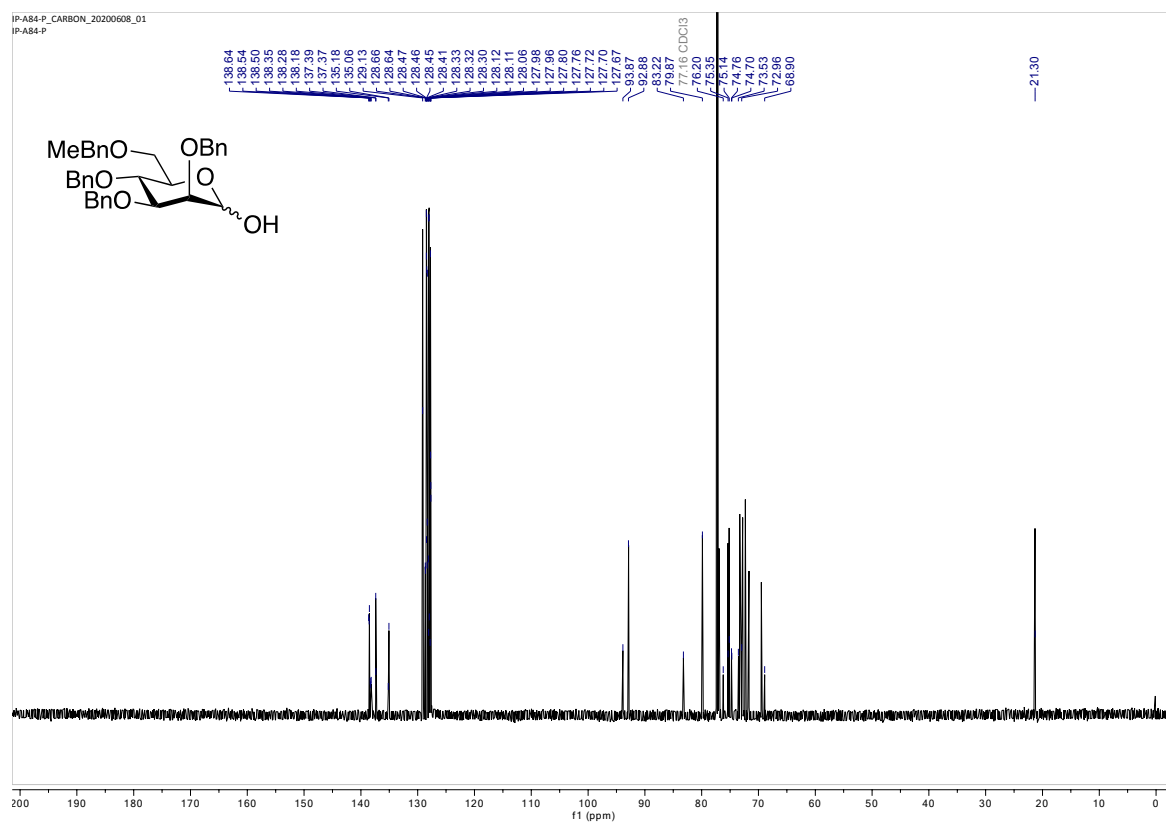
^{13}C NMR (126 MHz, Chloroform-*d*) 8a



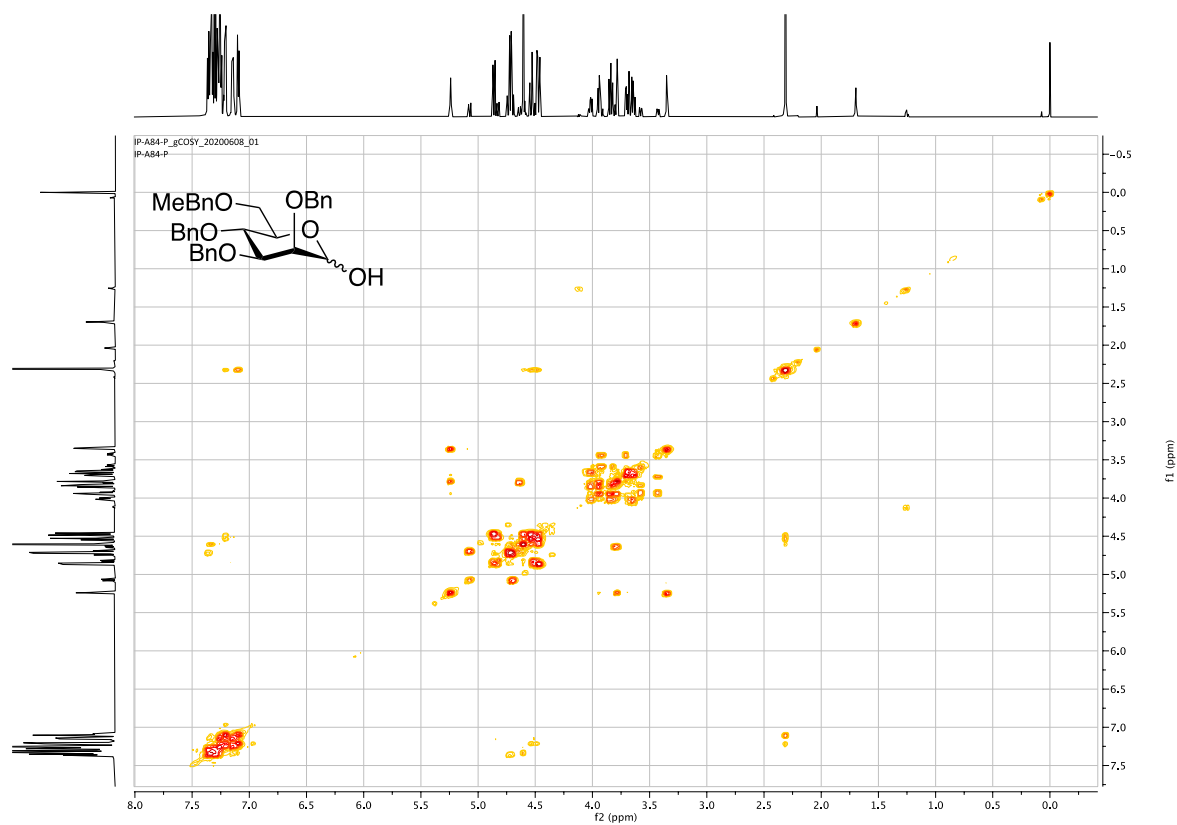
^1H NMR (600 MHz, Chloroform-*d*) 1b



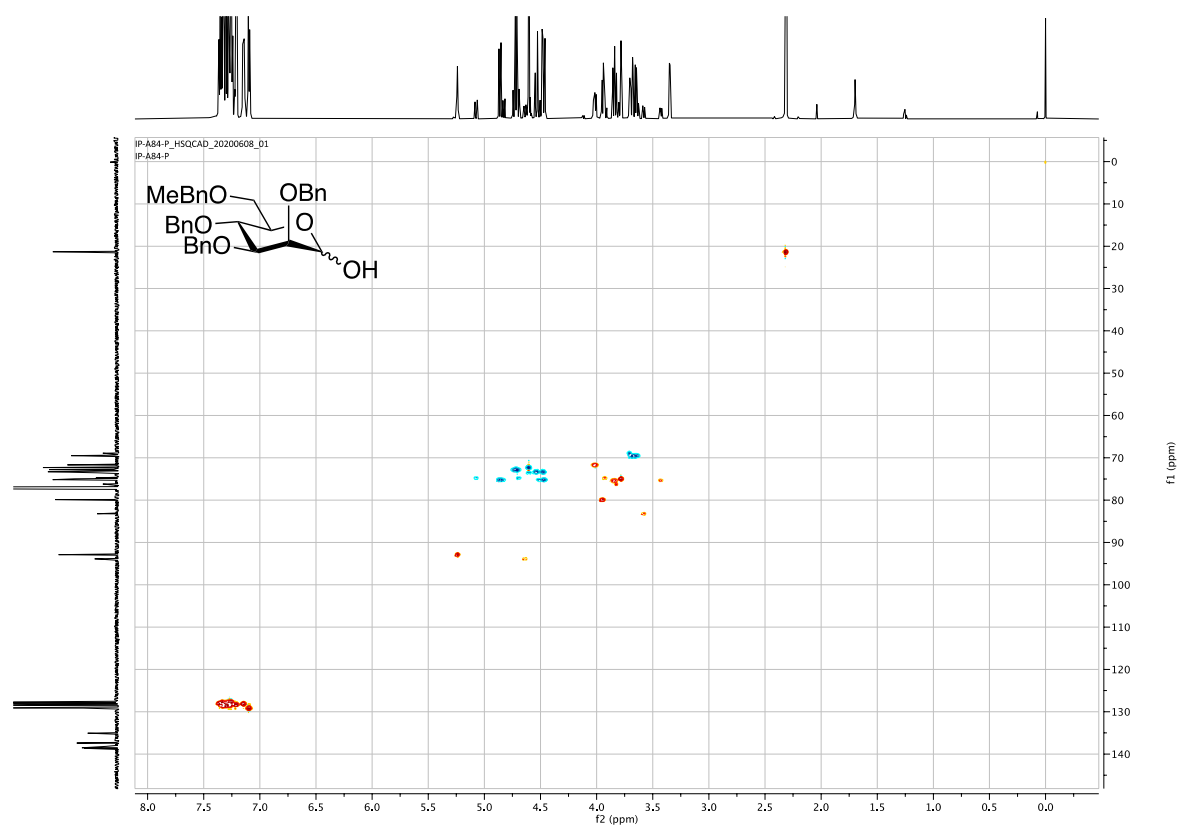
^{13}C NMR (151 MHz, Chloroform-*d*) 1b



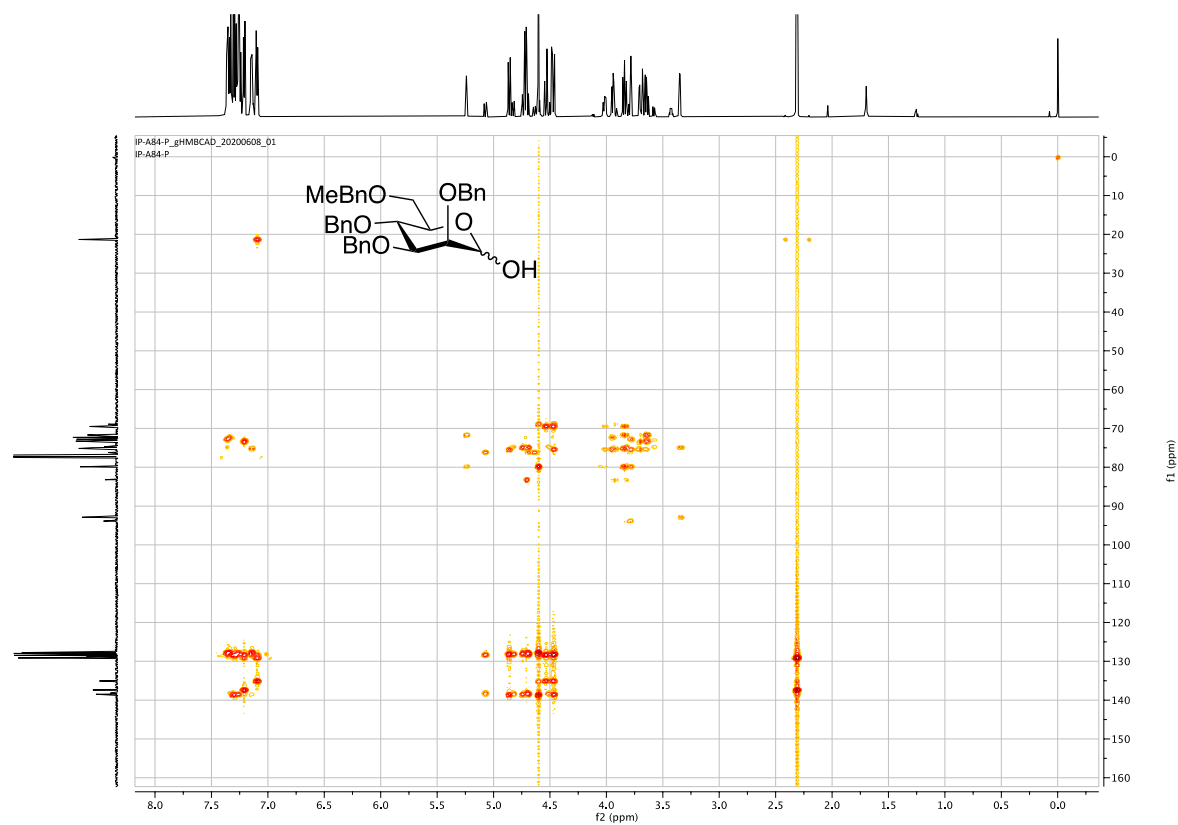
COSY NMR (600 MHz, Chloroform-*d*) 1b



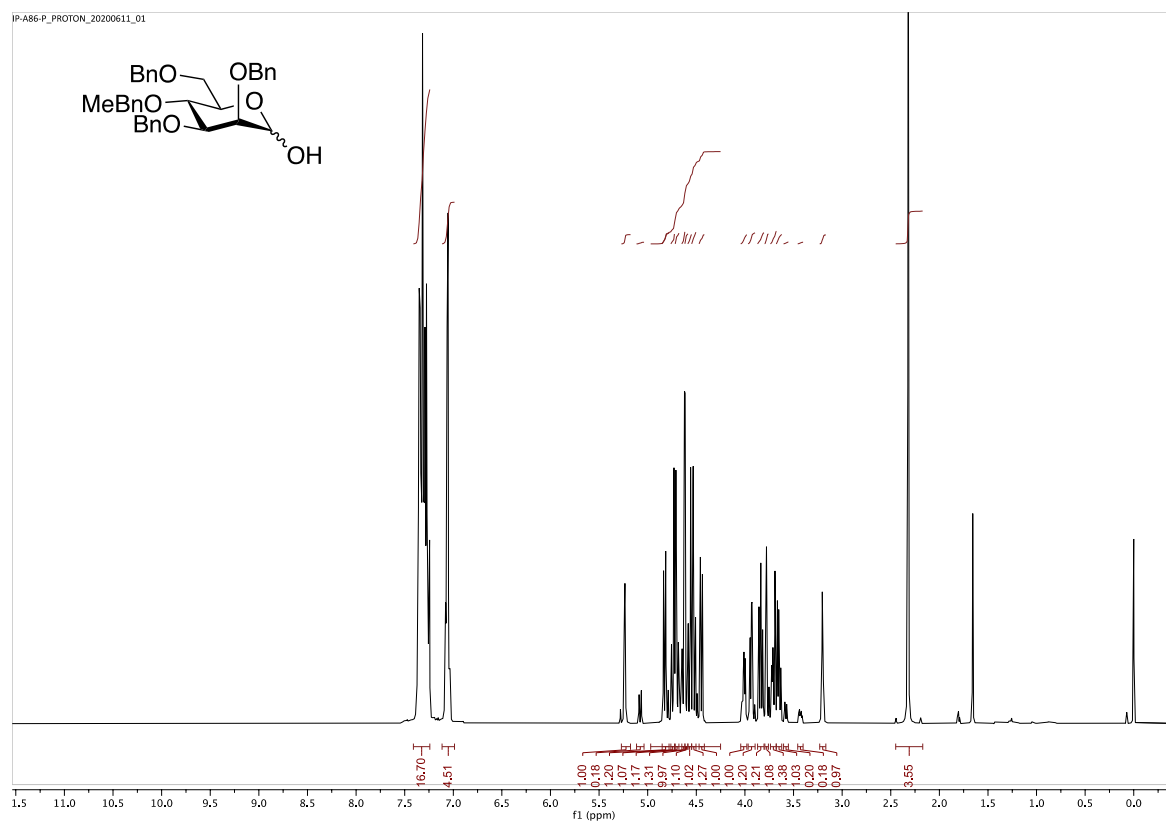
HSQC NMR (600 MHz x 151 MHz, Chloroform-*d*) 1b



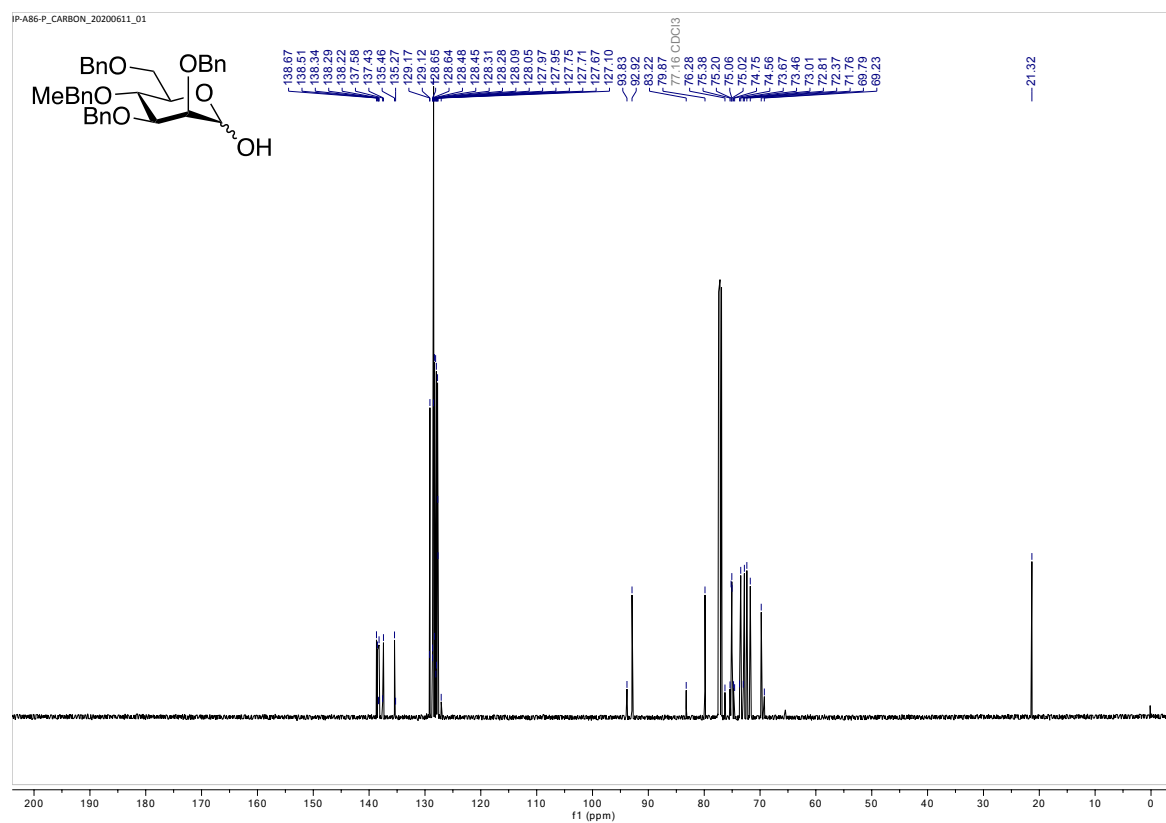
HMBC NMR (600 MHz x 151 MHz, Chloroform-*d*) 1b



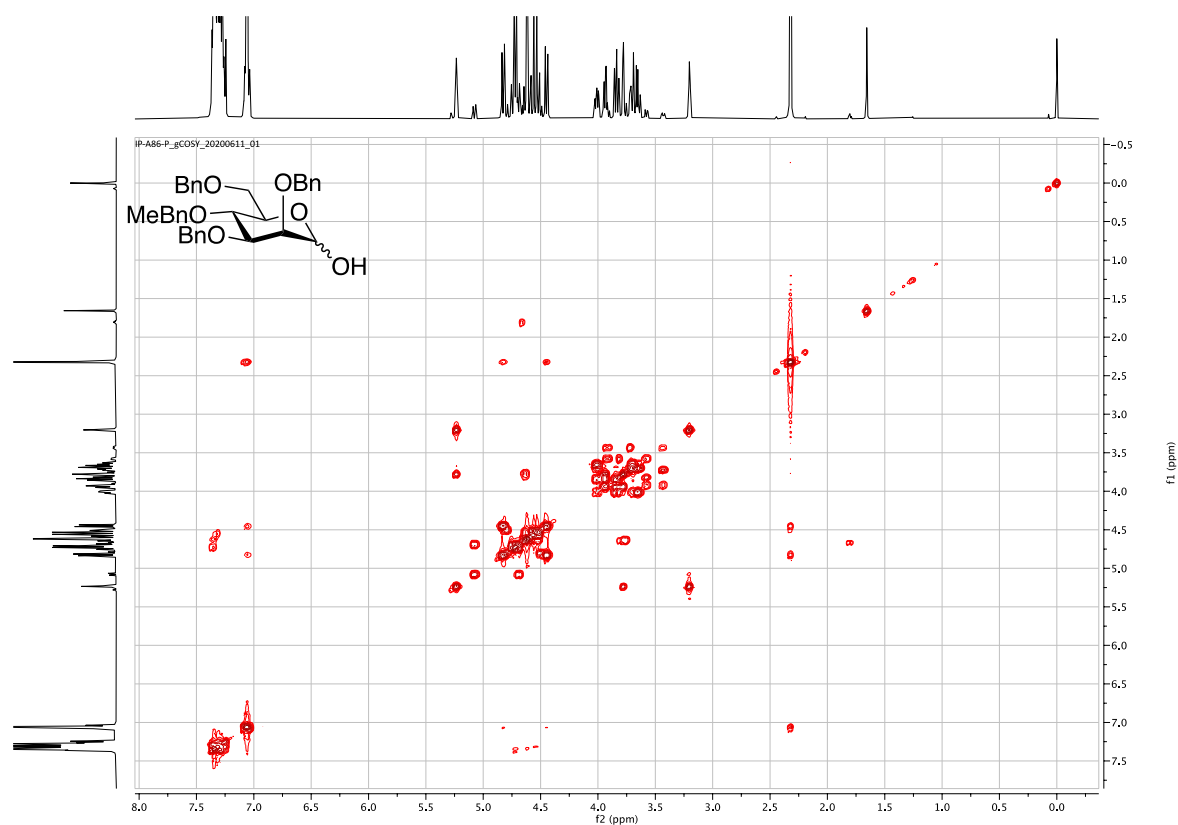
¹H NMR (500 MHz, Chloroform-*d*) 1c



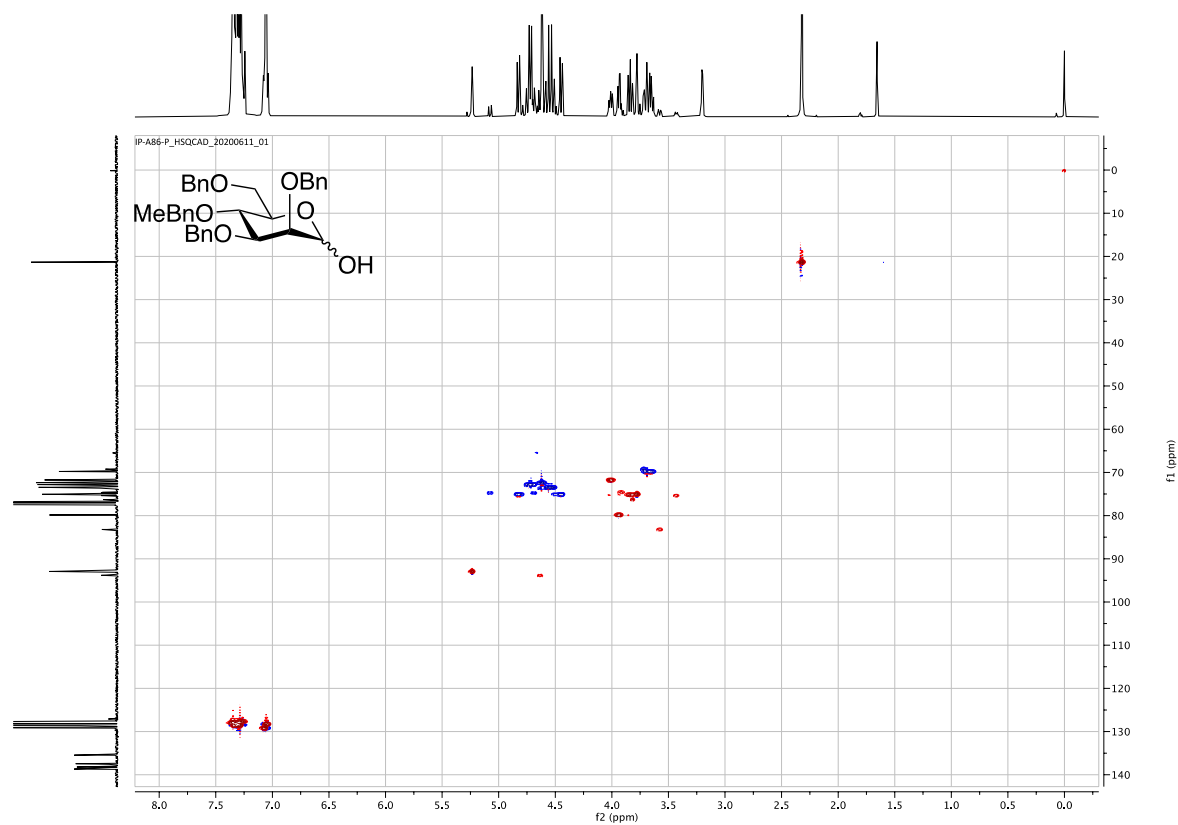
¹³C NMR (126 MHz, Chloroform-*d*) 1c



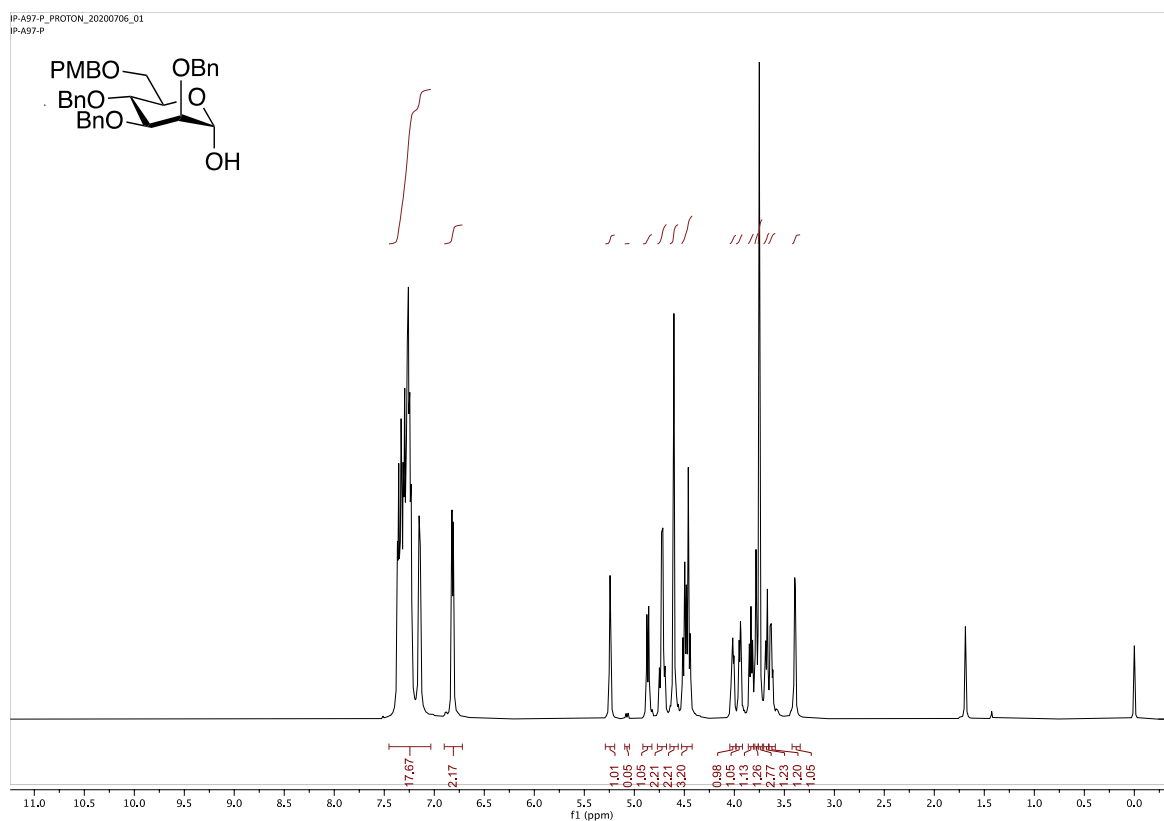
COSY NMR (500 MHz, Chloroform-*d*) 1c



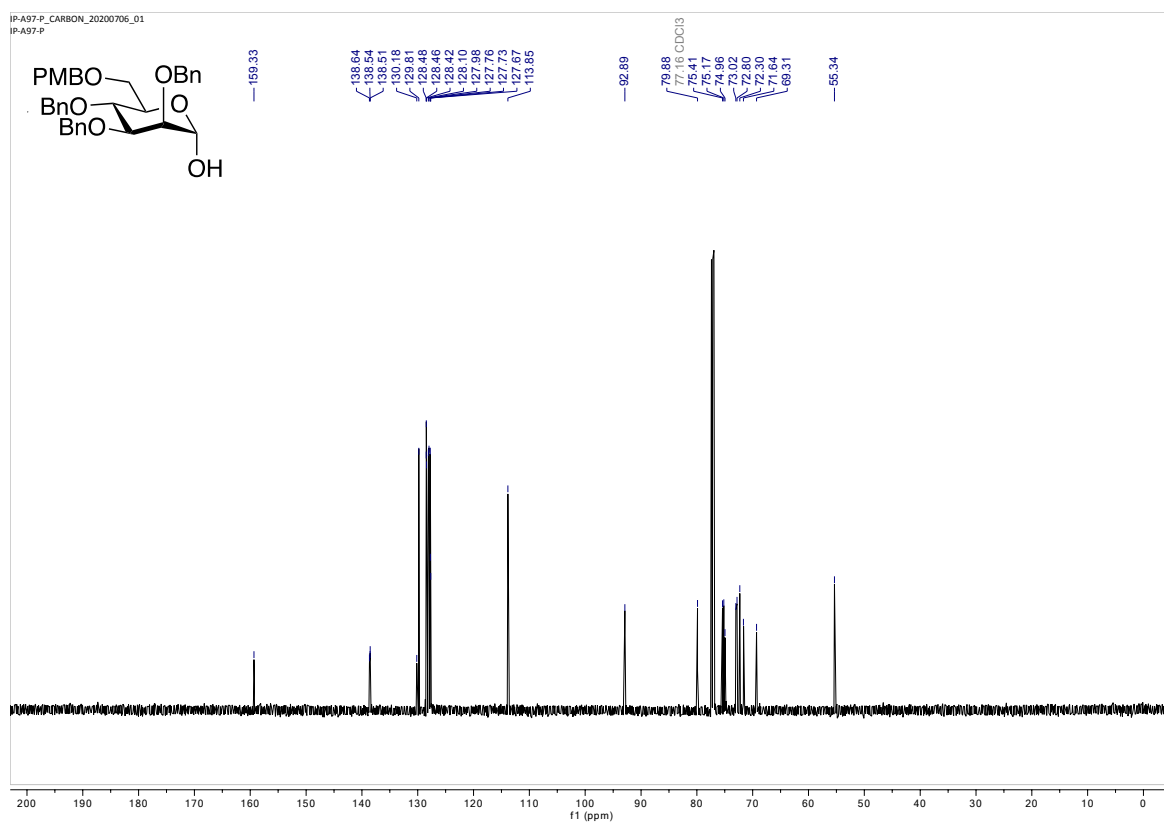
HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) 1c



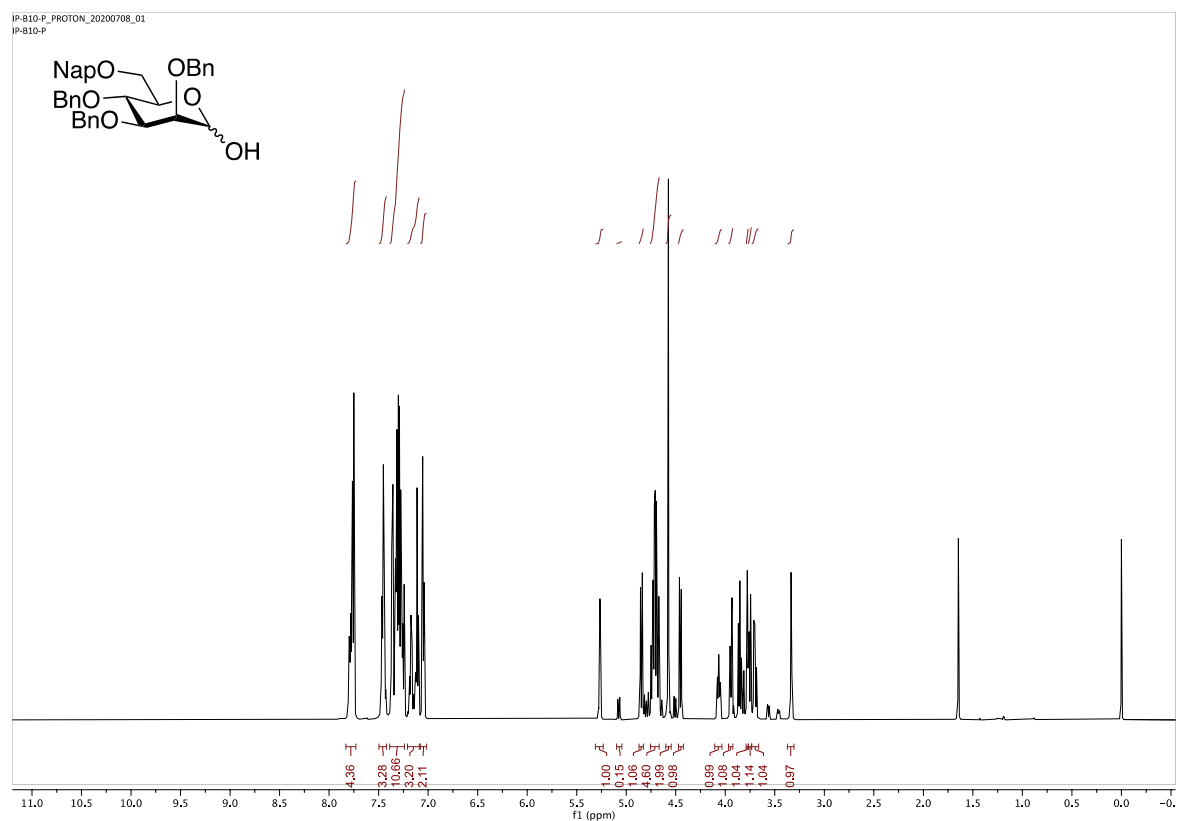
¹H NMR (600 MHz, Chloroform-*d*) 1d



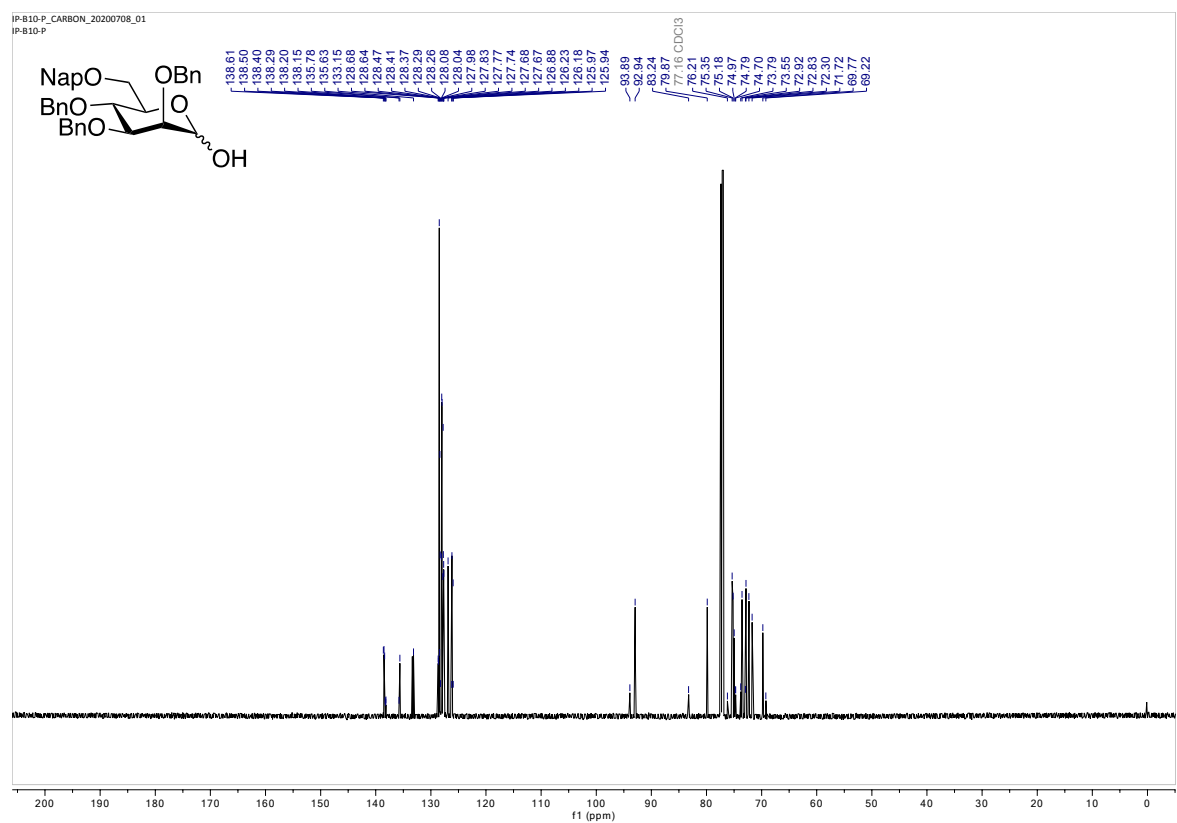
¹³C NMR (151 MHz, Chloroform-*d*) 1d



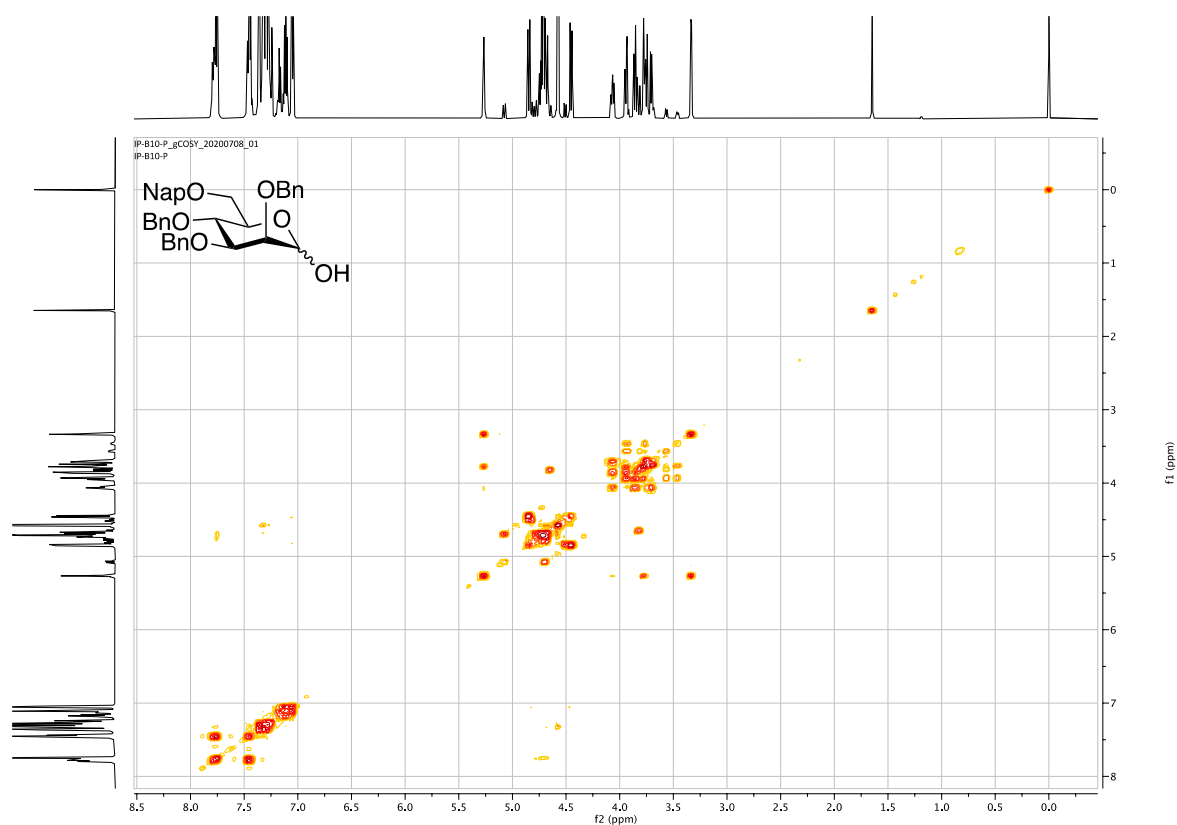
¹H NMR (600 MHz, Chloroform-*d*) 1e



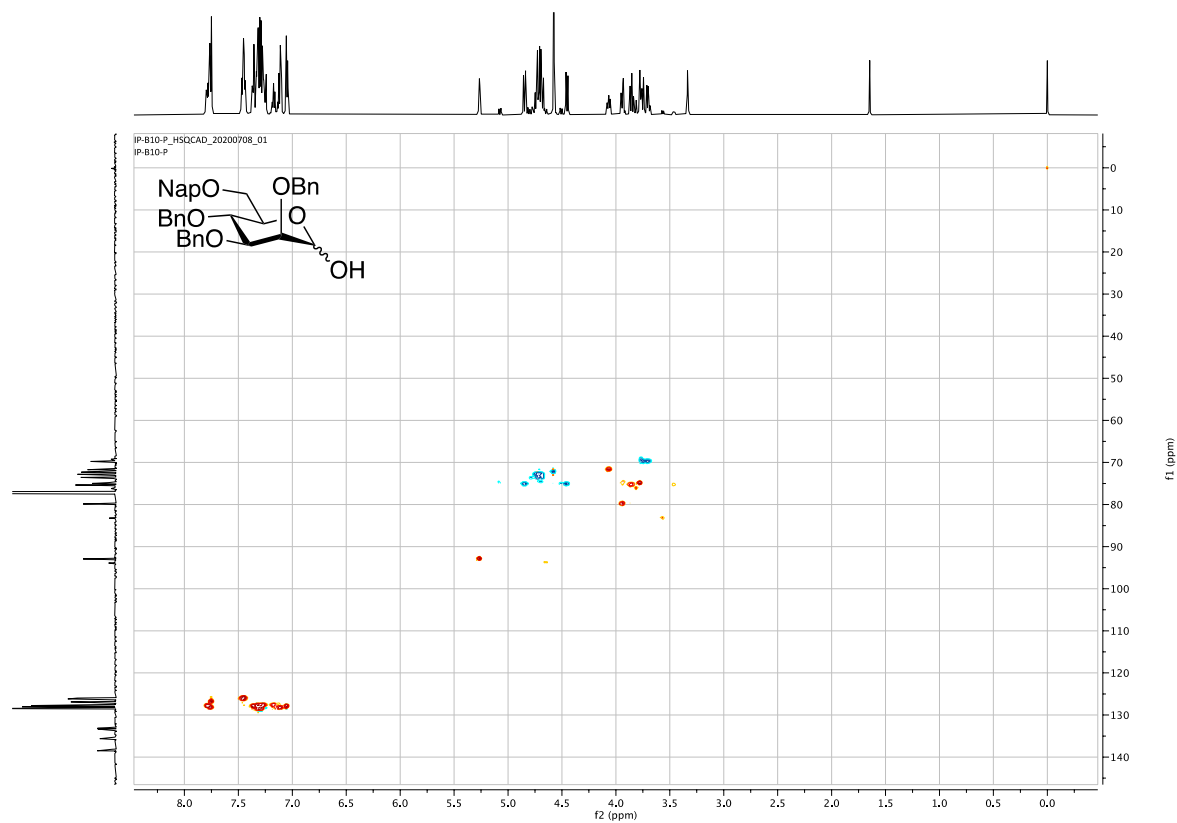
¹³C NMR (151 MHz, Chloroform-*d*) 1e



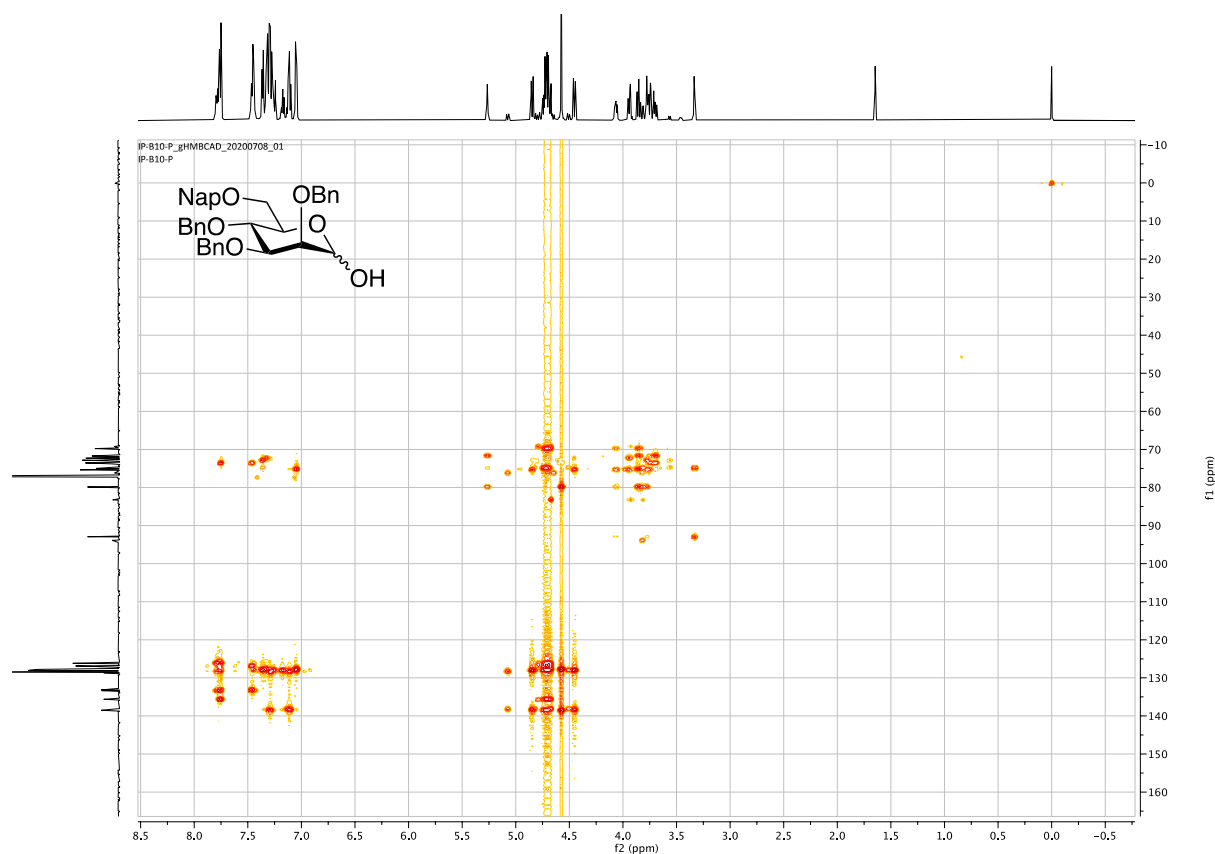
COSY NMR (600 MHz, Chloroform-*d*) 1e



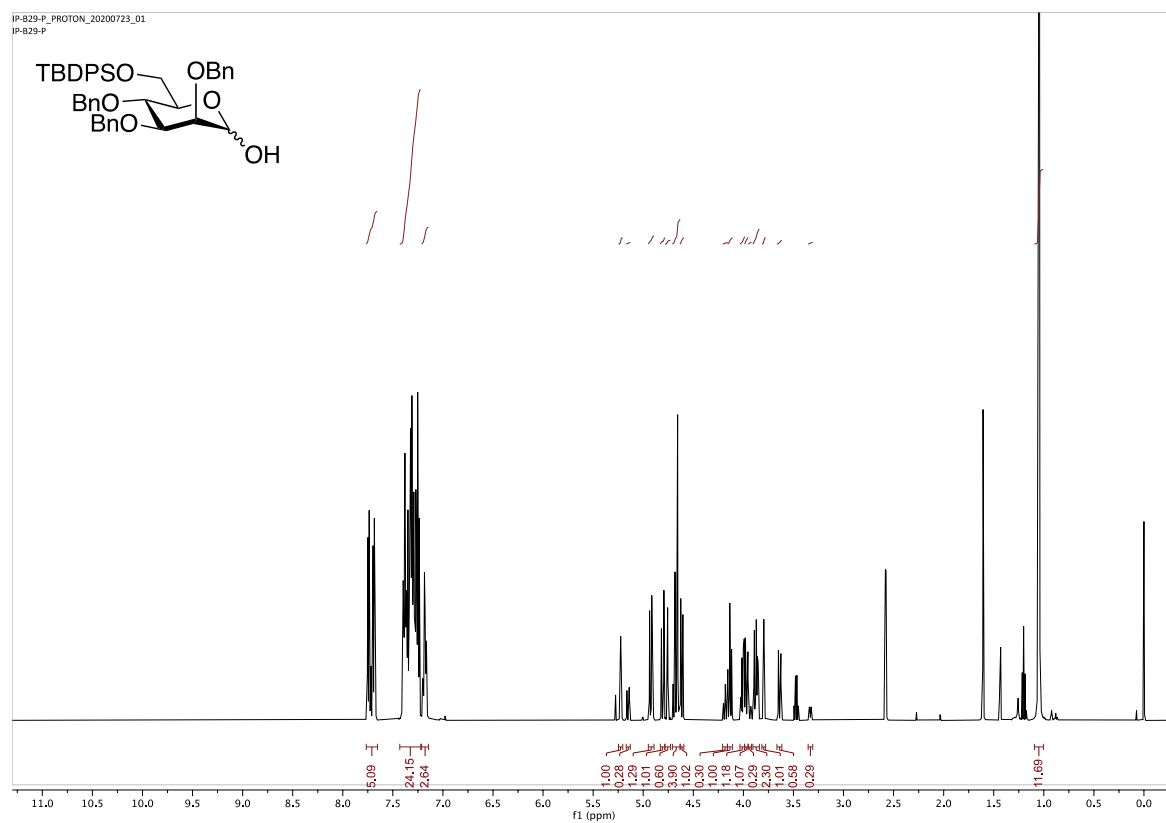
HSQC NMR (600 MHz x 151 MHz, Chloroform-*d*) 1e



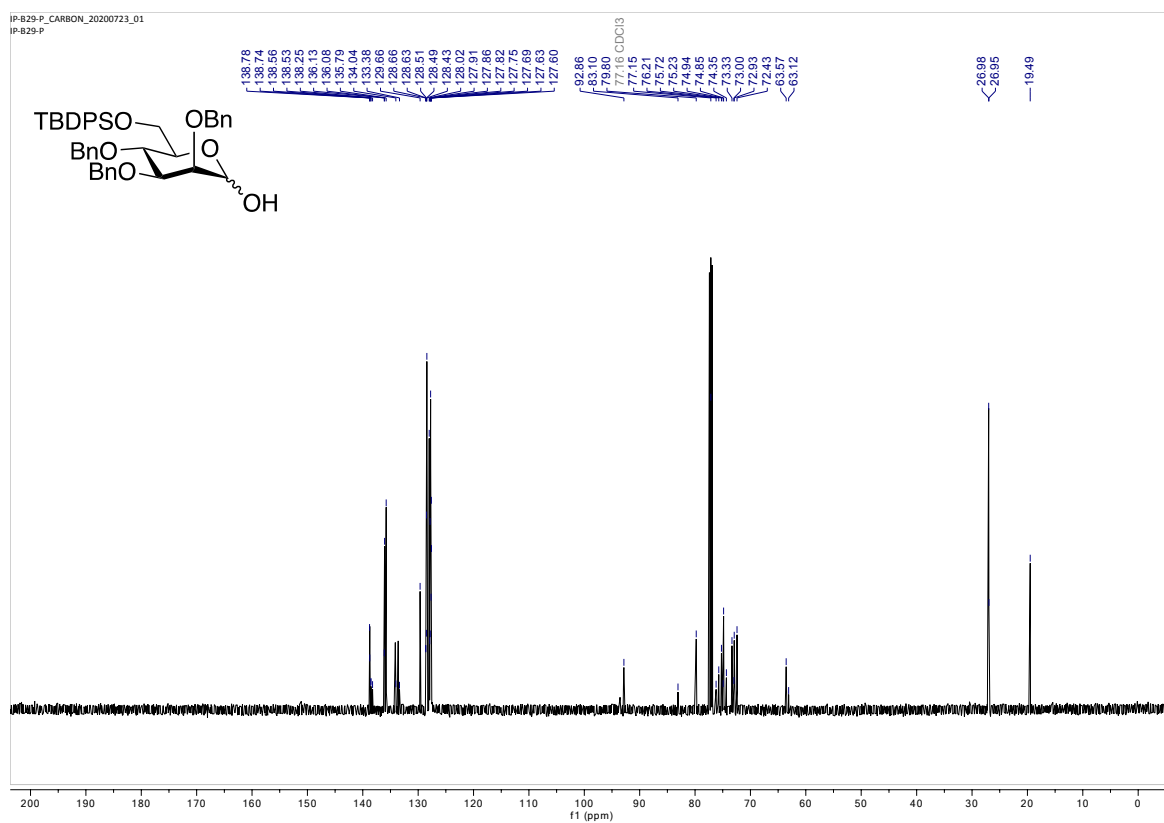
HMBC NMR (600 MHz x 151 MHz, Chloroform-*d*) 1e



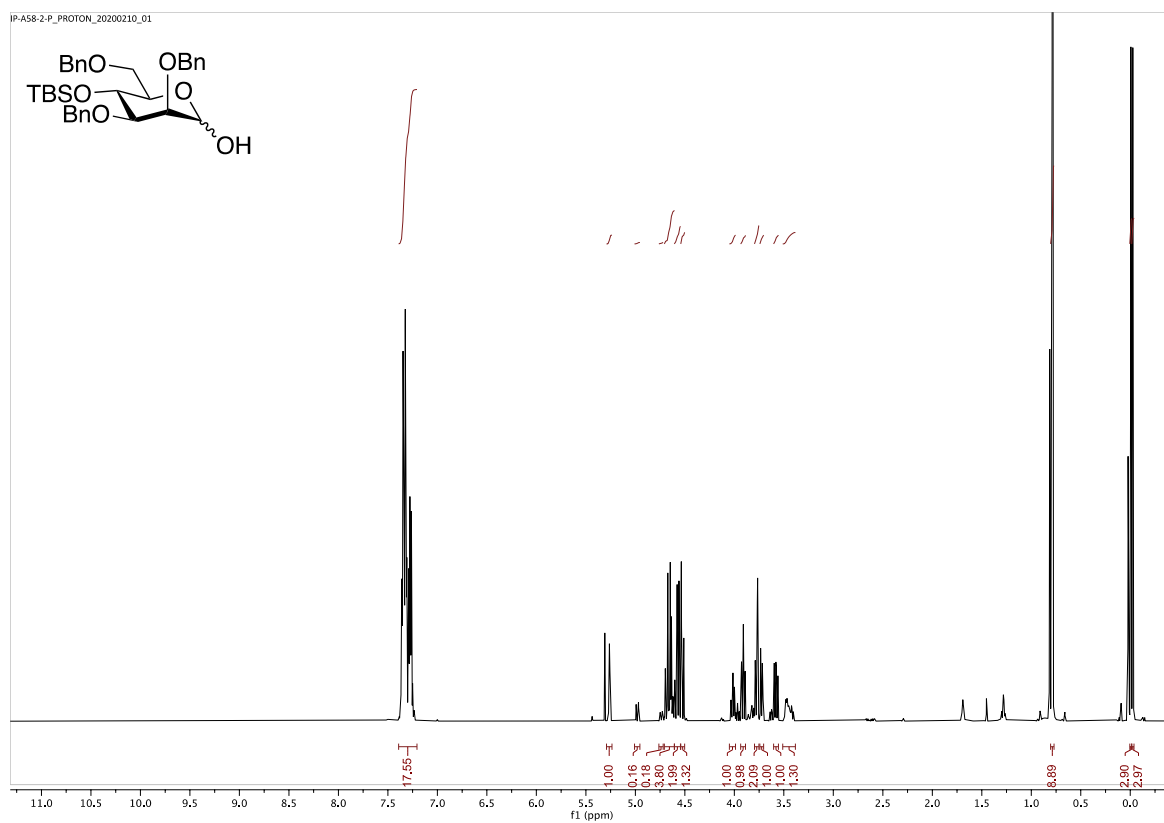
¹H NMR (500 MHz, Chloroform-*d*) 1f



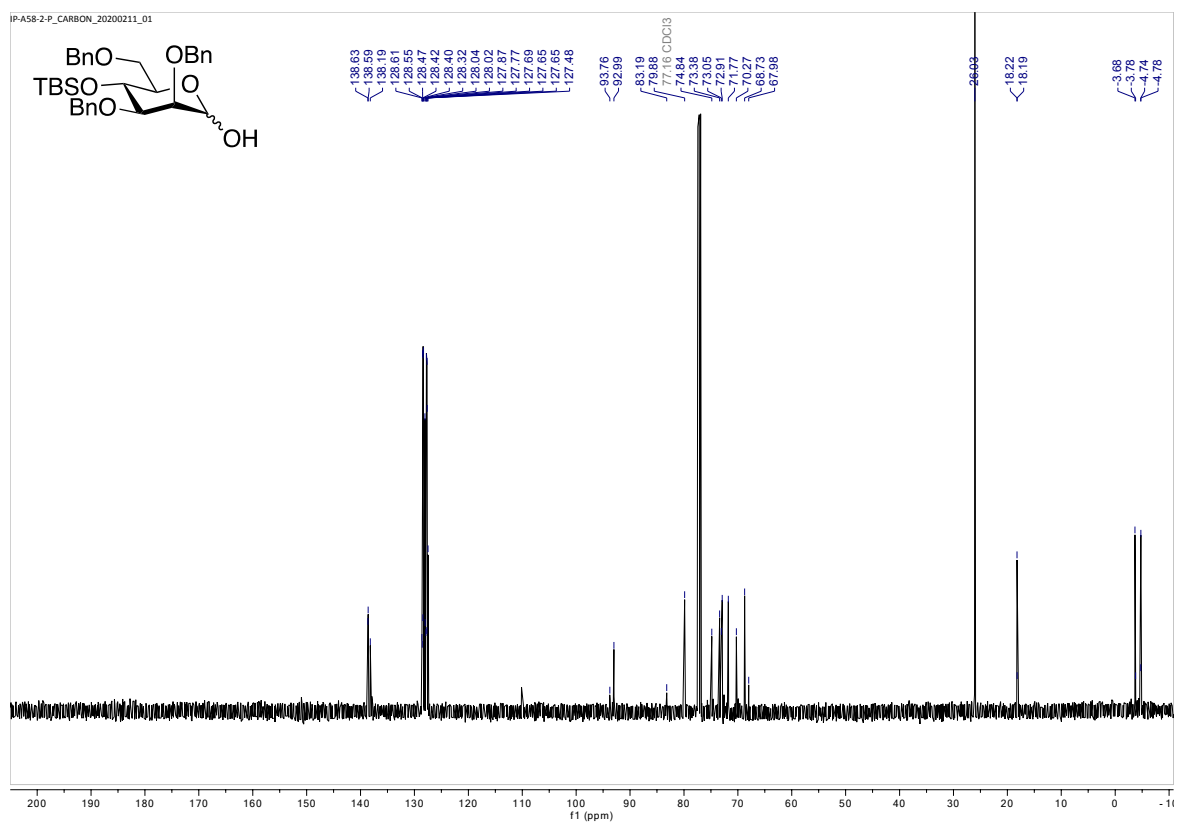
¹³C NMR (126 MHz, Chloroform-*d*) 1f



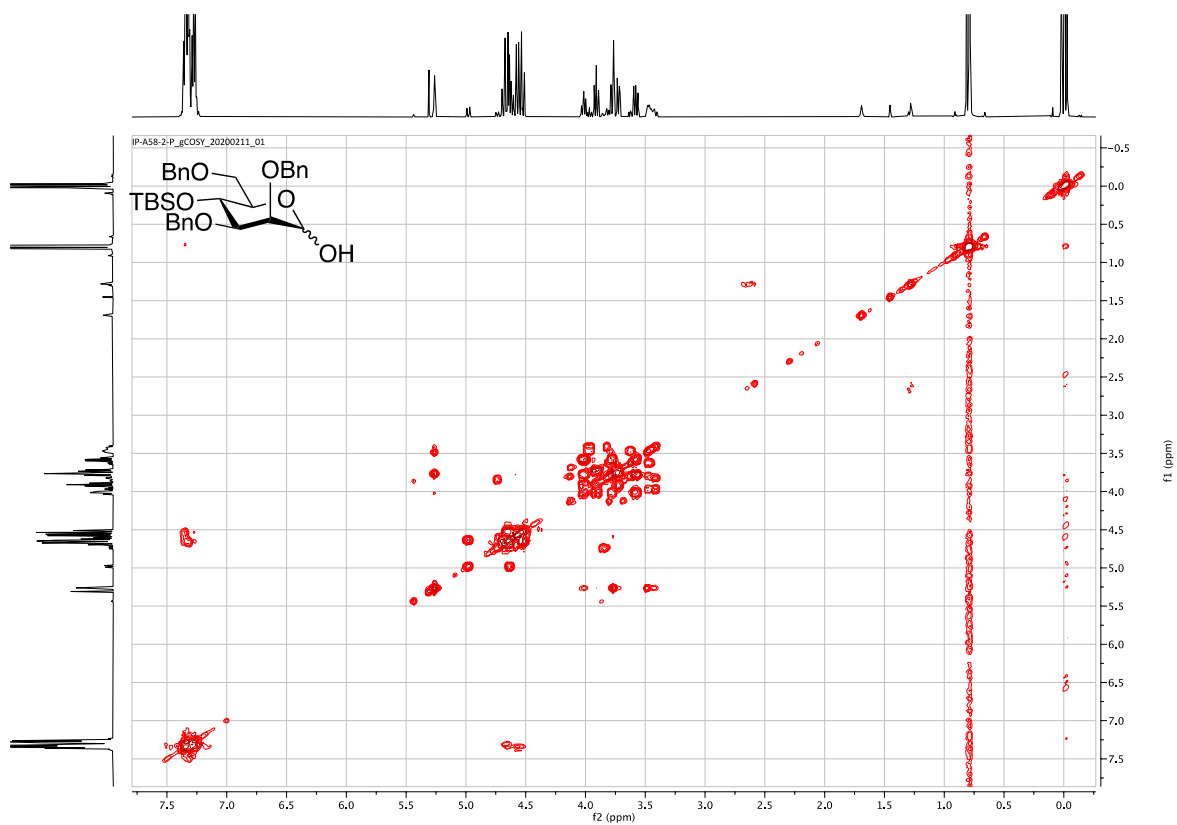
¹H NMR (500 MHz, Chloroform-*d*) 1g



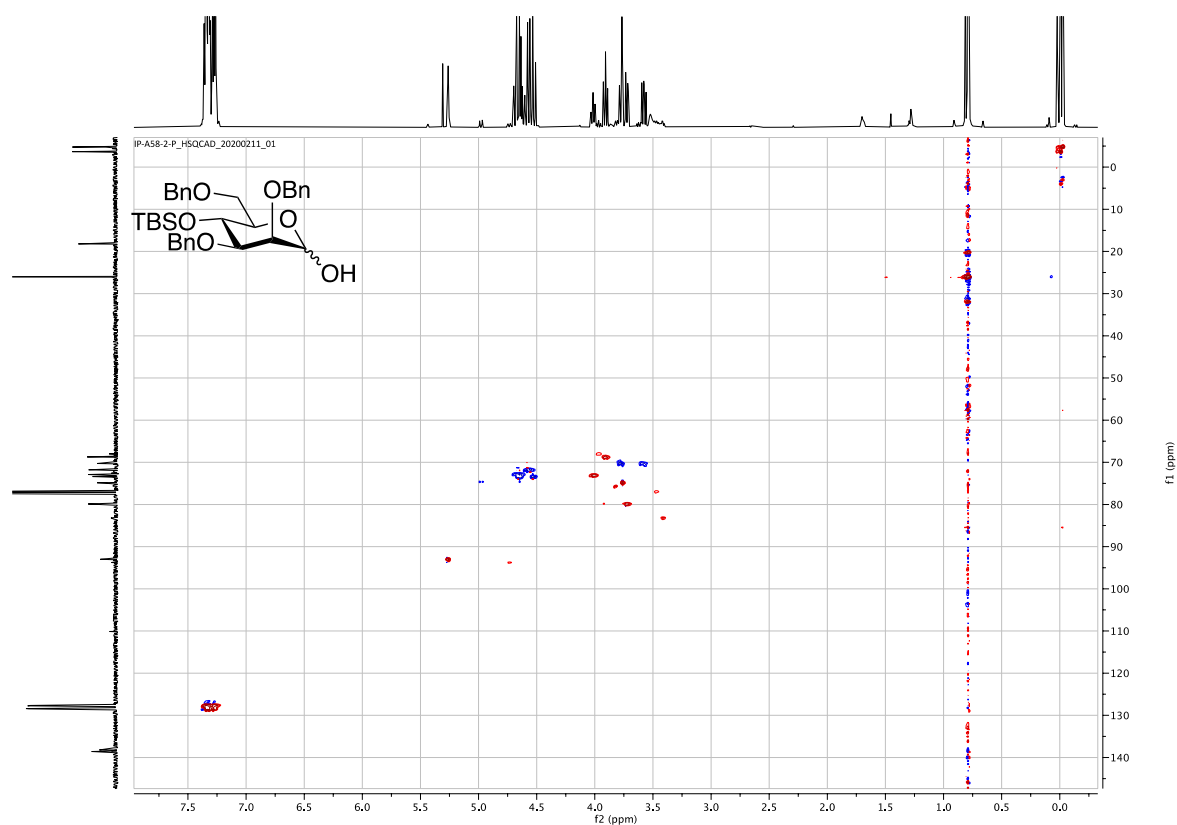
^{13}C NMR (126 MHz, Chloroform-*d*) 1g



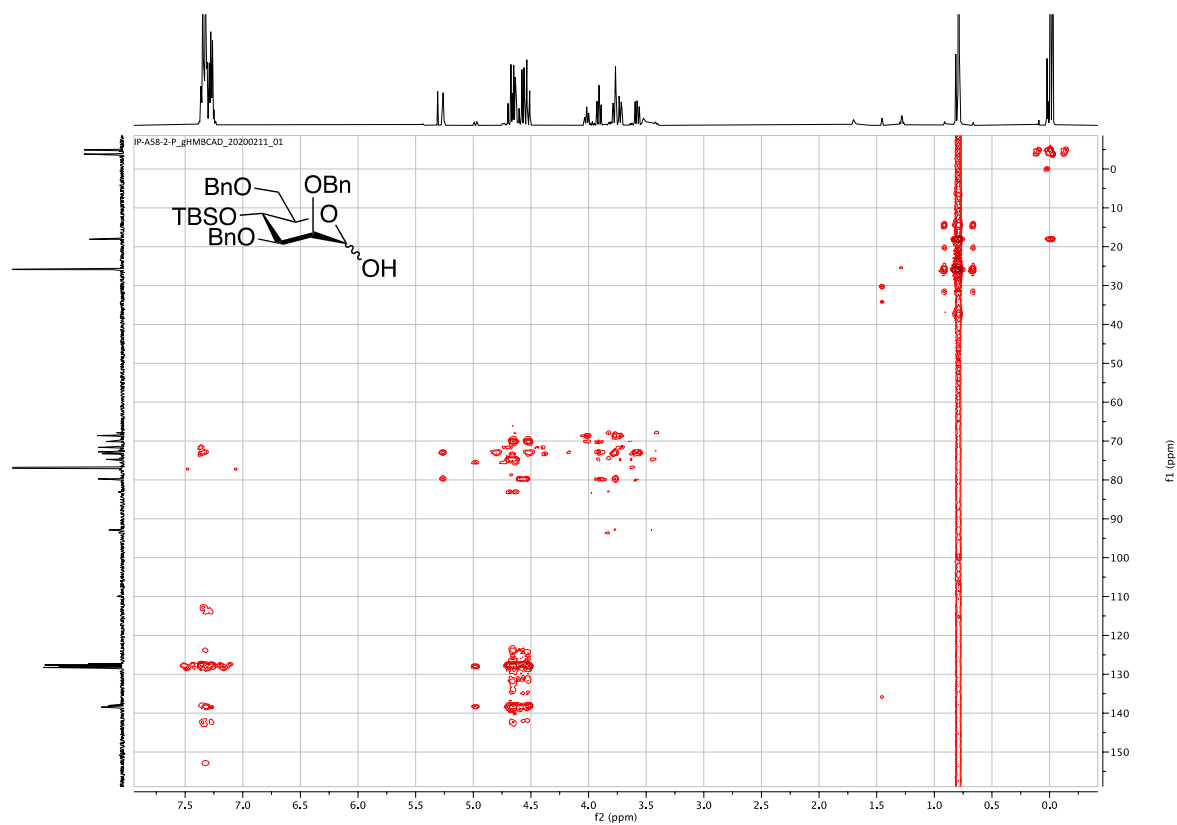
COSY NMR (500 MHz, Chloroform-*d*) 1g



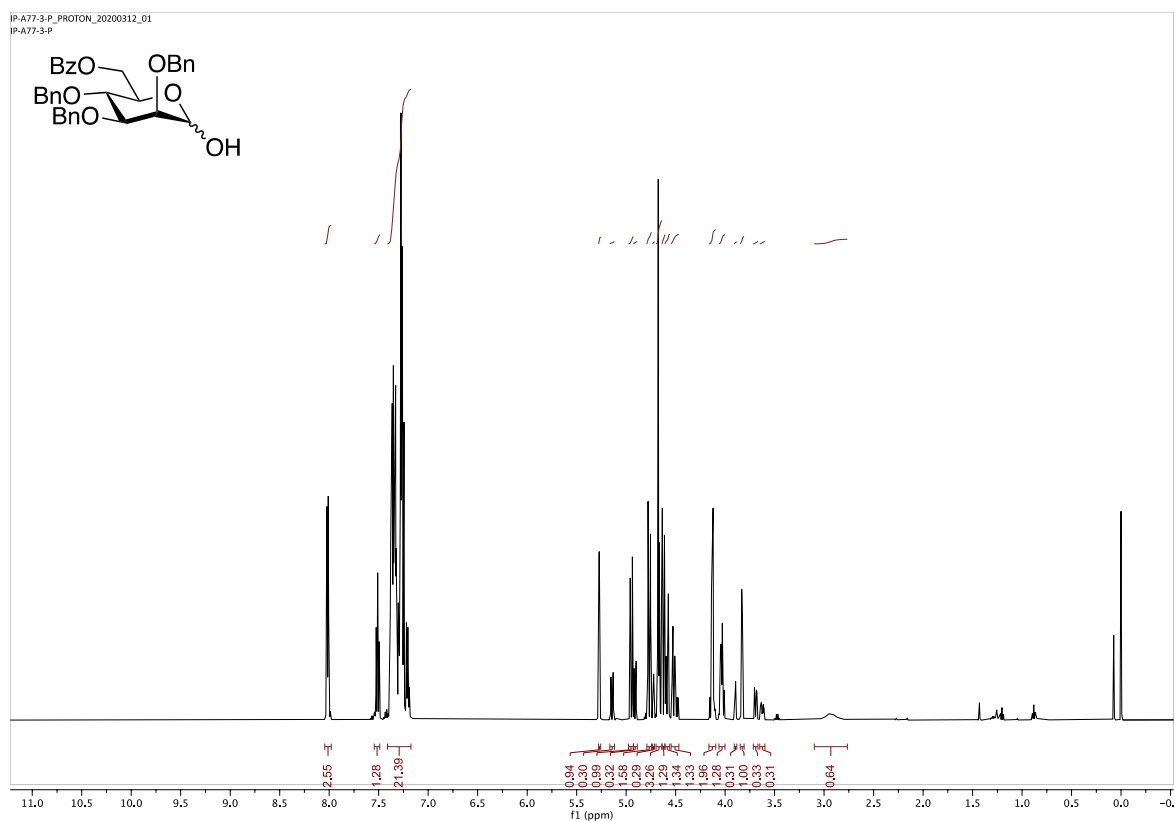
HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) 1g



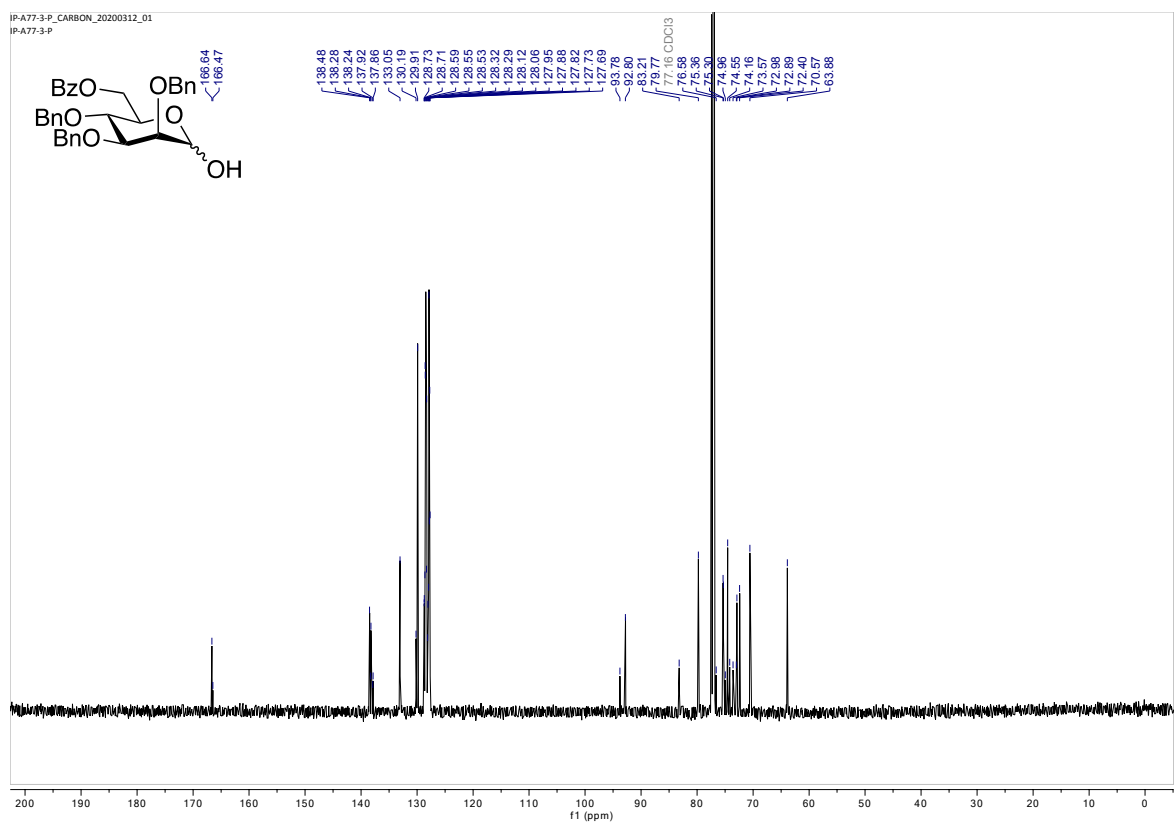
HMBC NMR (500 MHz x 126 MHz, Chloroform-*d*) 1g



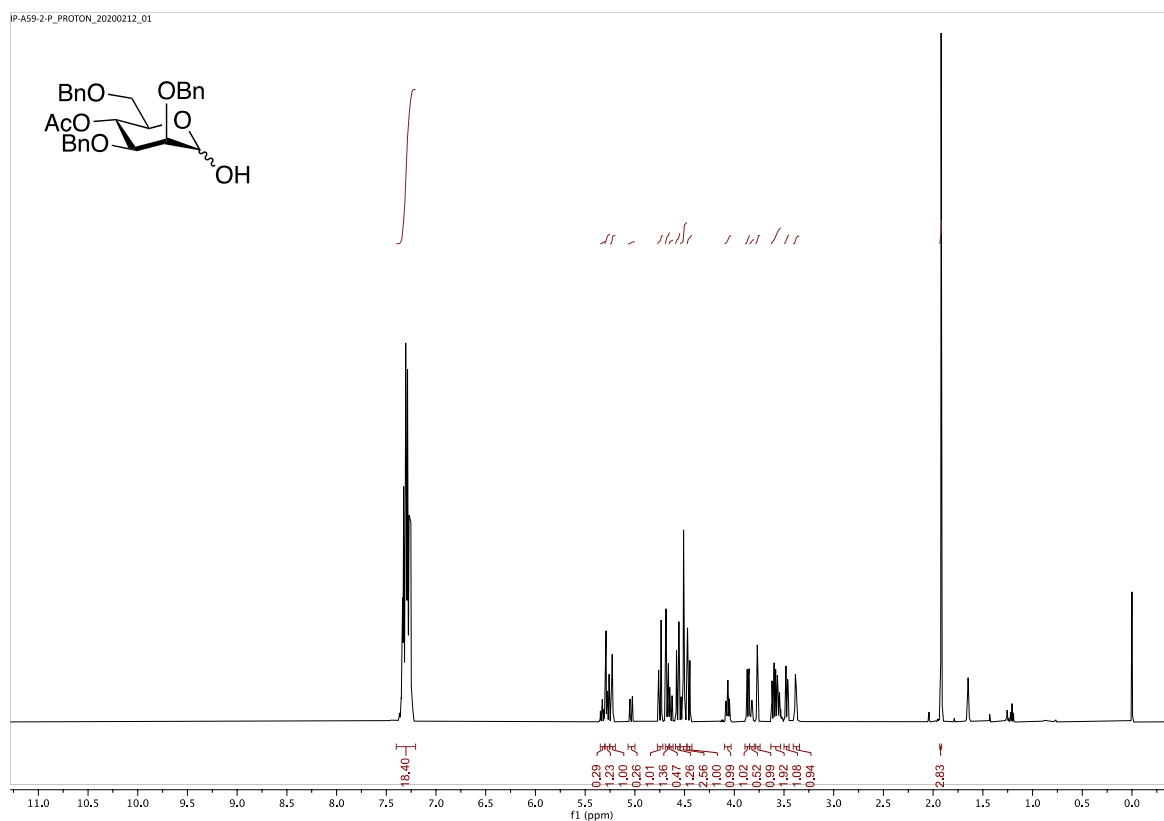
¹H NMR (500 MHz, Chloroform-*d*) 1h



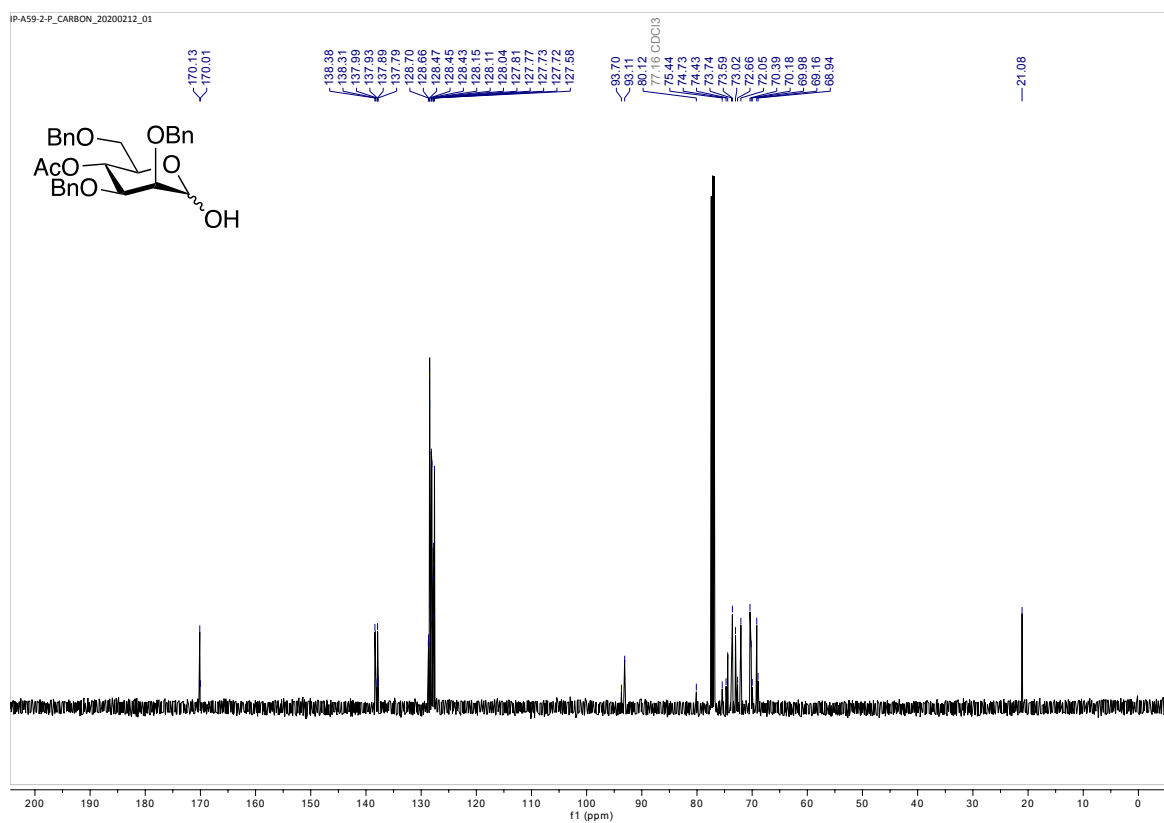
¹³C NMR (126 MHz, Chloroform-*d*) 1h



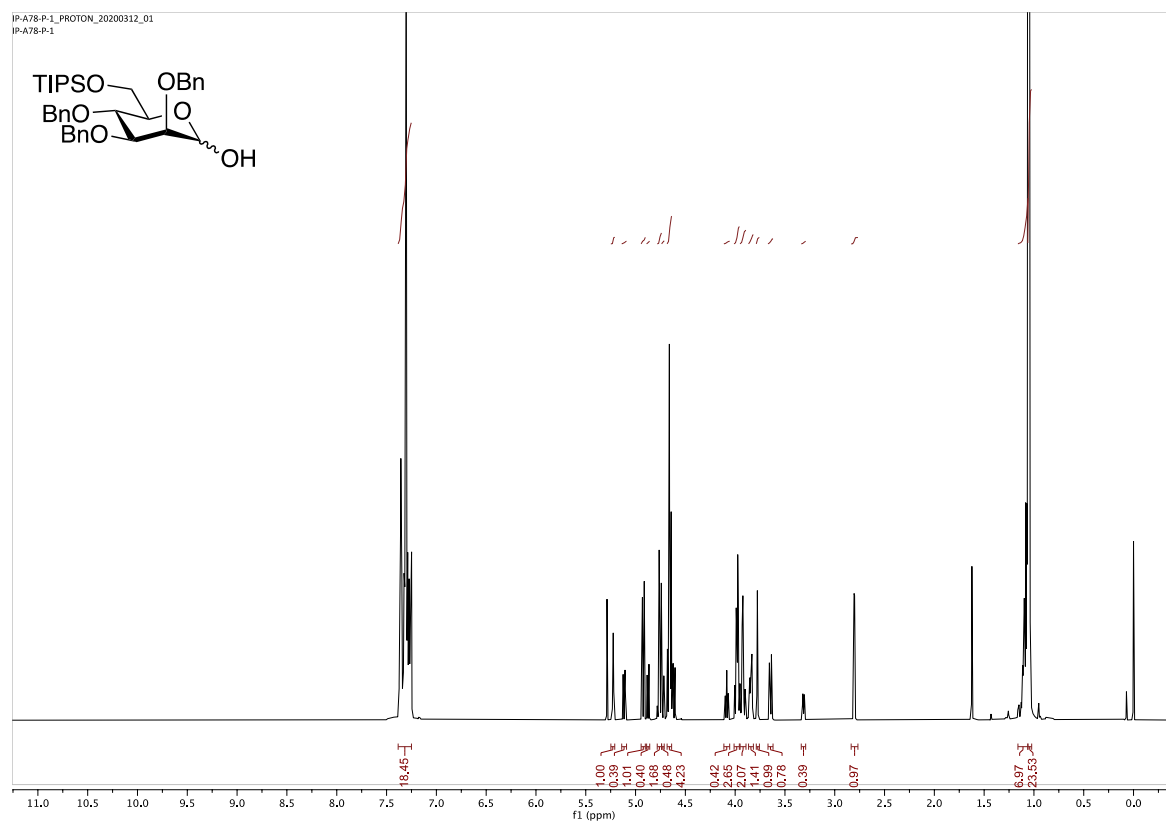
¹H NMR (500 MHz, Chloroform-*d*) S22



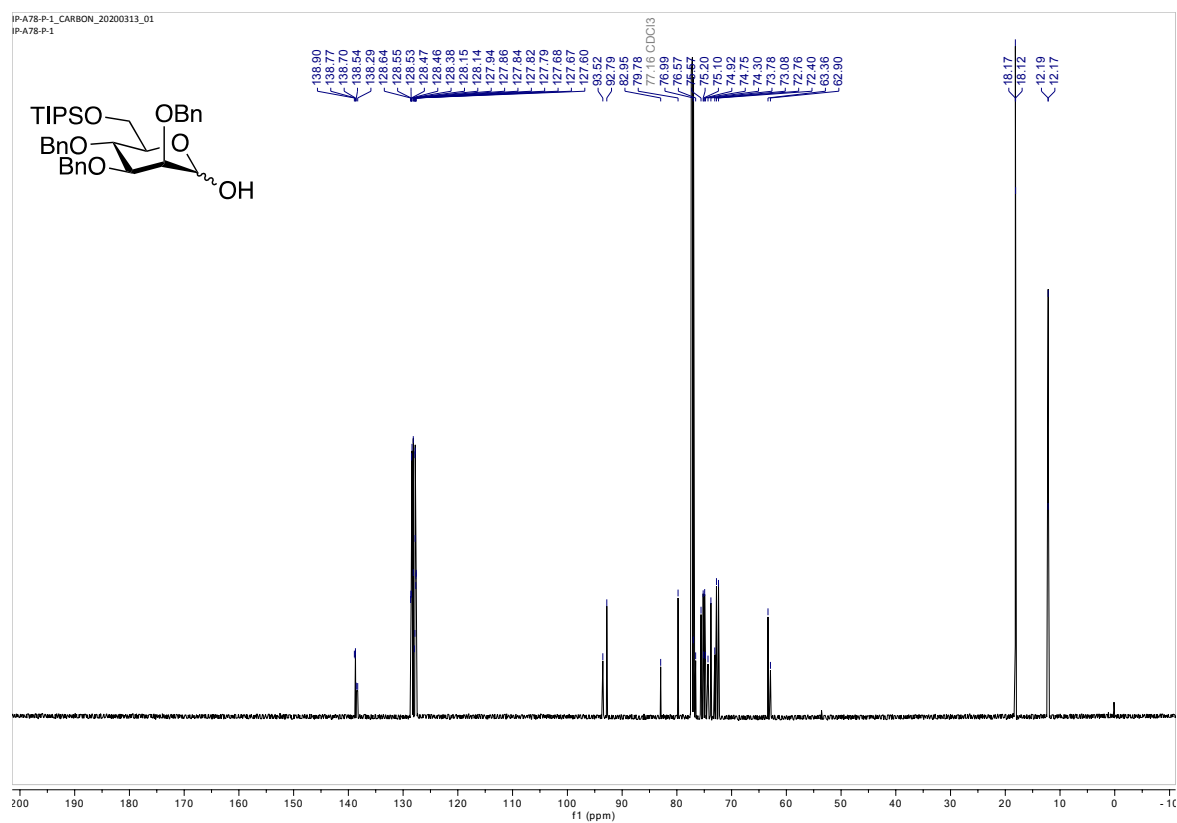
¹³C NMR (126 MHz, Chloroform-*d*) S22



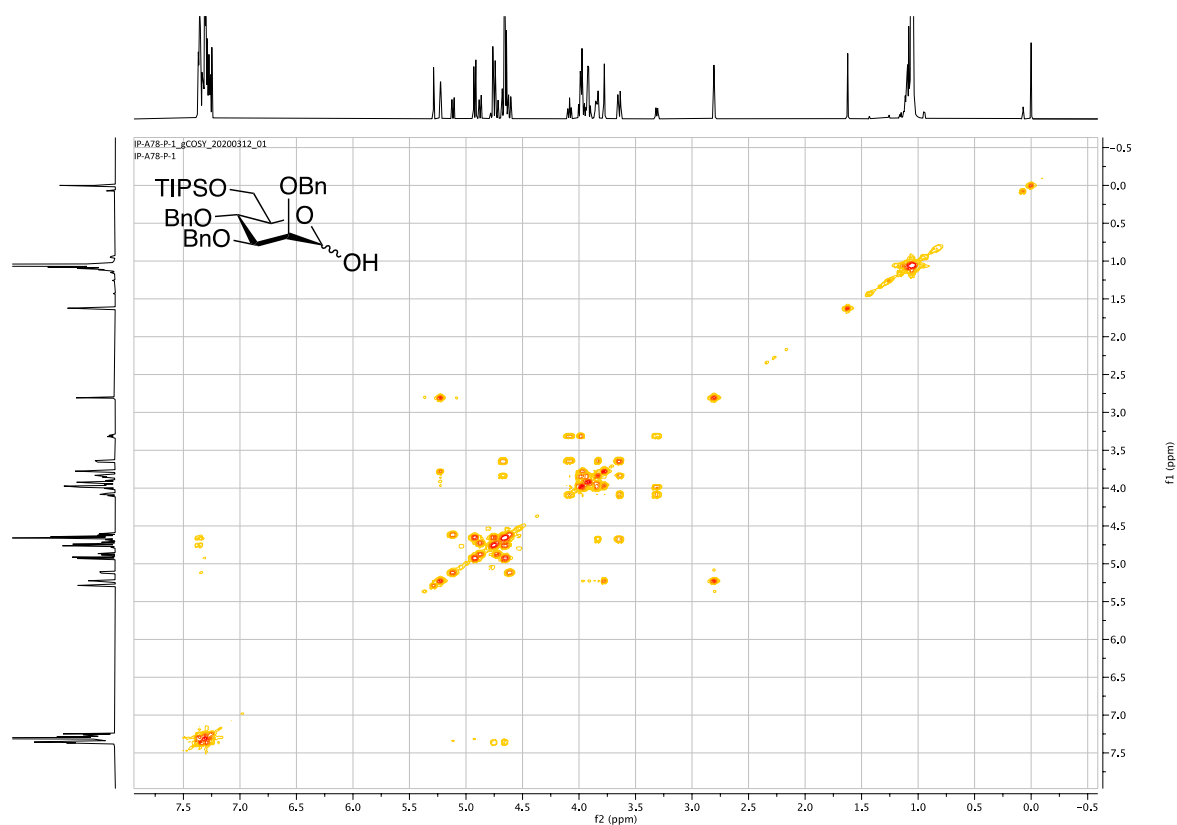
¹H NMR (600 MHz, Chloroform-*d*) S23



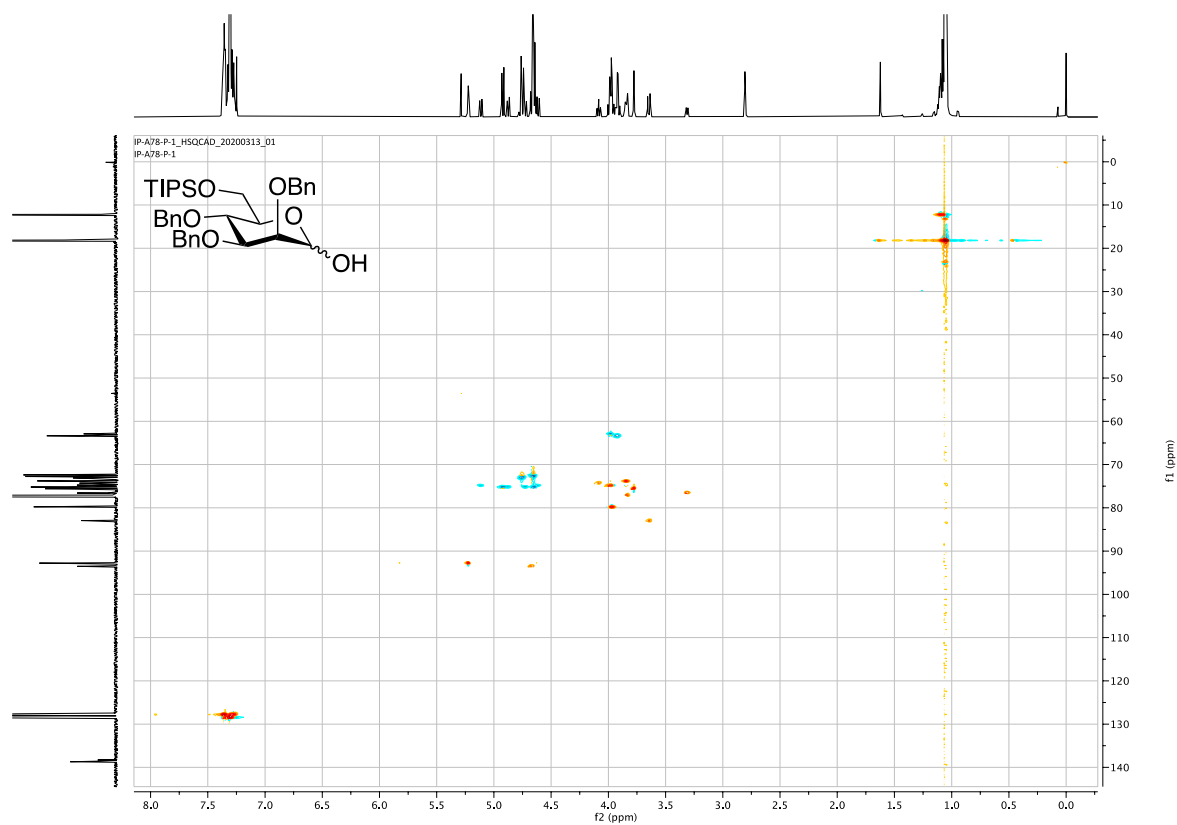
¹³C NMR (151 MHz, Chloroform-*d*) S23



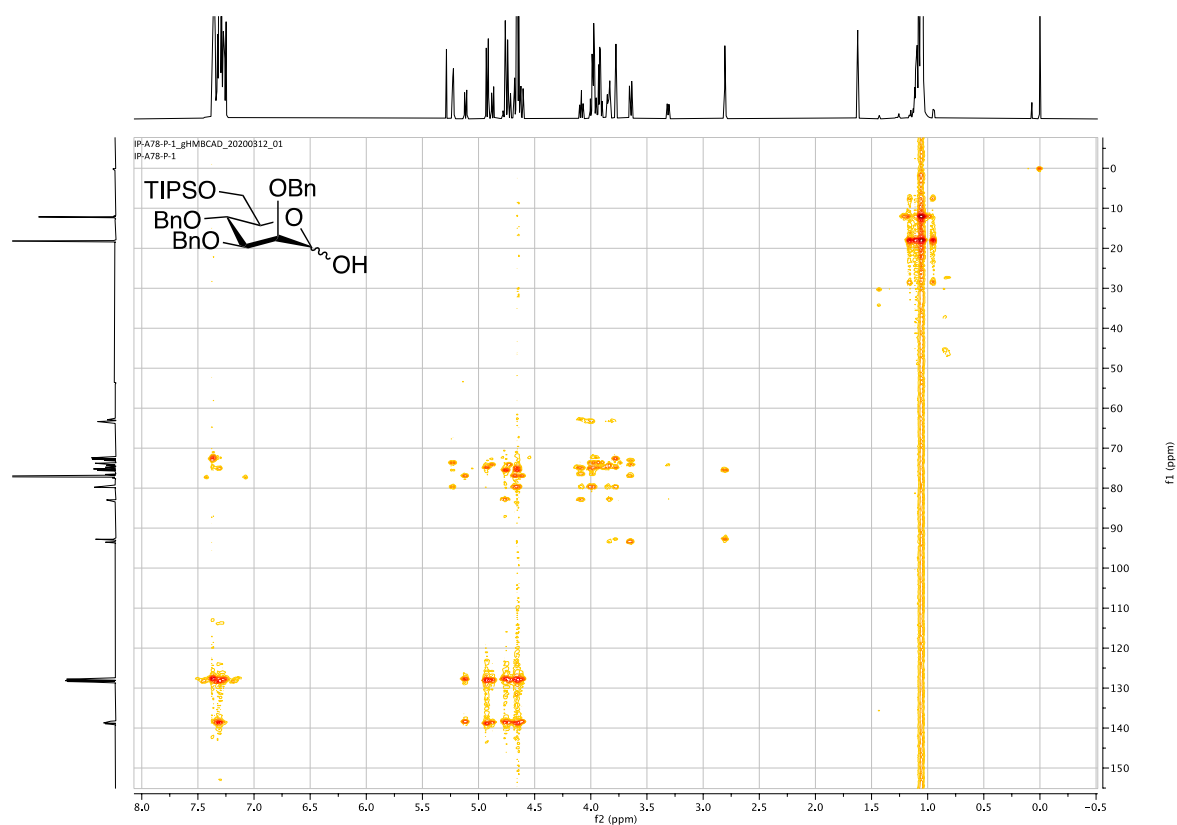
COSY NMR (600 MHz, Chloroform-*d*) S23



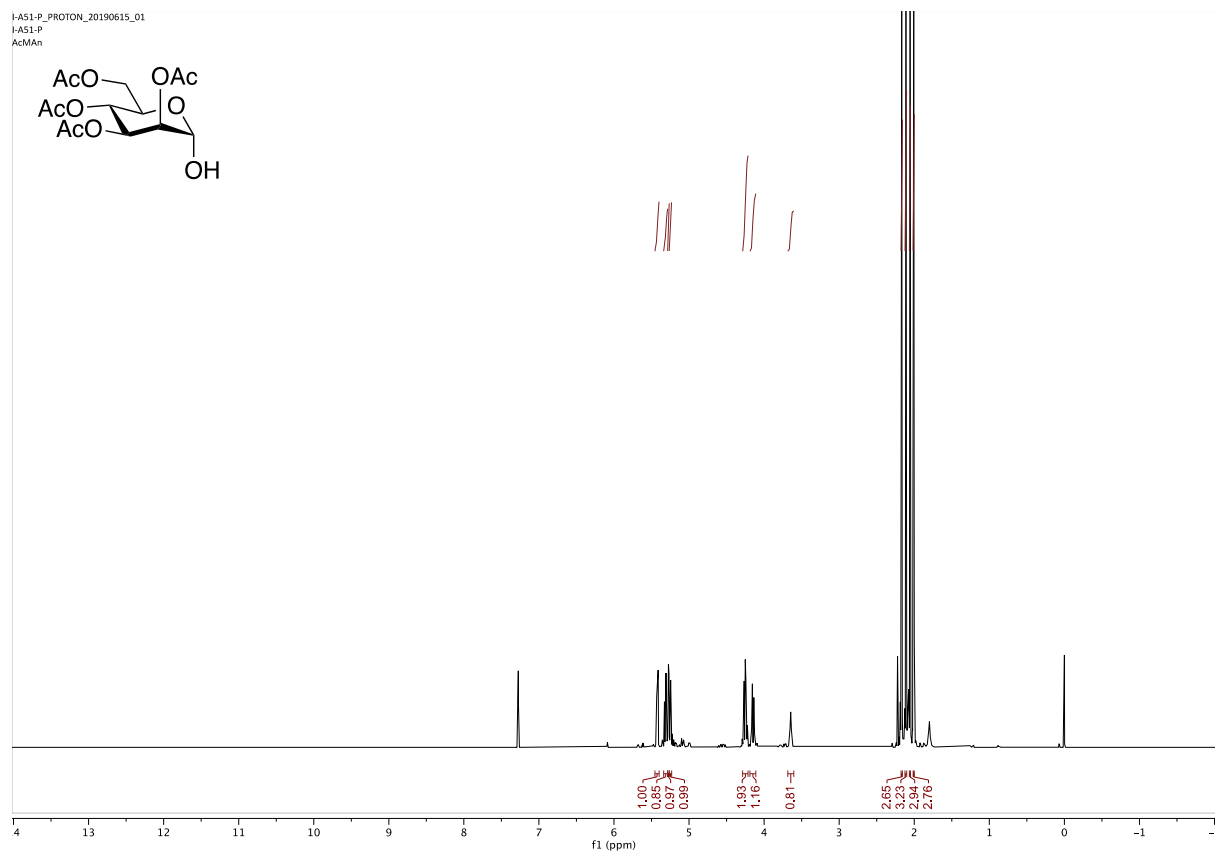
HSQC NMR (600 MHz x 151 MHz, Chloroform-*d*) S23



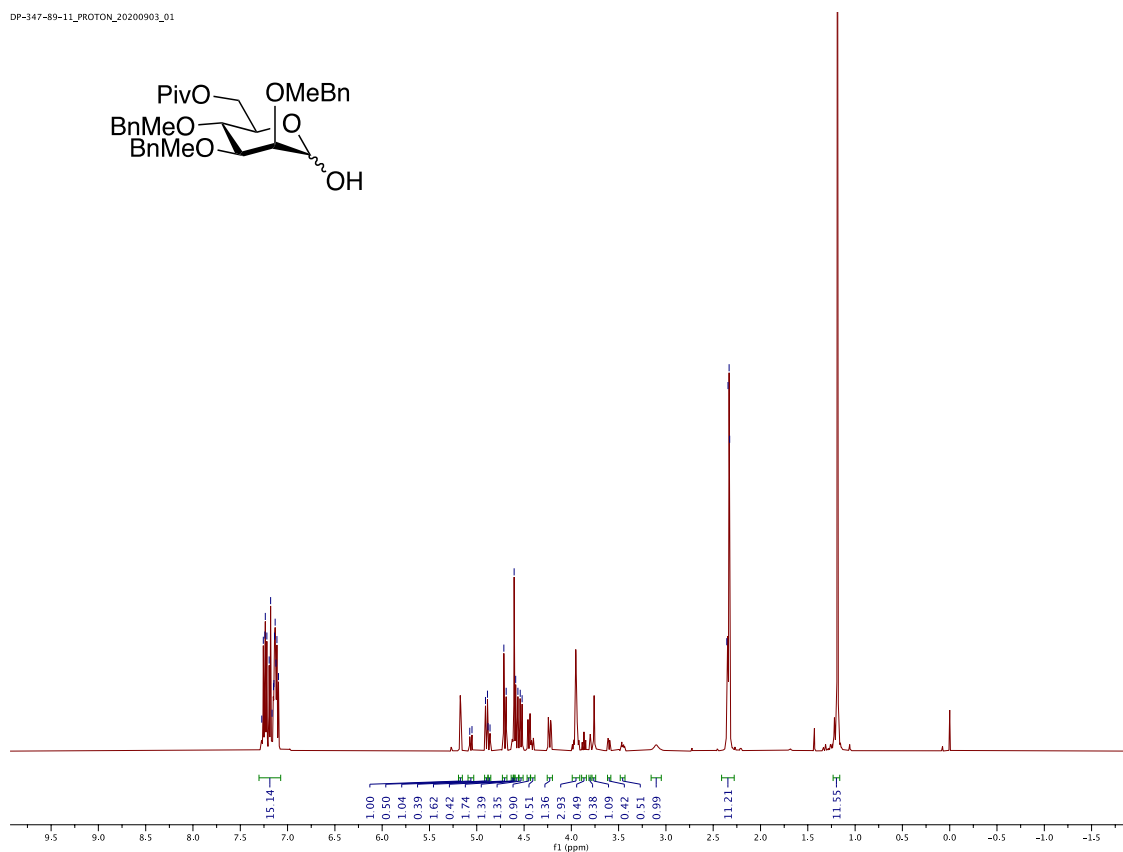
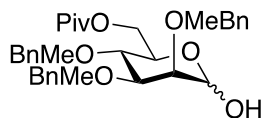
HMBC NMR (600 MHz x 151 MHz, Chloroform-*d*) S23



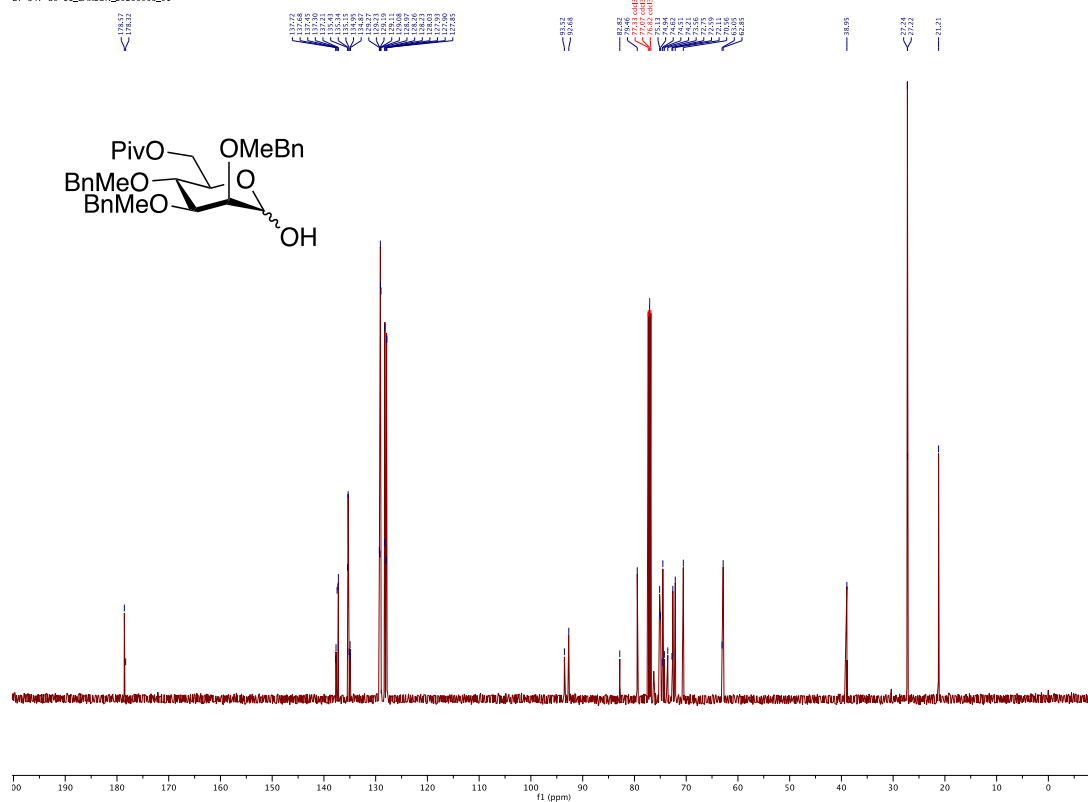
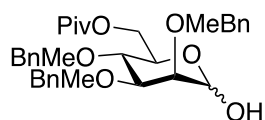
^1H NMR (500 MHz, Chloroform-*d*) S24



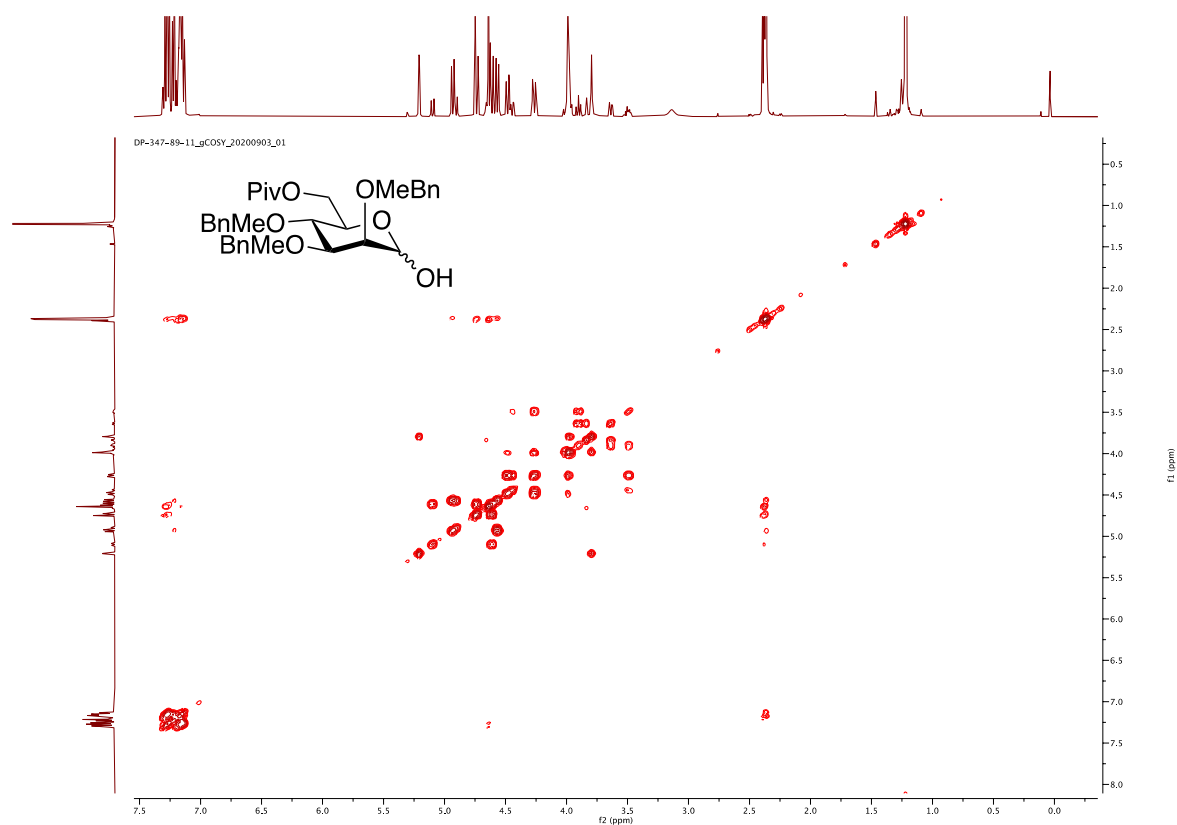
DP-347-89-11 PROTON 20200903 01



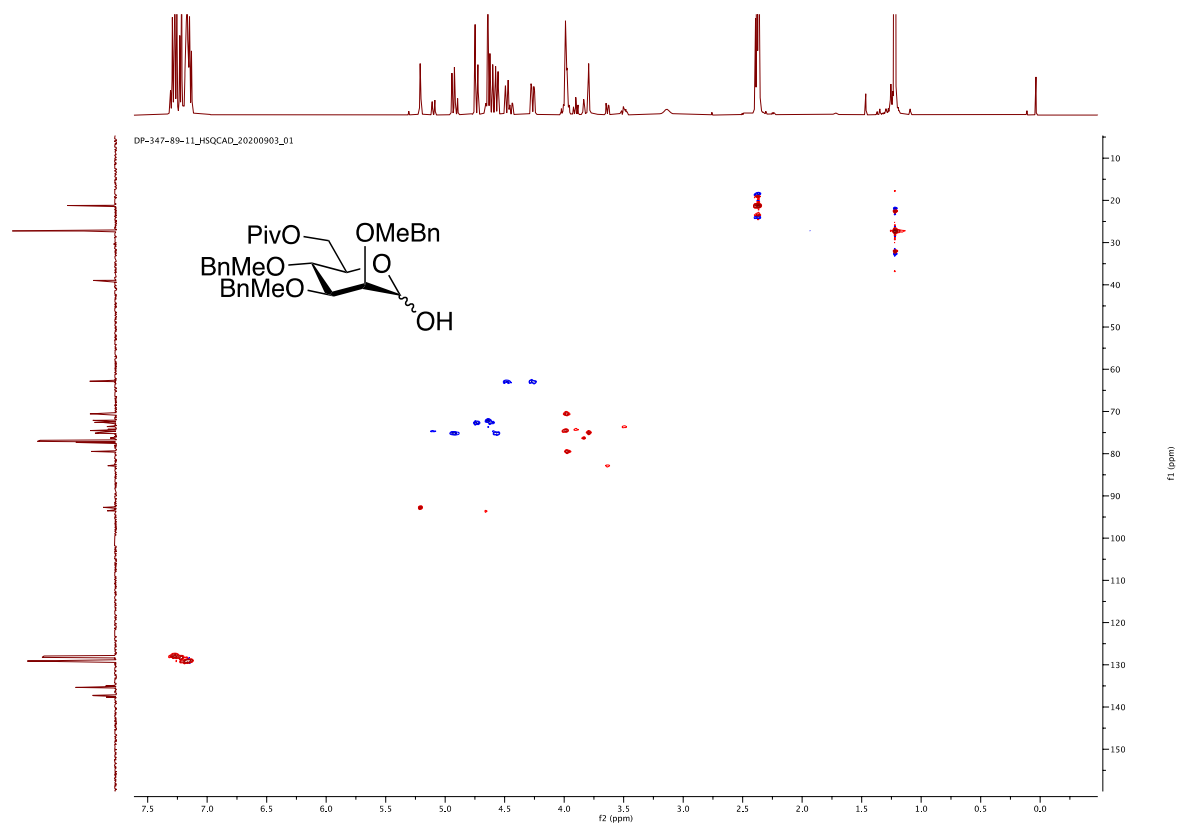
DP-347-89-11 CARBON 20200903_01



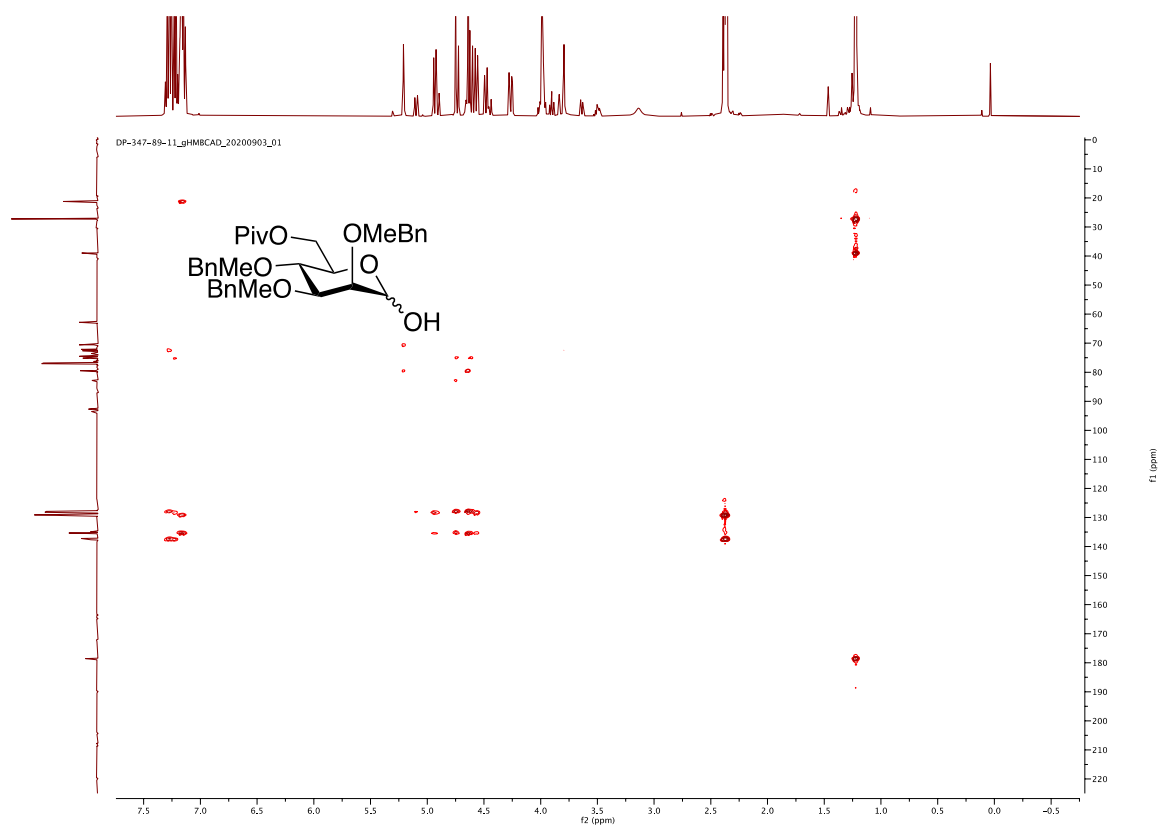
COSY NMR (500 MHz, Chloroform-*d*) 1i



HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) 1i

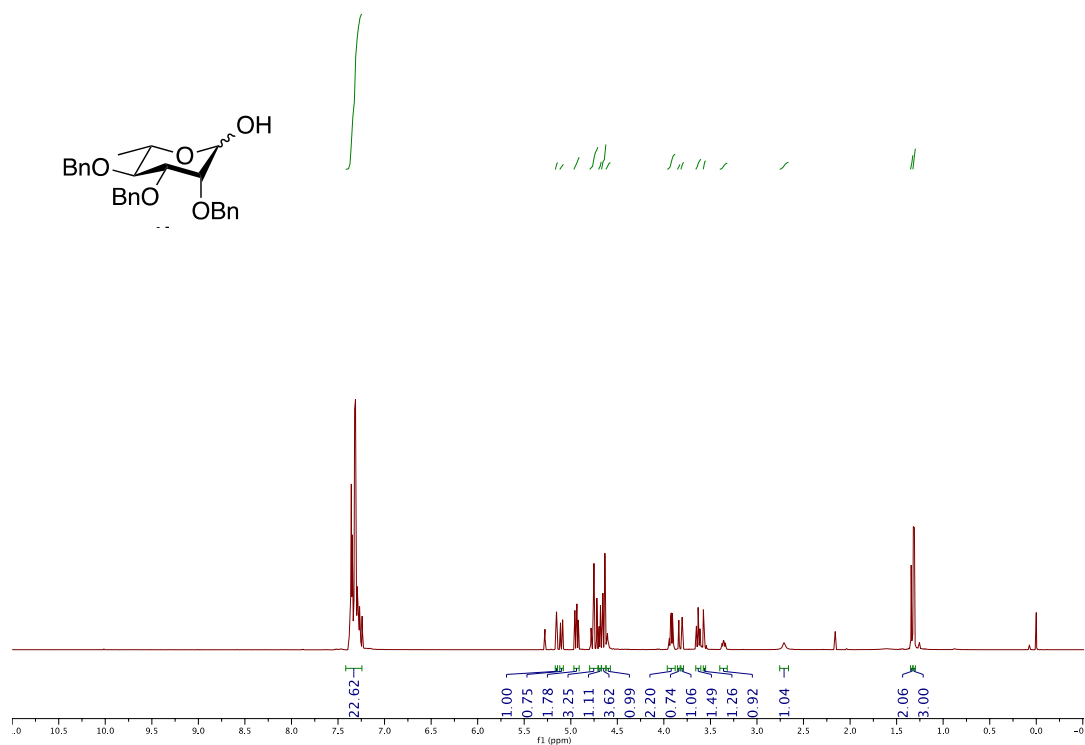


HMBC NMR (500 MHz x 126 MHz, Chloroform-*d*) 1i



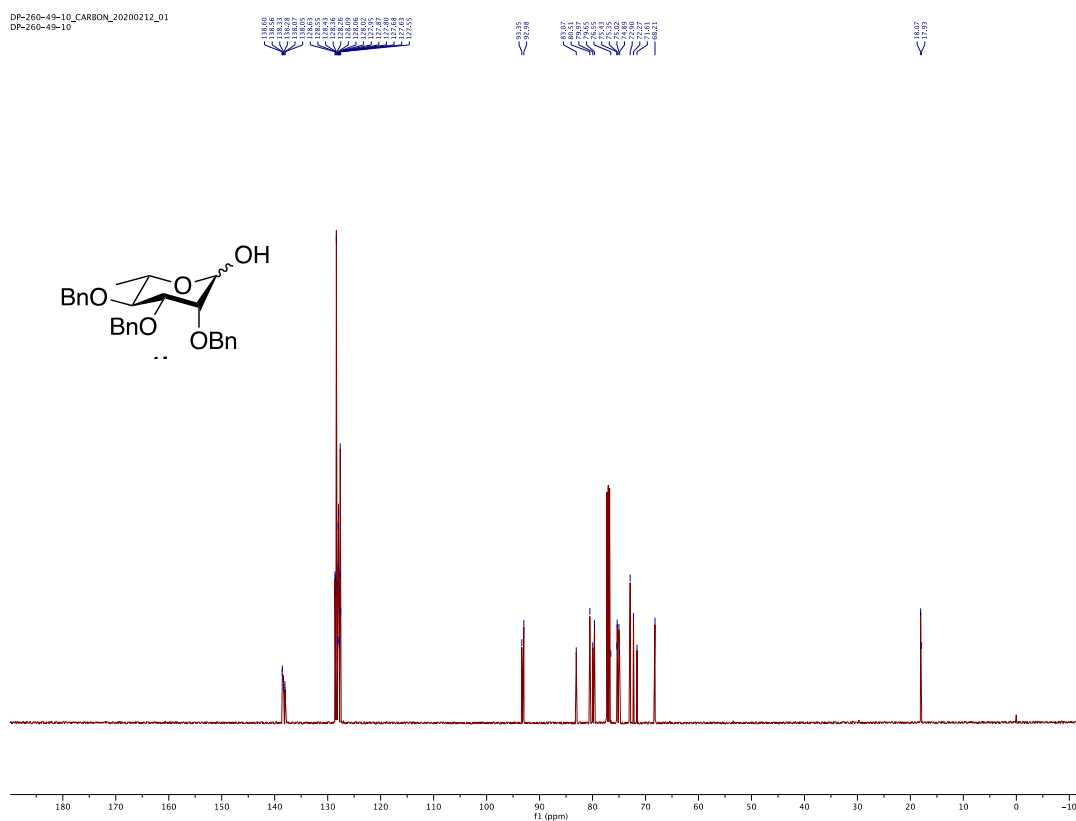
¹H NMR (500 MHz, Chloroform-*d*) 1j

DP-260-49-10_PROTON_20200211_01
DP-260-49-10

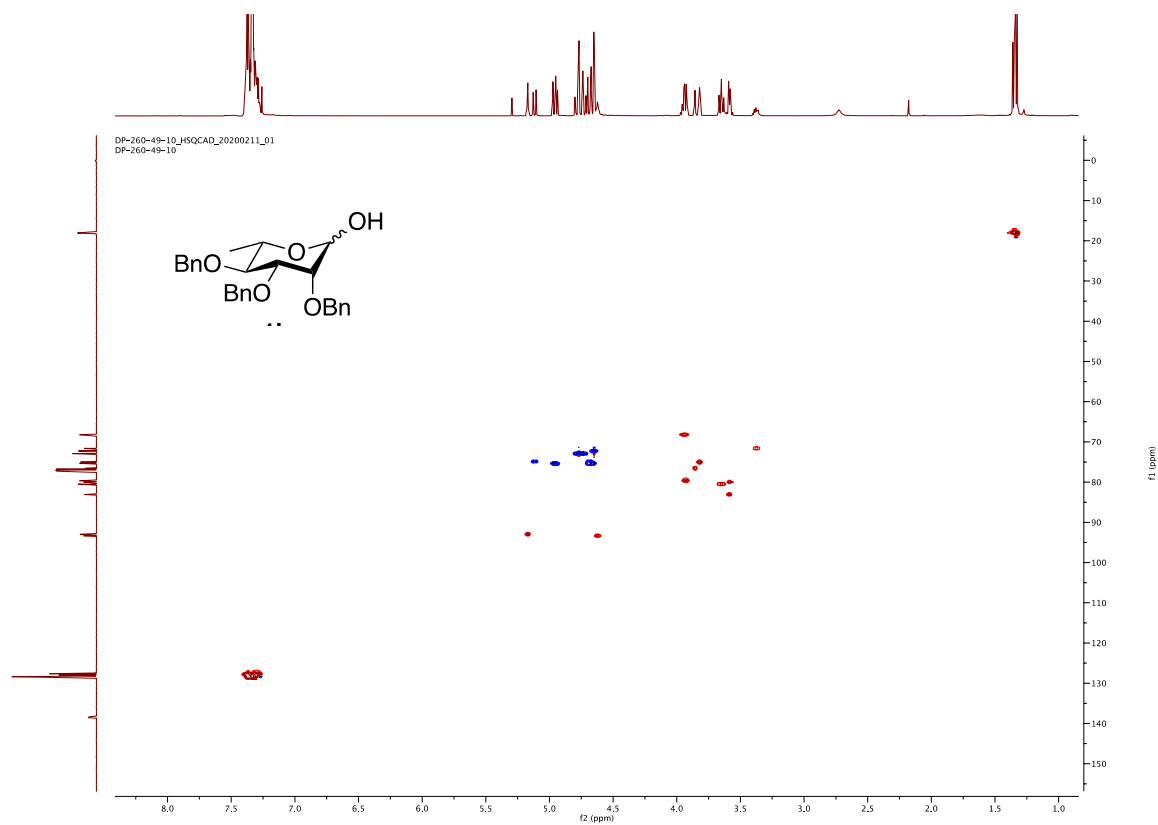


¹³C NMR (126 MHz, Chloroform-*d*) 1j

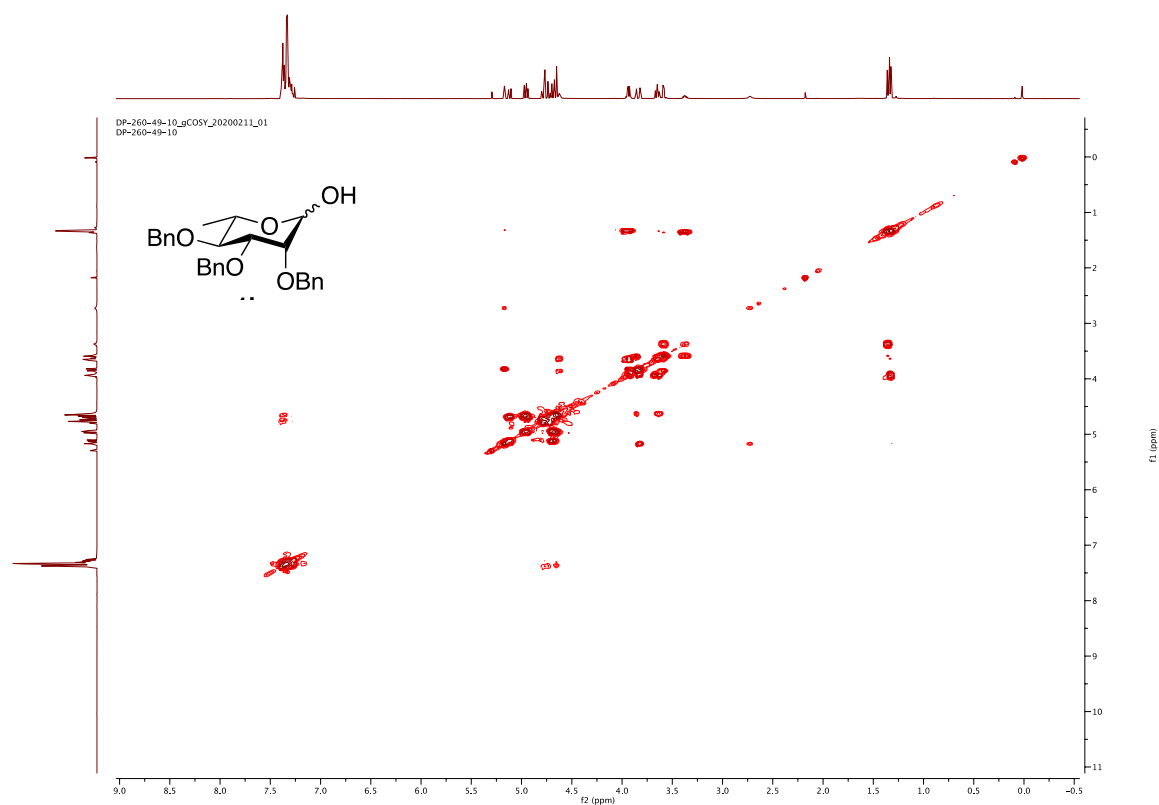
DP-260-49-10 CARBON_20200212_01
DP-260-49-10



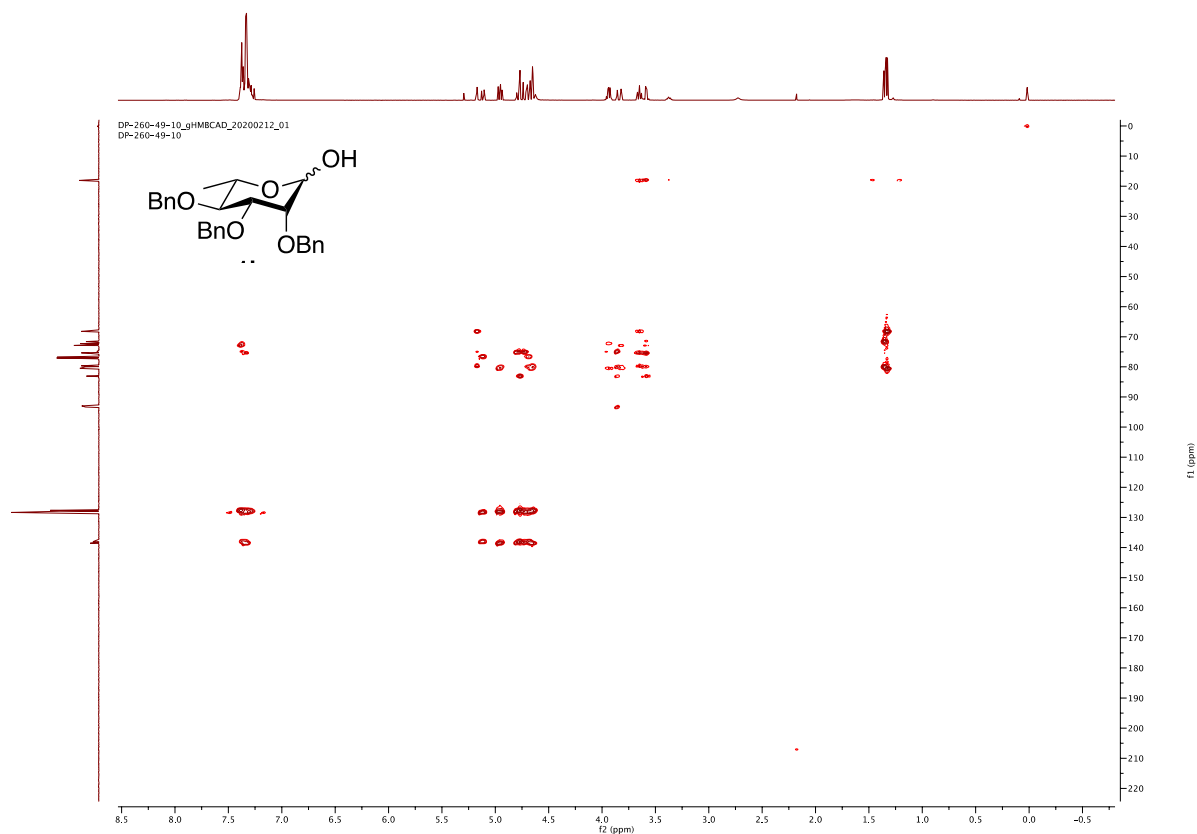
¹³C - ¹H decoupled HSQC (500 x 126 MHz, Chloroform-*d*) 1j



COSY (500 x 500 MHz, Chloroform-*d*) 1j

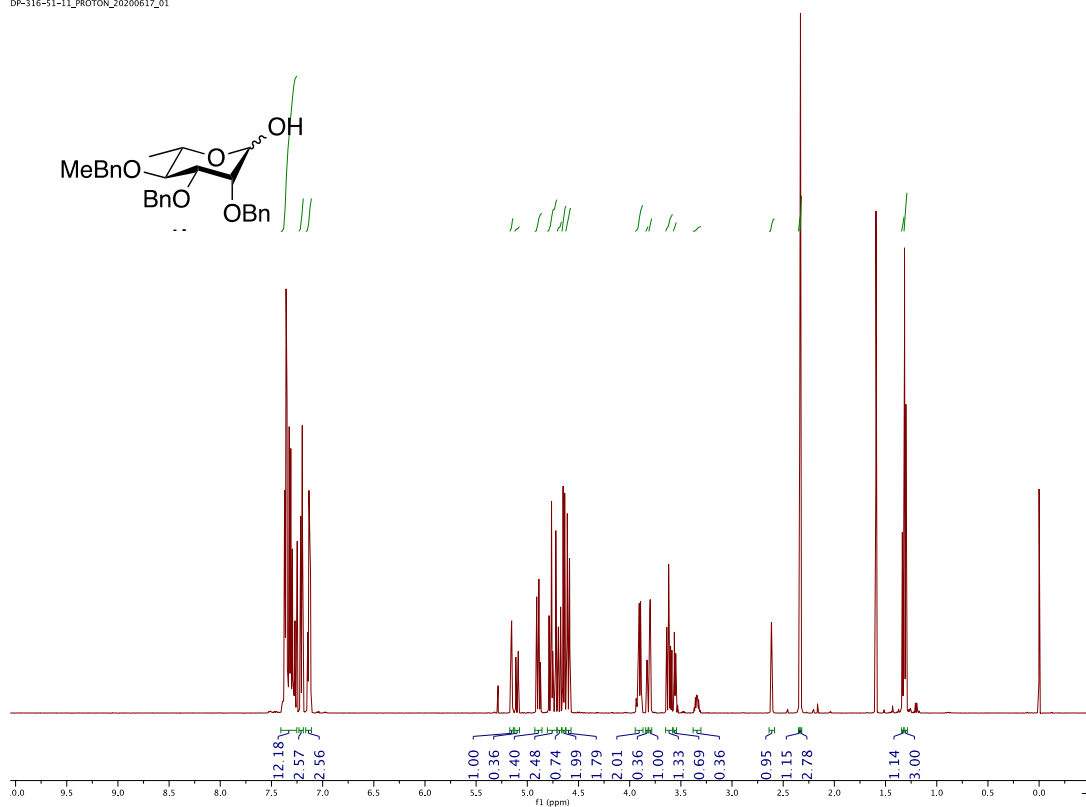


HMBC (500 x 126 MHz, Chloroform-*d*) 1j



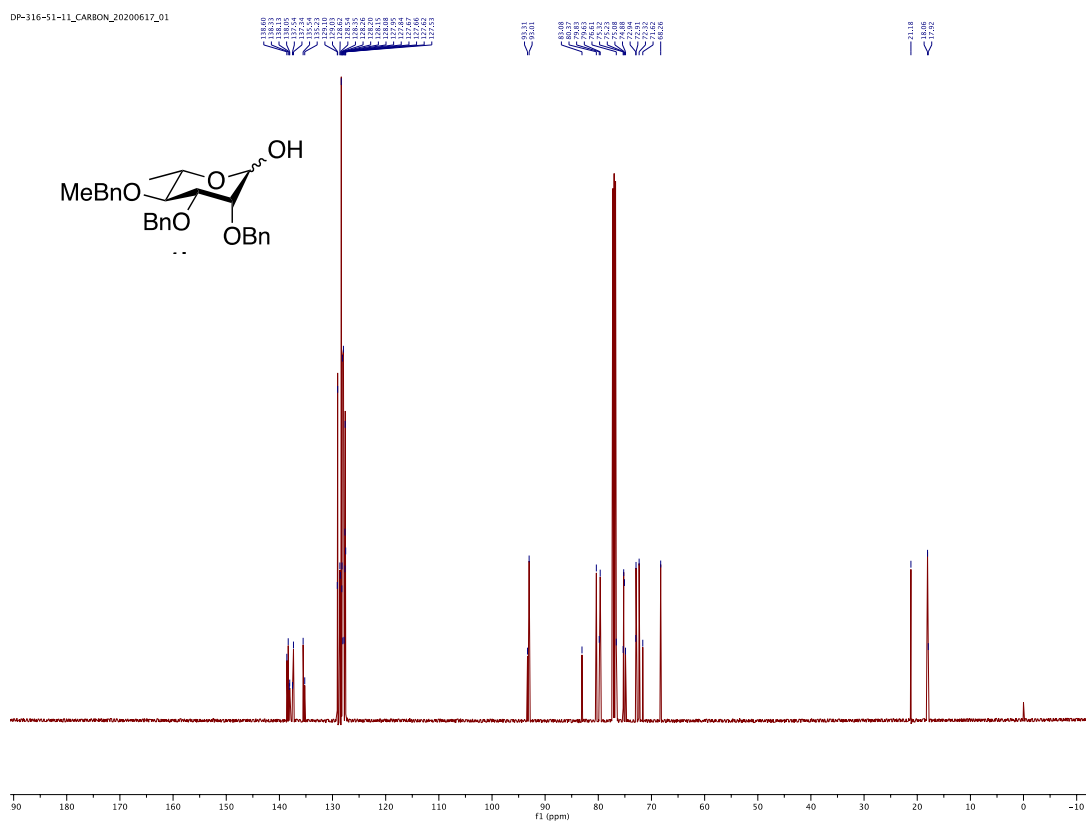
¹H NMR (500 MHz, Chloroform-*d*) 1k

DP-316-51-11_PROTON_20200617_01

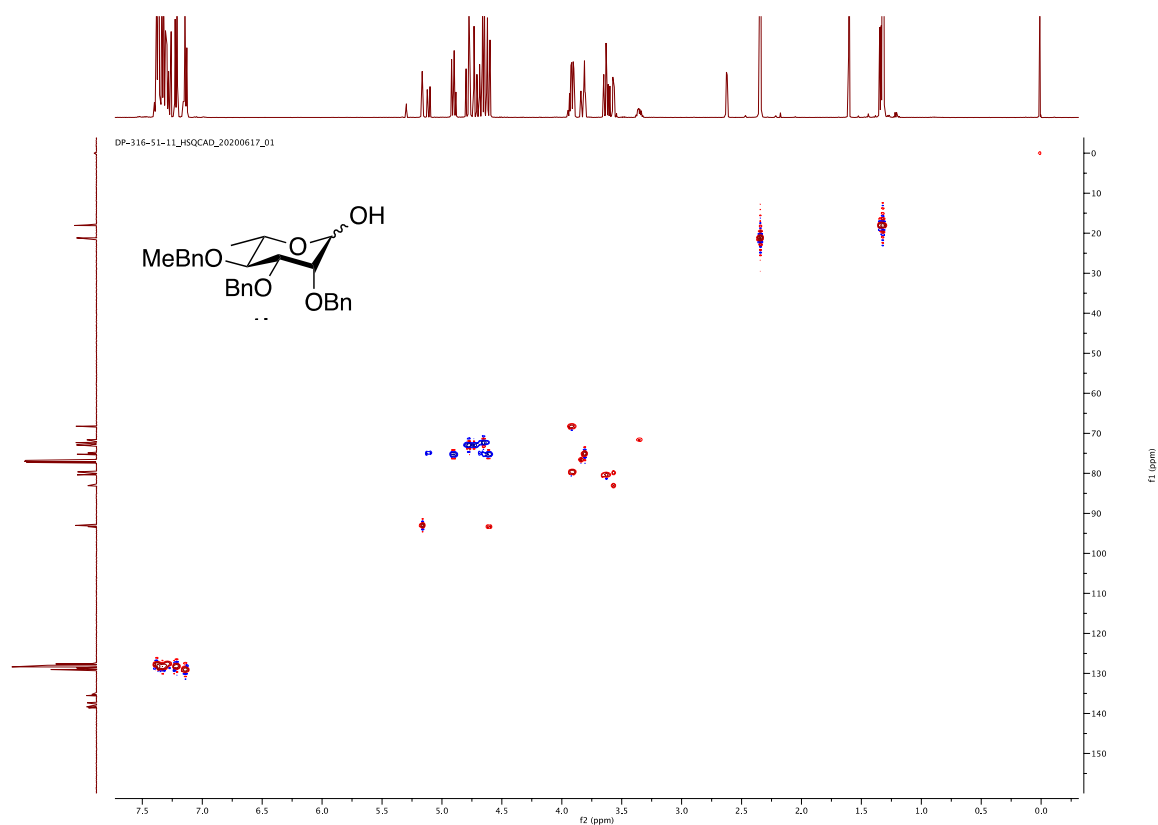


¹³C NMR (126 MHz, Chloroform-*d*) 1k

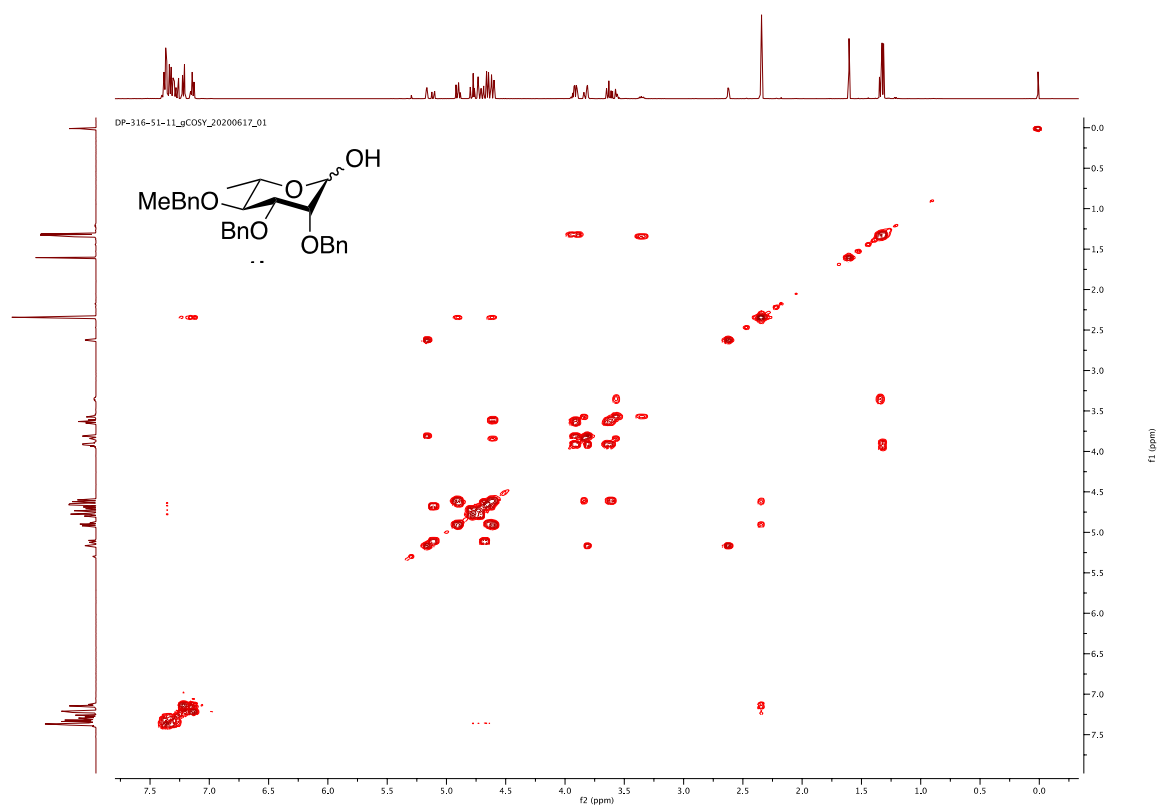
DP-316-51-11_CARBON_20200617_01



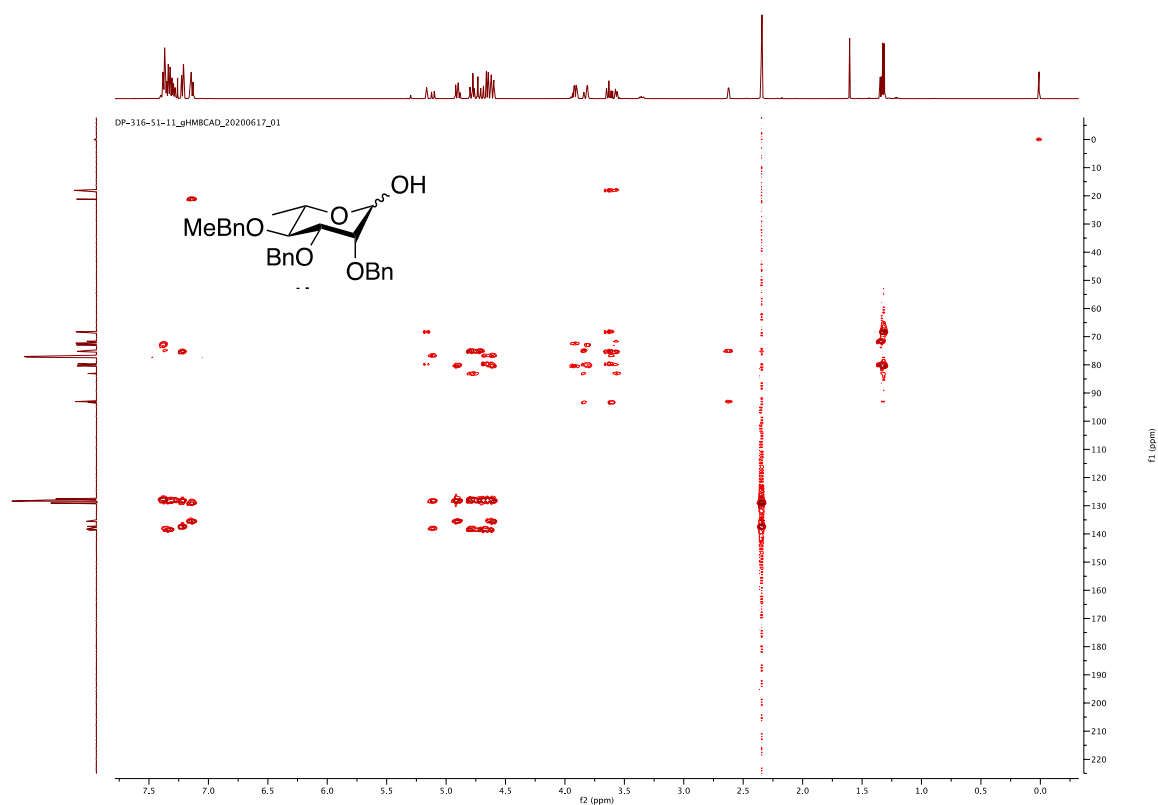
^{13}C - ^1H decoupled HSQC (500 x 126 MHz, Chloroform-*d*) 1k



COSY NMR (650 MHz, Chloroform-*d*) 1k

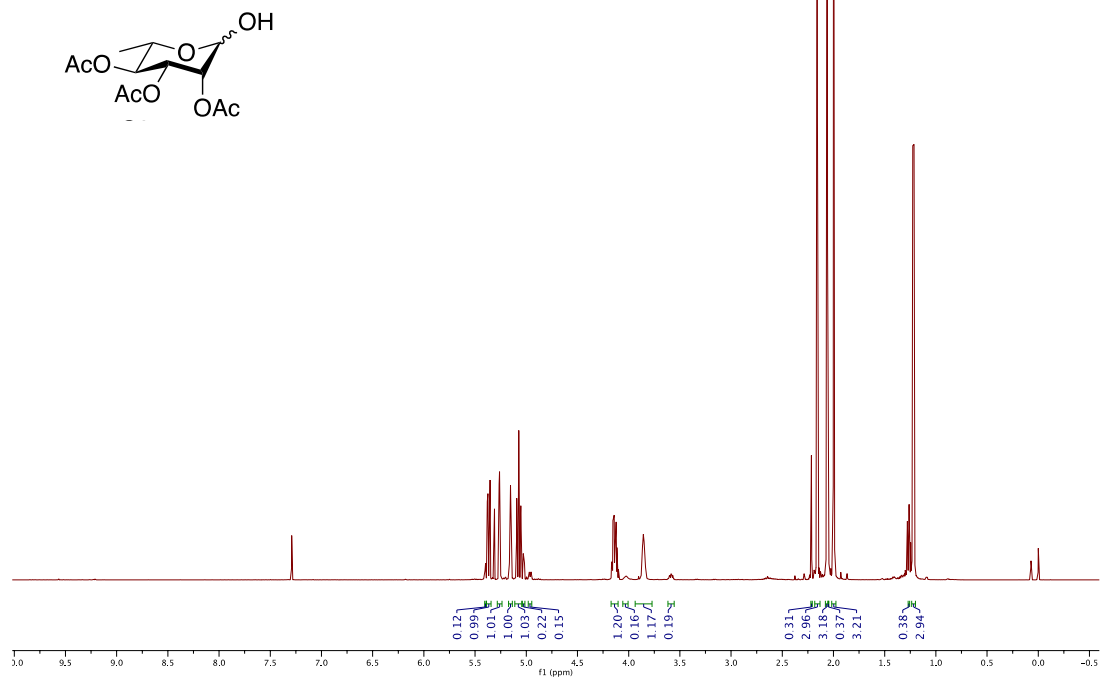


HMBC (500 x 126 MHz, Chloroform-*d*) 1k

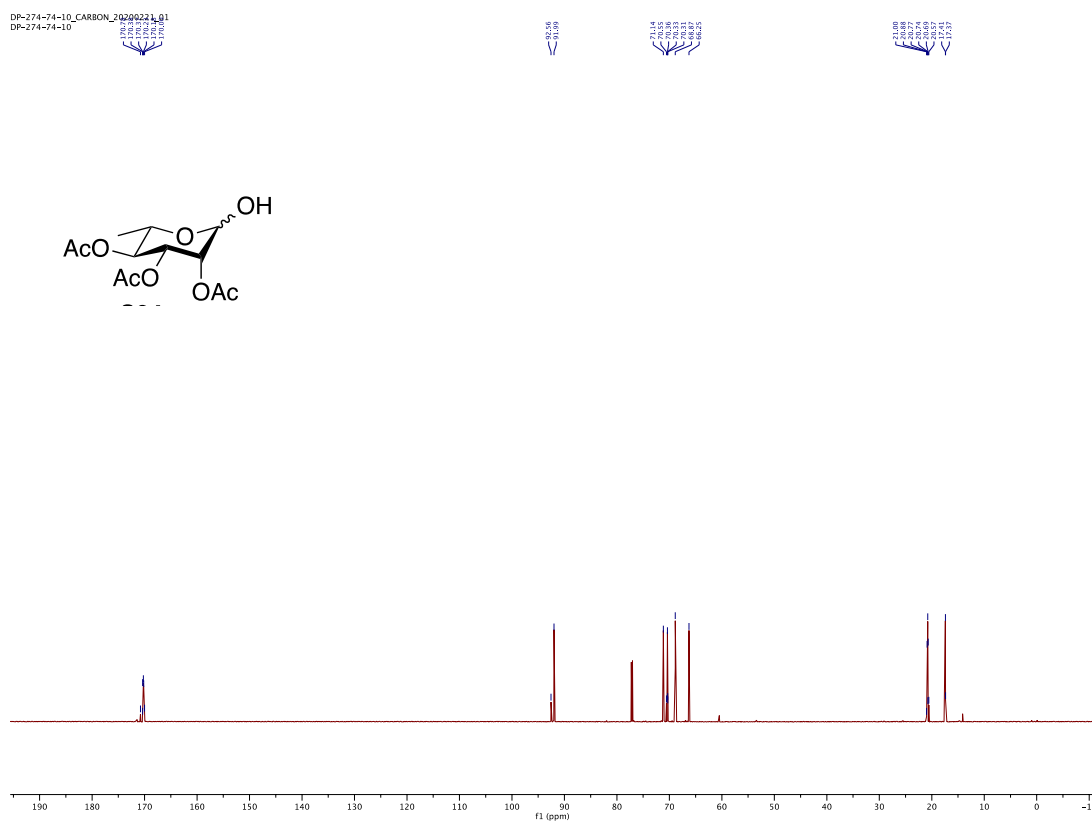


¹H NMR (500 MHz, Chloroform-*d*) S35

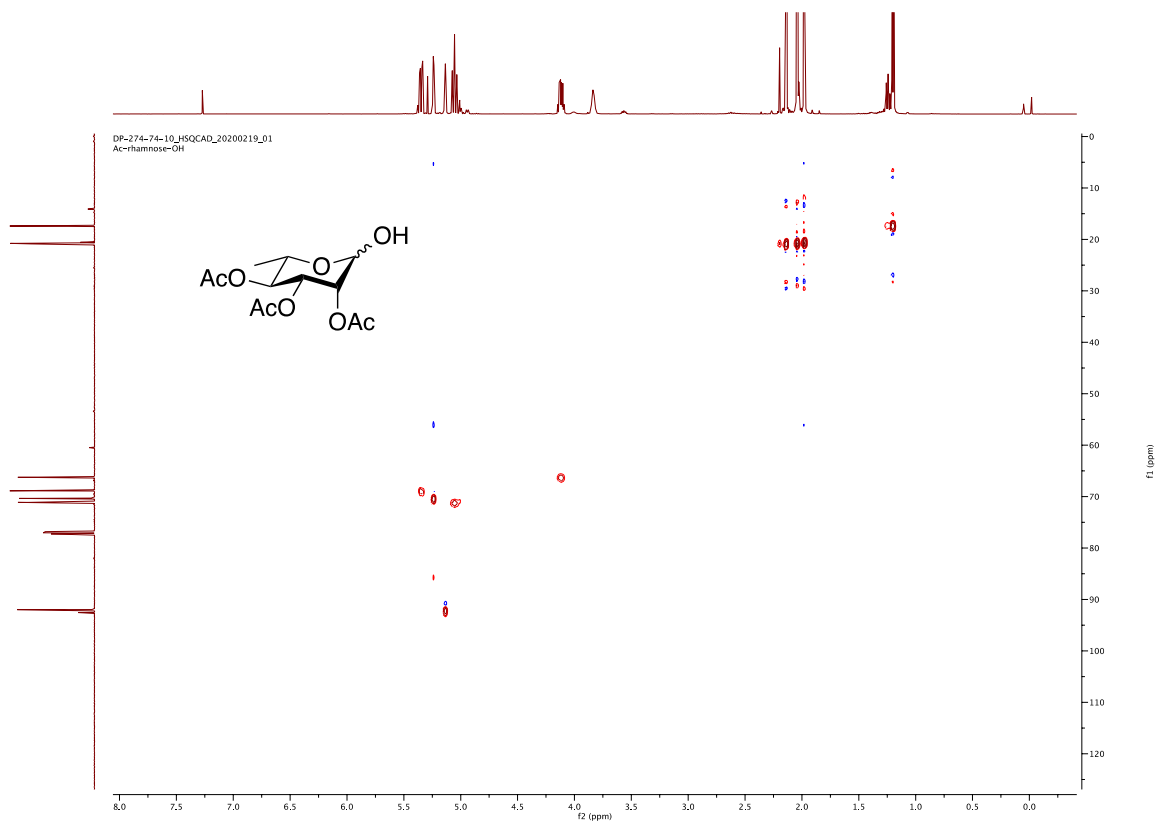
DP-274-74-10_PROTON_20200219_01
Ac-ribose-OH



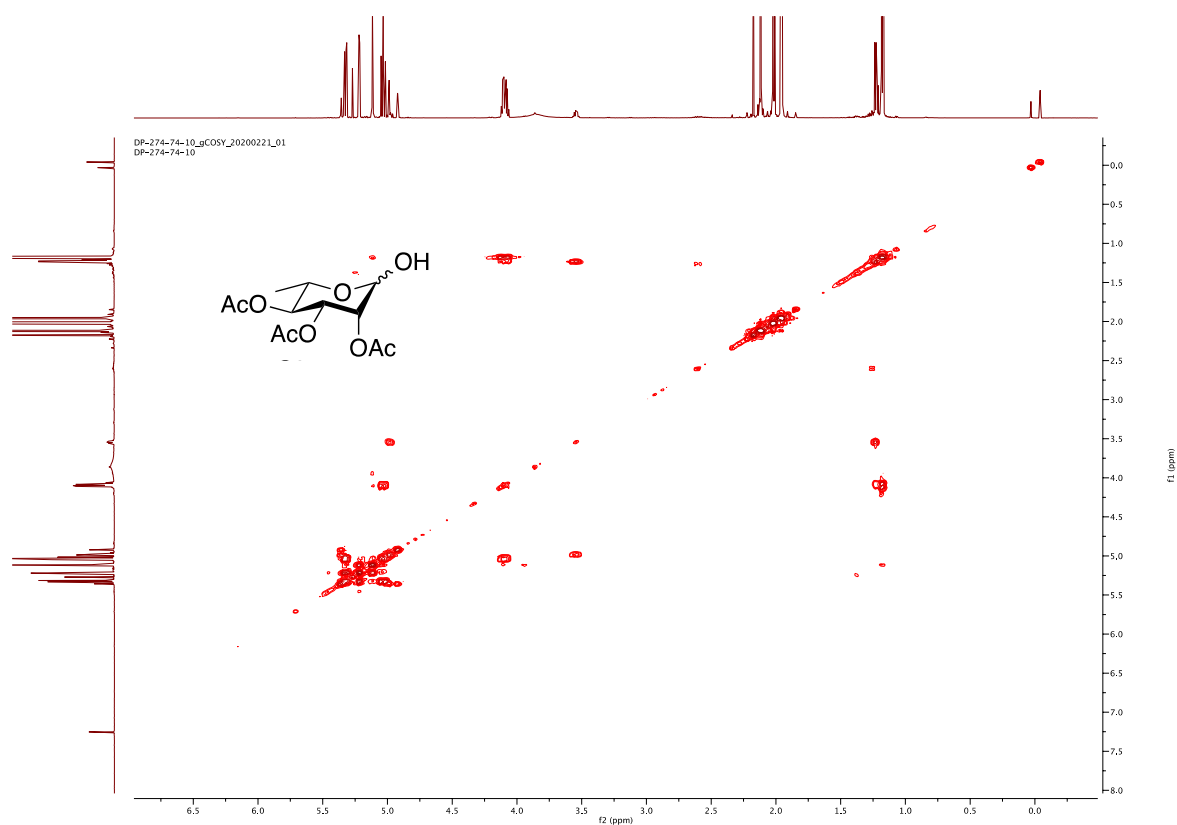
¹³C NMR (126 MHz, Chloroform-*d*) S35



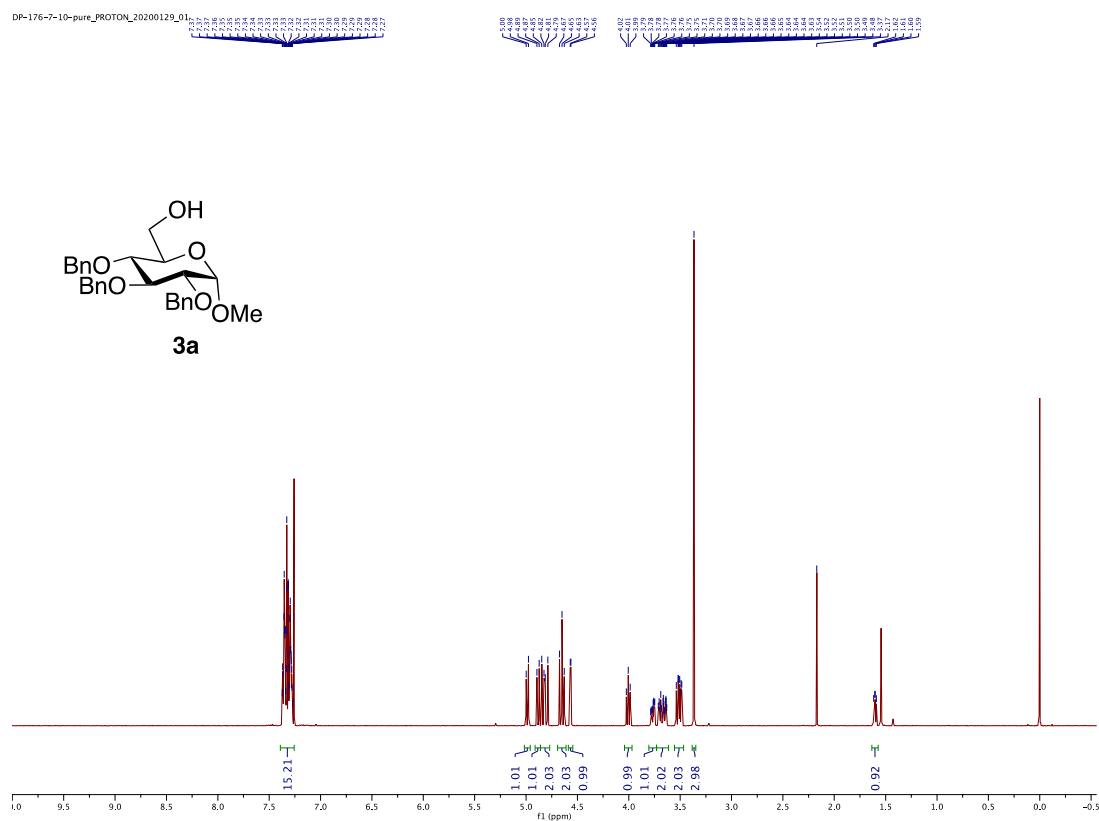
¹³C - ¹H decoupled HSQC (500 x 126 MHz, Chloroform-*d*) S35



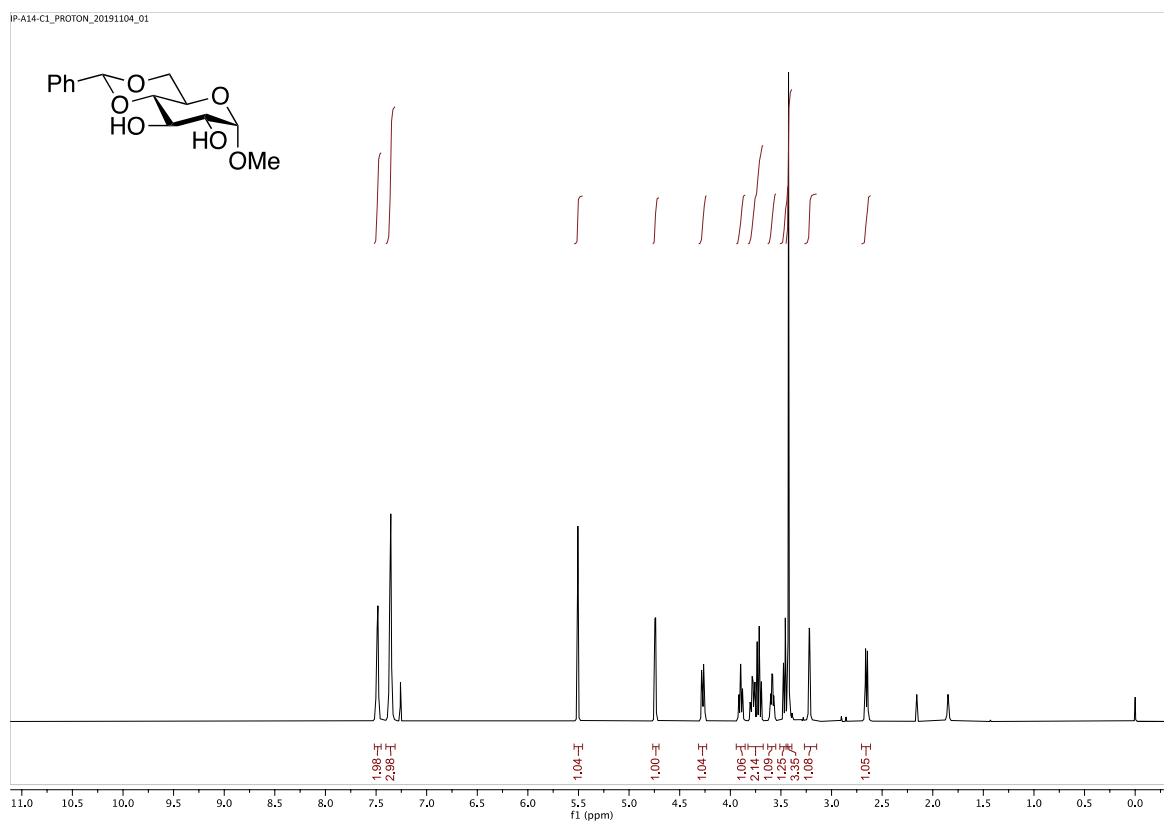
COSY (500 x 500 MHz, Chloroform-*d*) S35



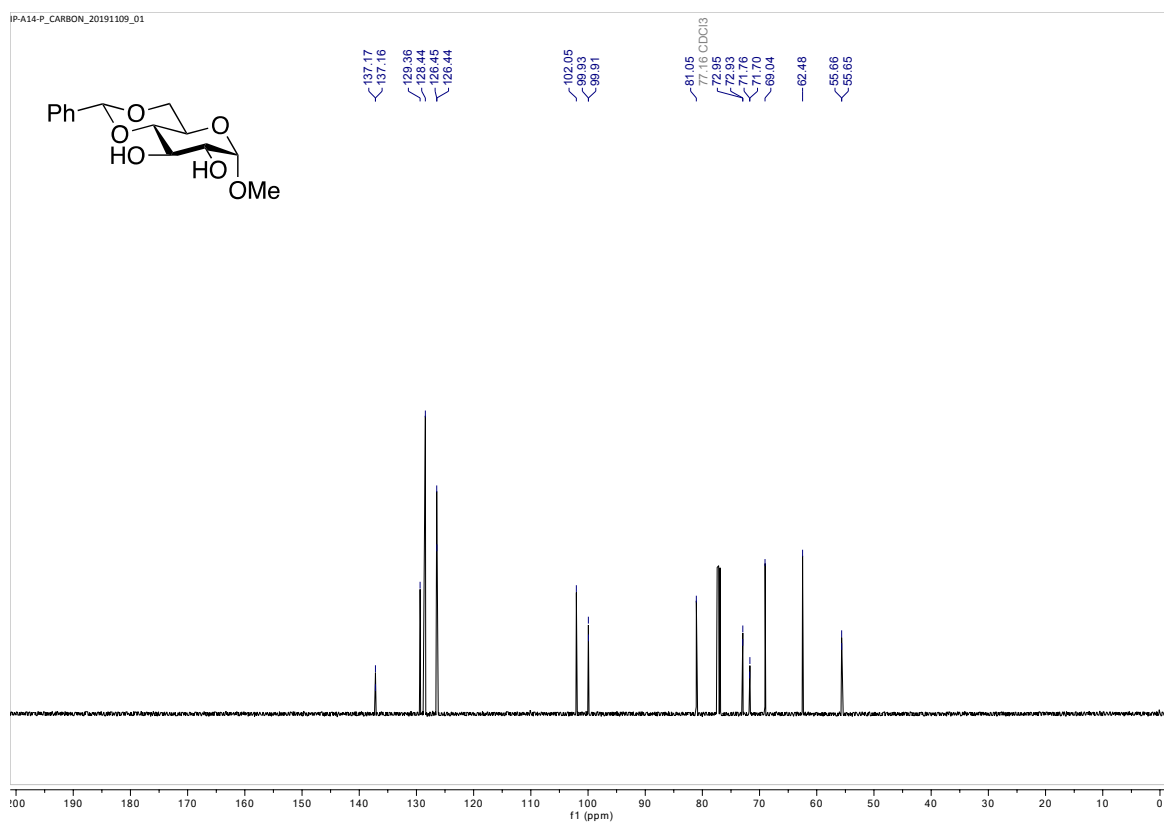
¹H NMR (500 MHz, Chloroform-*d*) 3a



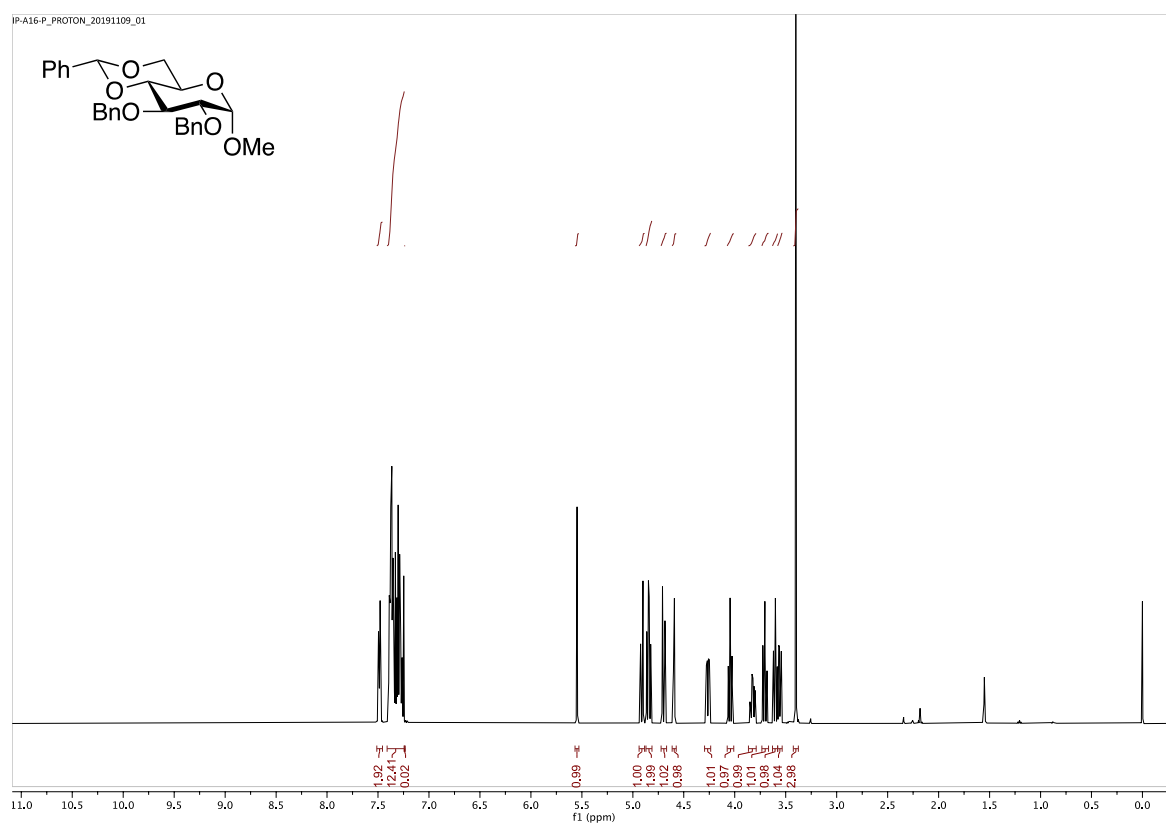
¹H NMR (500 MHz, Chloroform-*d*) S38



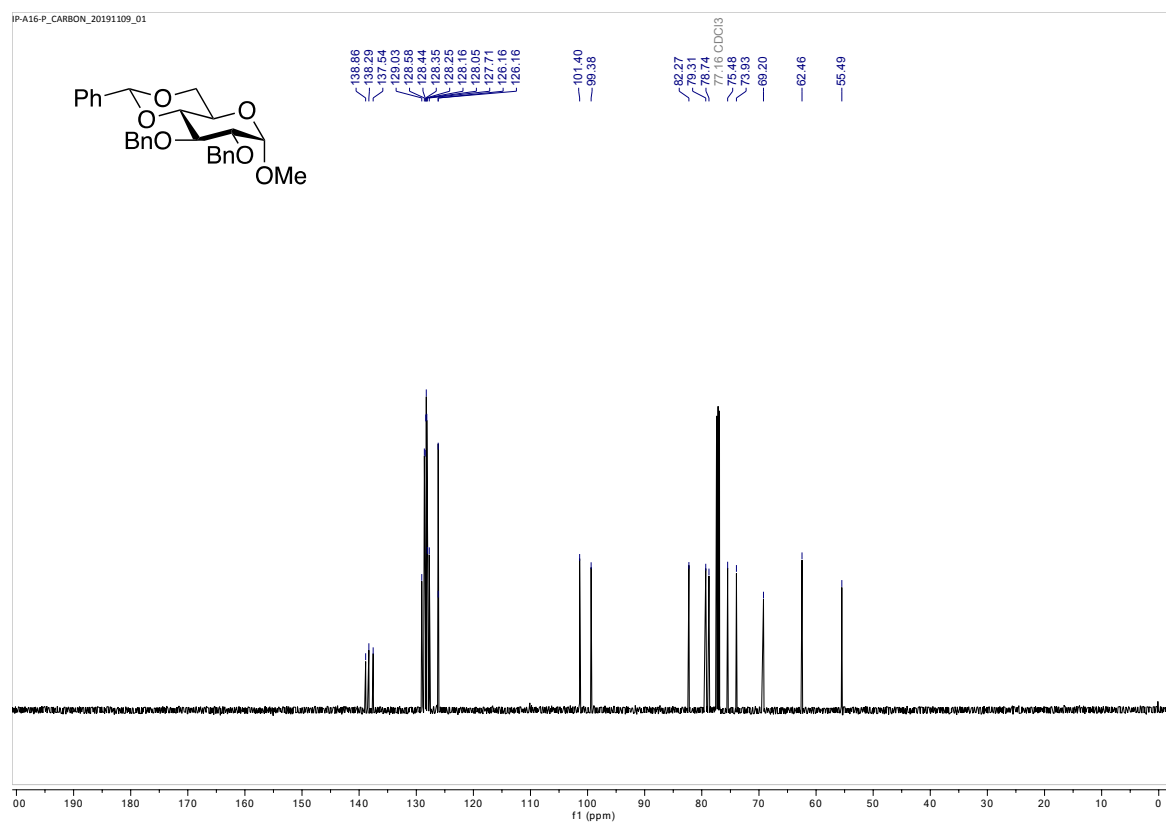
¹³C NMR (126 MHz, Chloroform-*d*) S38



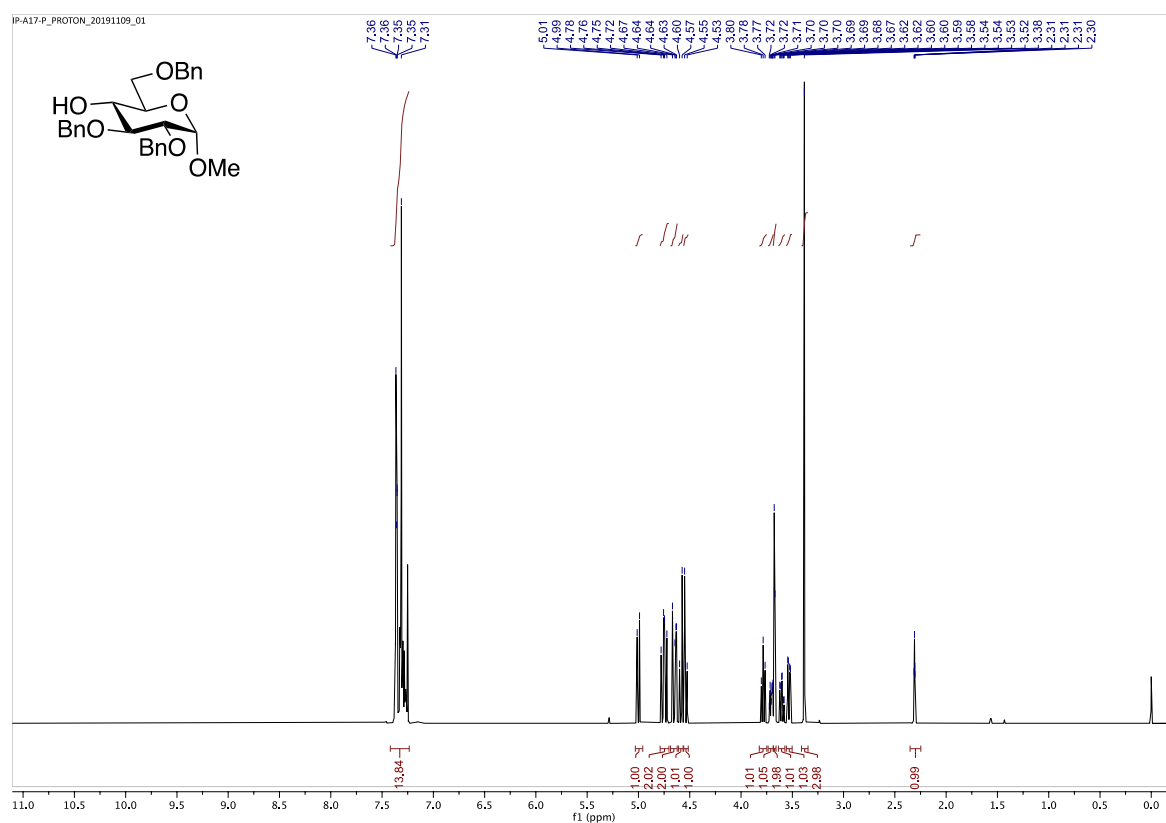
¹H NMR (500 MHz, Chloroform-*d*) S39



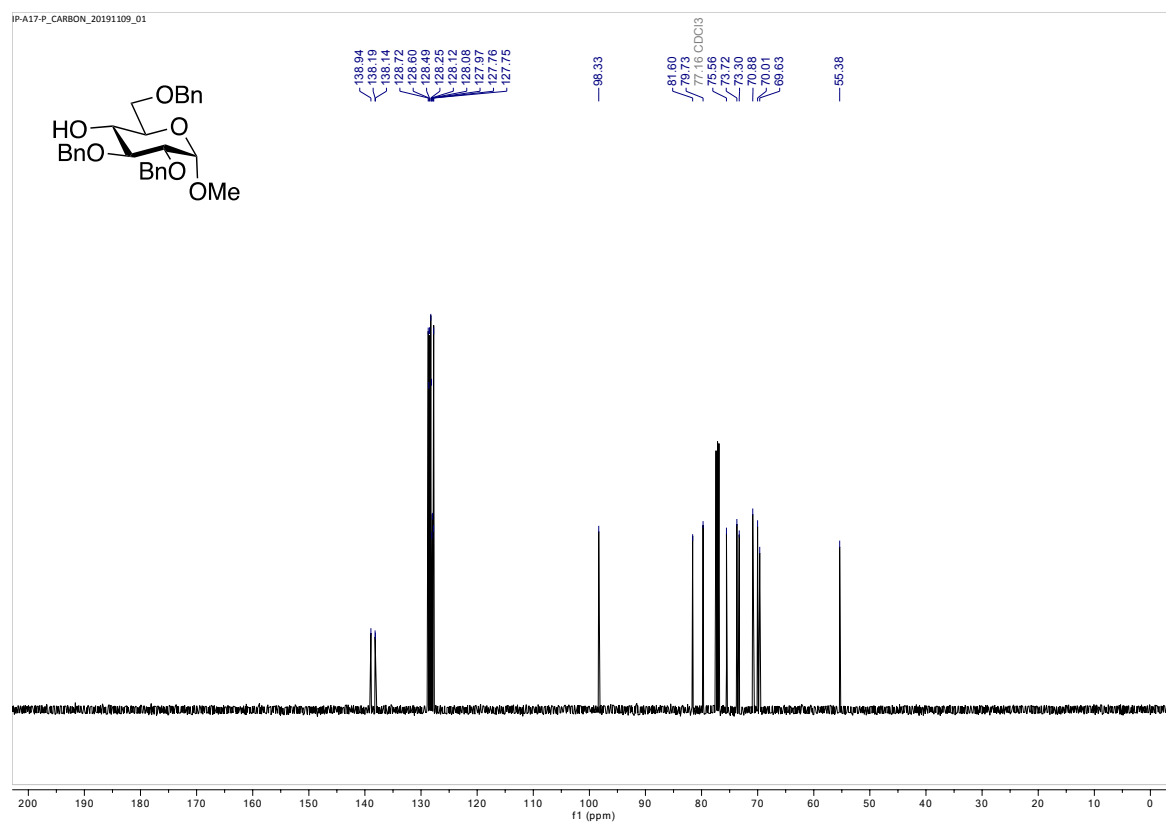
¹³C NMR (126 MHz, Chloroform-*d*) S39



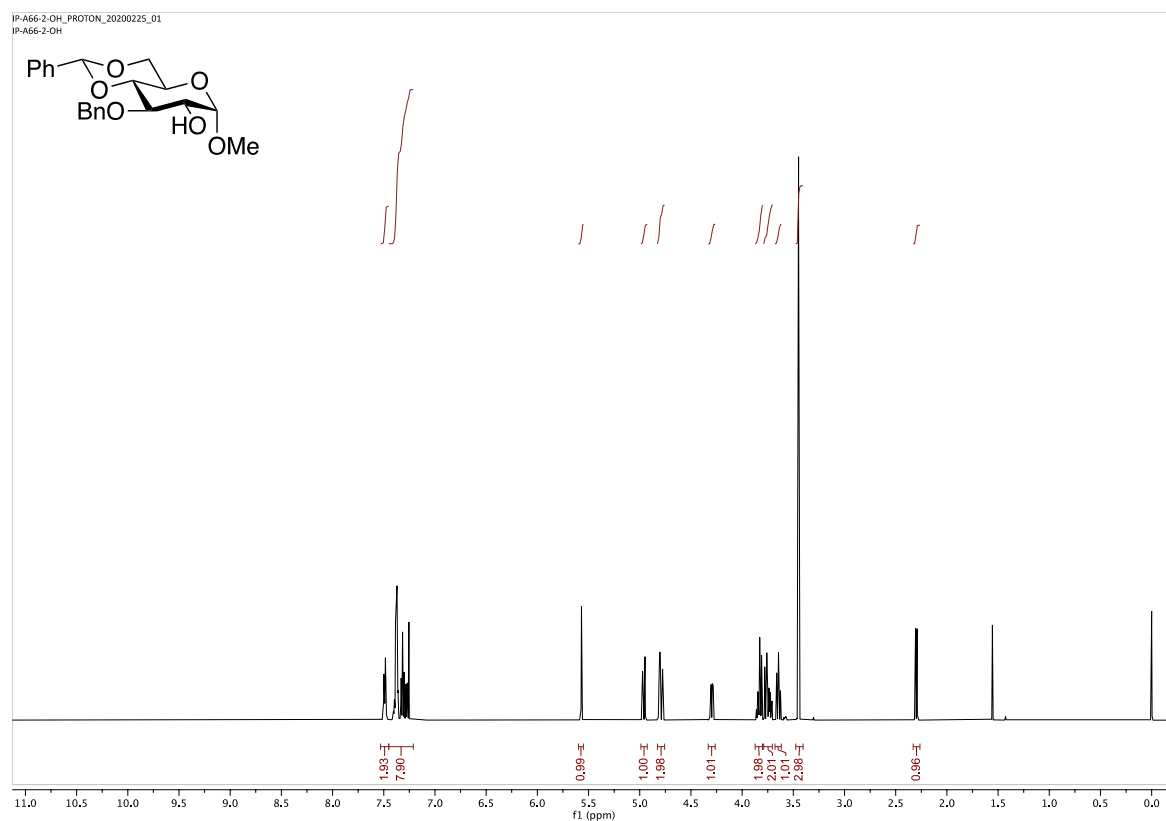
¹H NMR (500 MHz, Chloroform-*d*) 3b



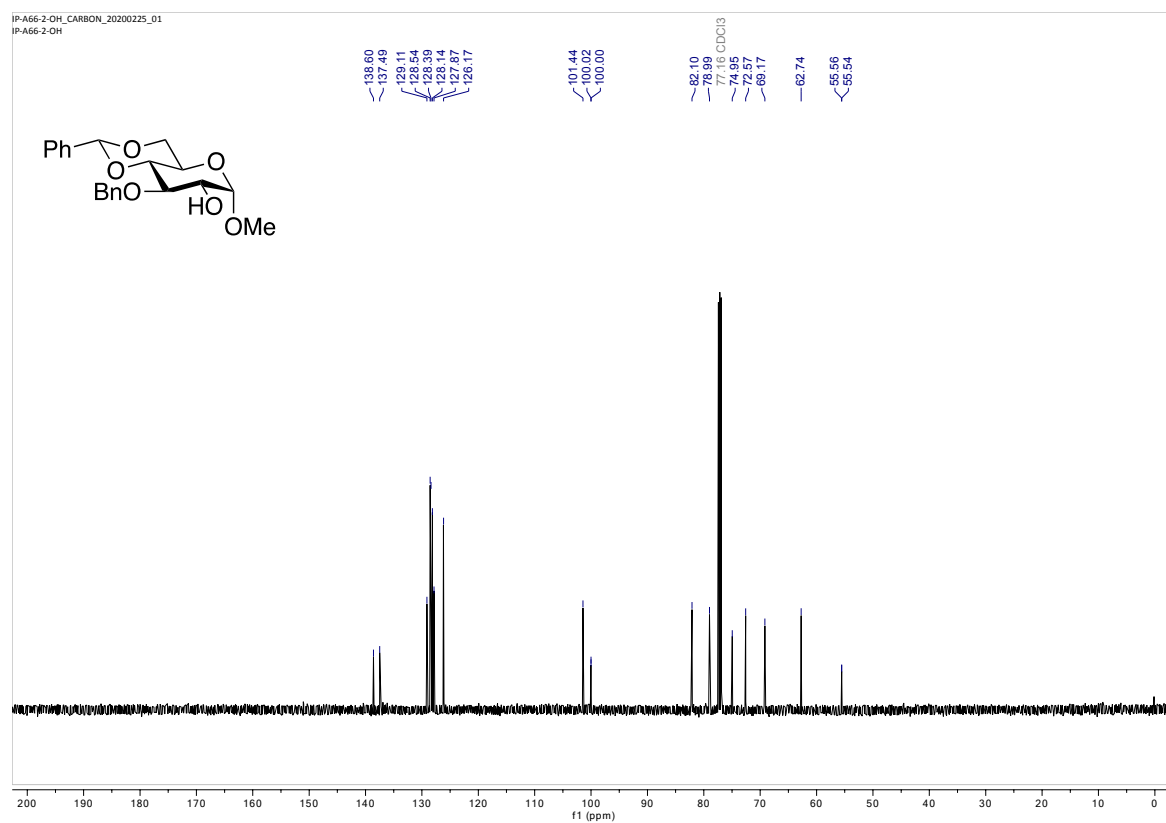
¹³C NMR (126 MHz, Chloroform-*d*) 3b



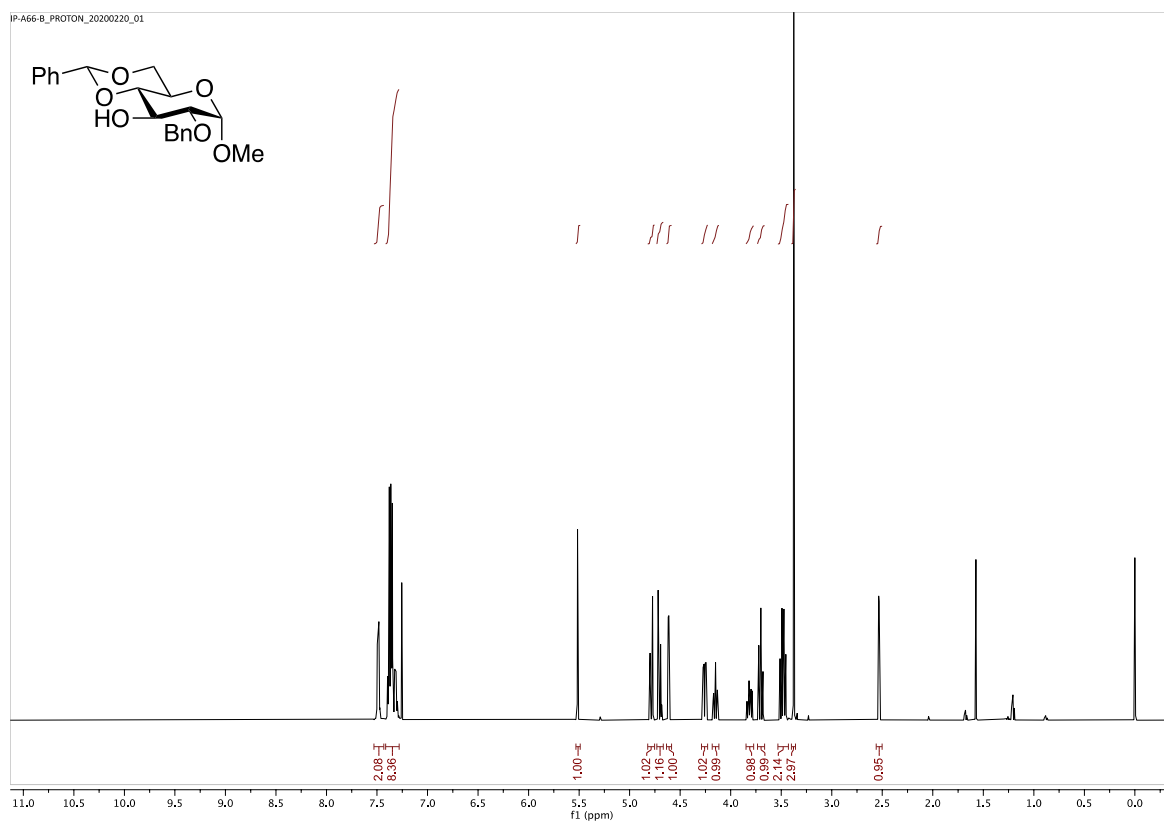
¹H NMR (500 MHz, Chloroform-*d*) S40



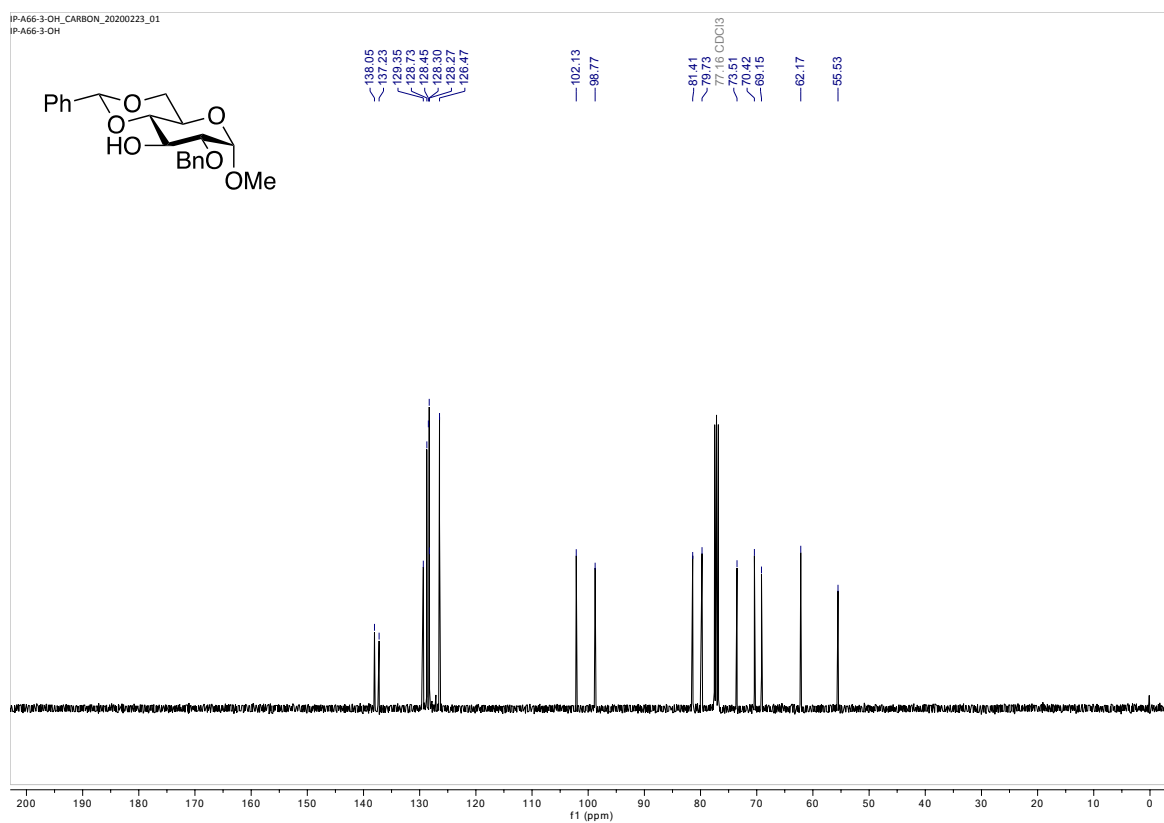
¹³C NMR (126 MHz, Chloroform-*d*) S40



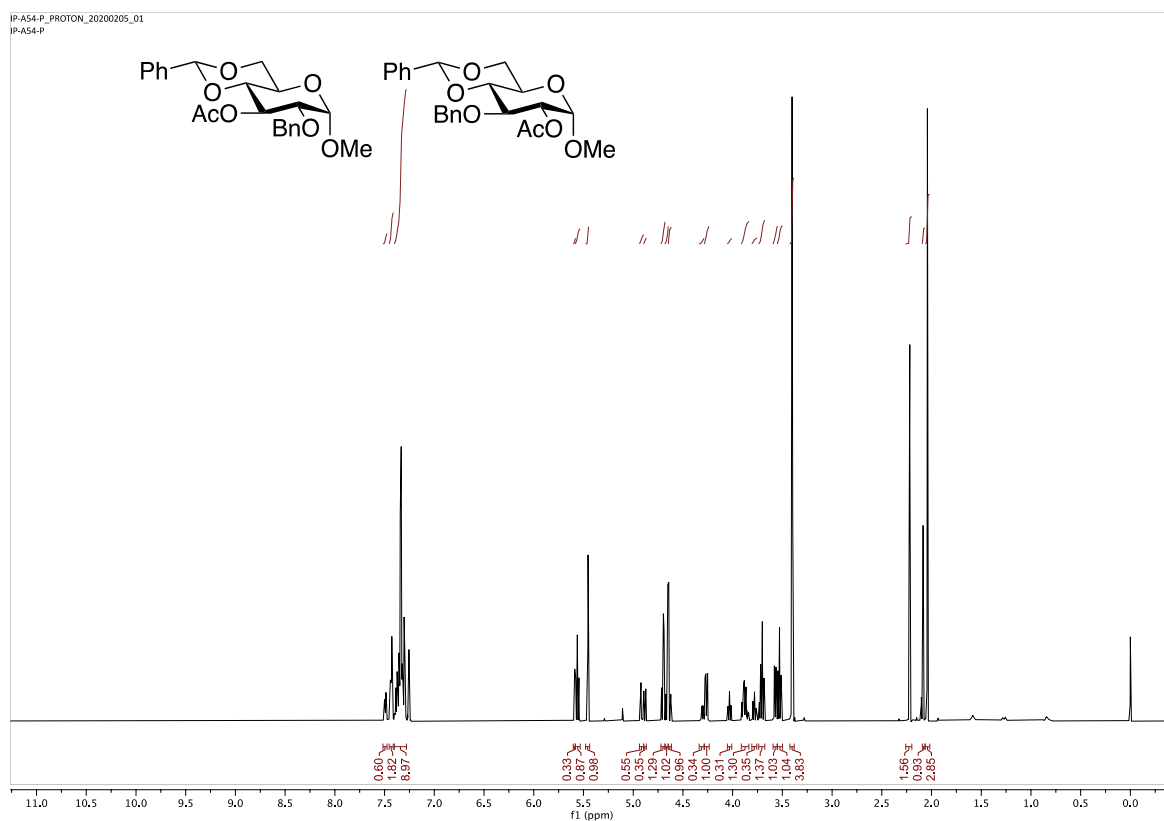
¹H NMR (400 MHz, Chloroform-*d*) 3d



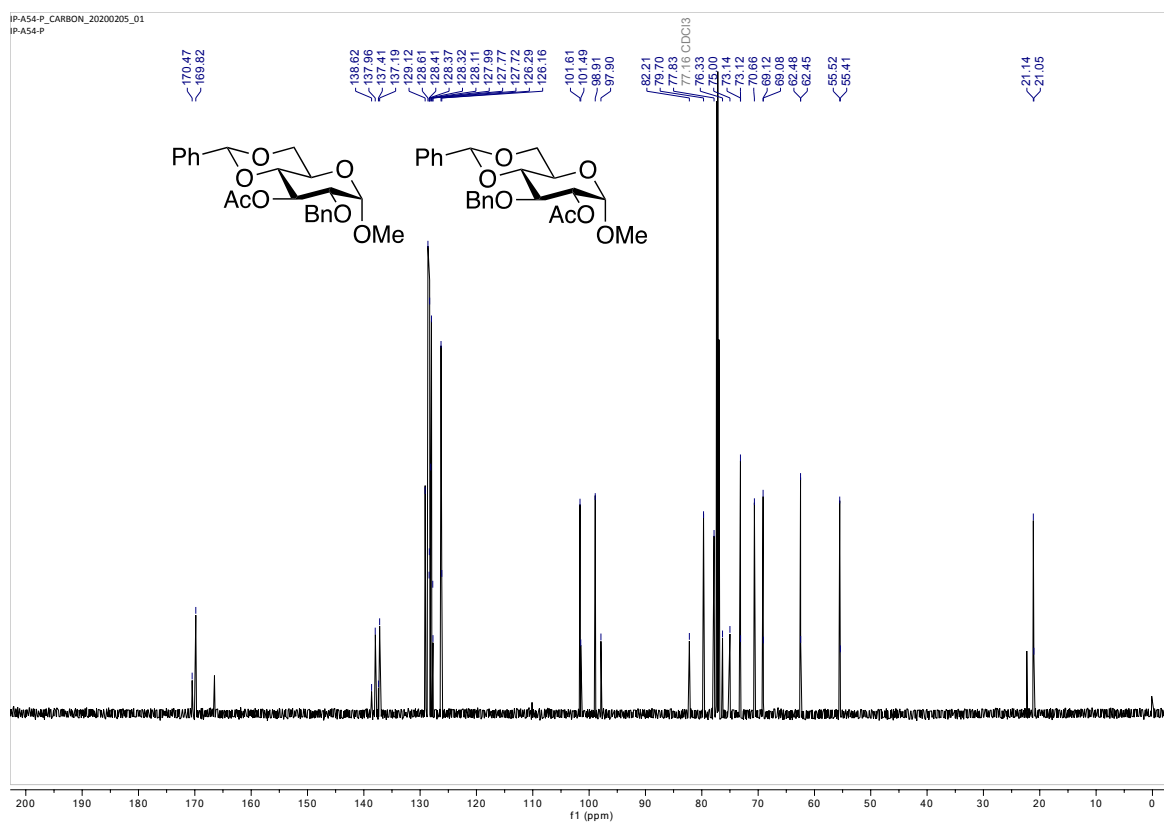
¹³C NMR (101 MHz, Chloroform-*d*) 3d



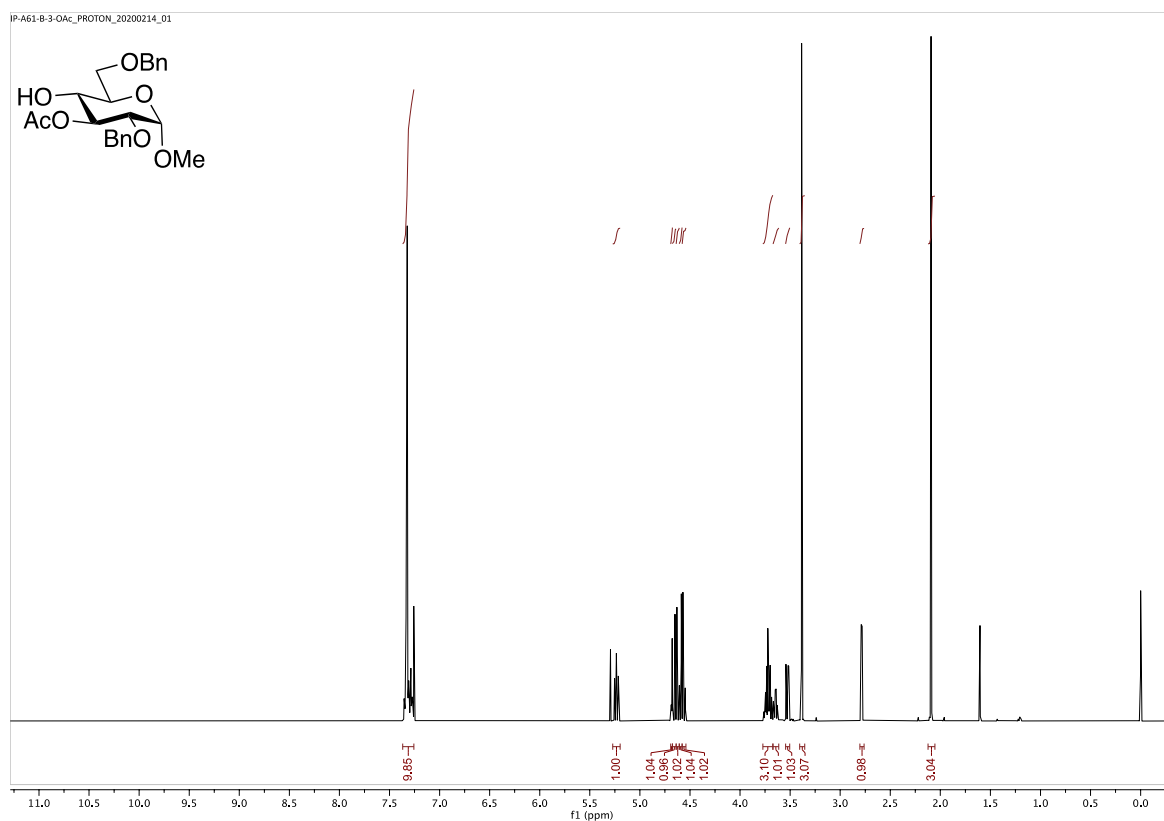
¹H NMR (600 MHz, Chloroform-*d*) S41 and S42



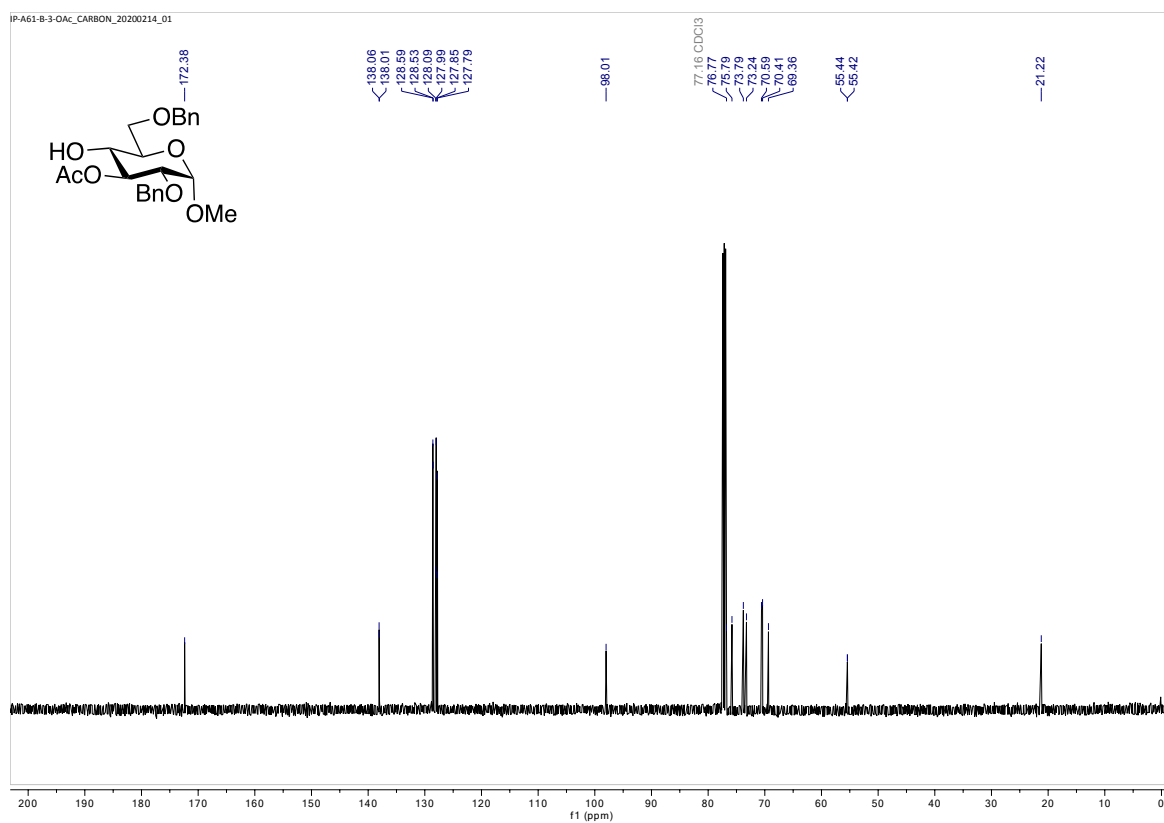
¹³C NMR (151 MHz, Chloroform-*d*) S41 and S42



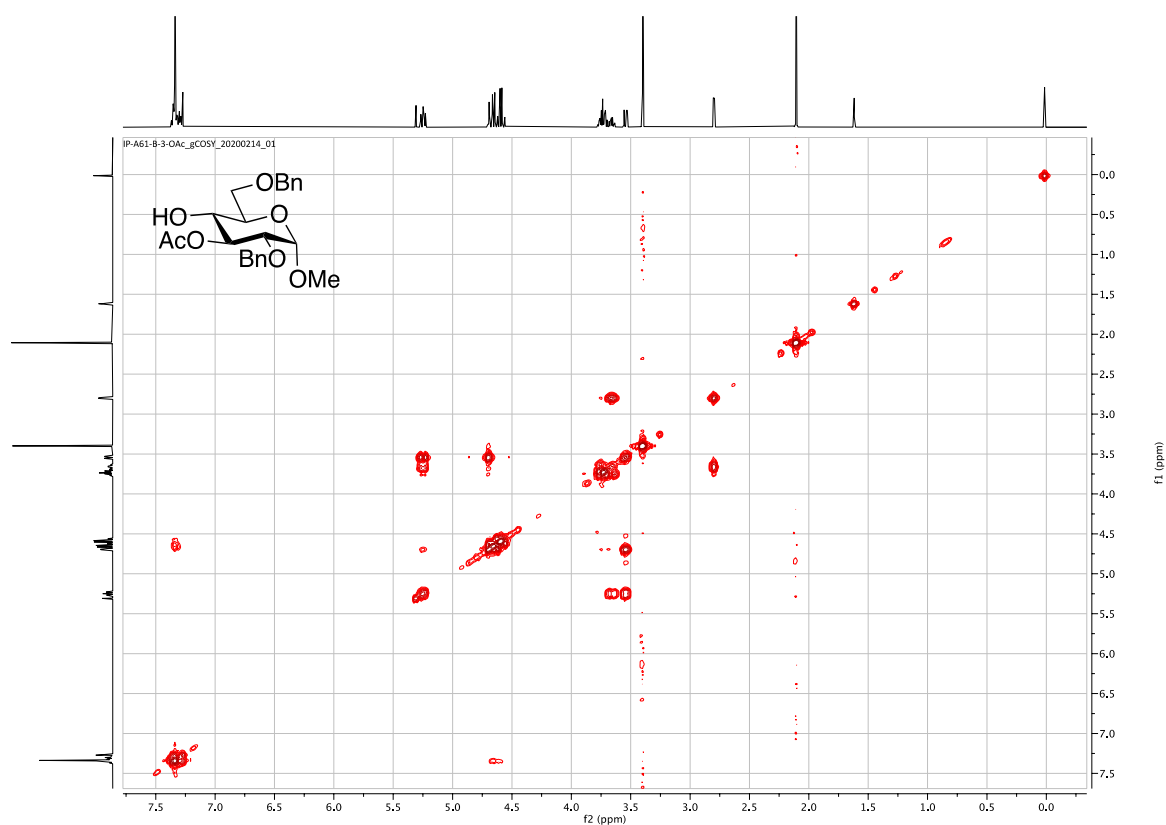
¹H NMR (500 MHz, Chloroform-*d*) S43



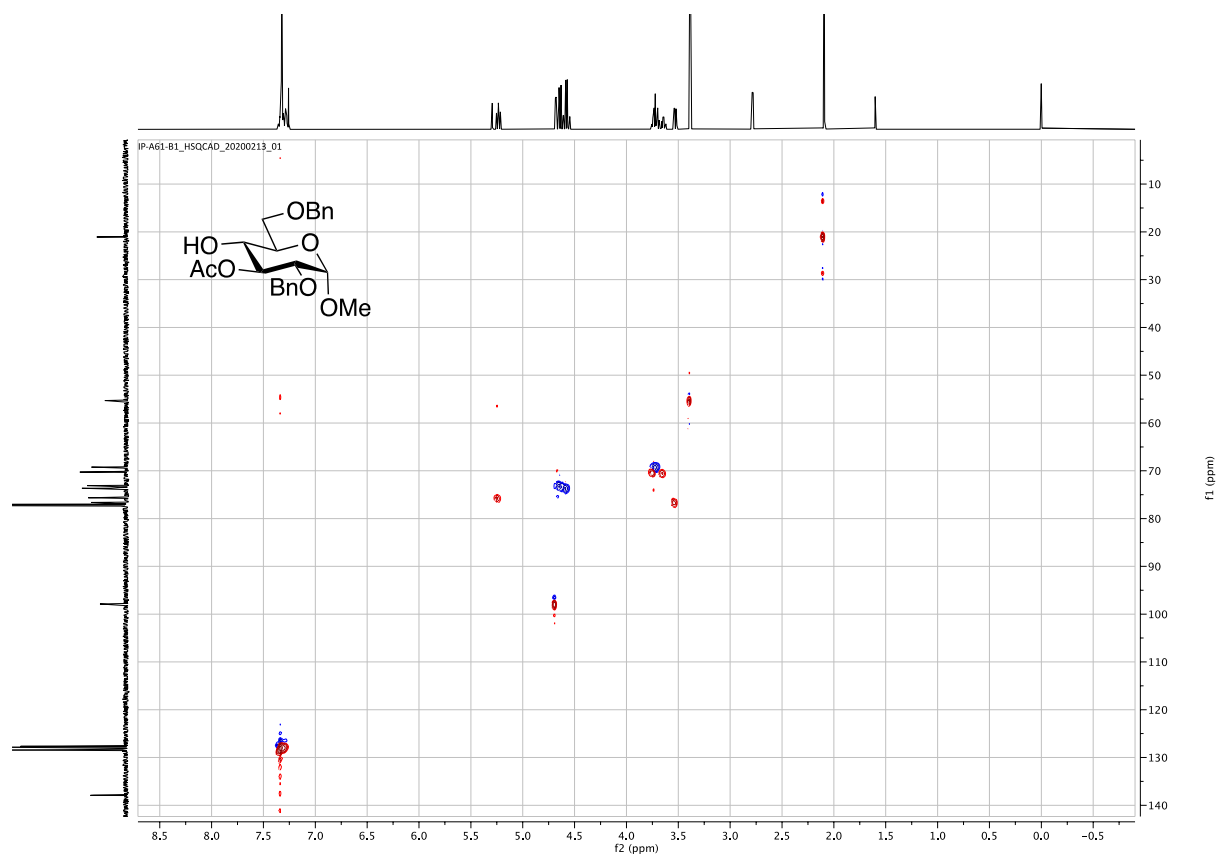
¹³C NMR (126 MHz, Chloroform-*d*) S43



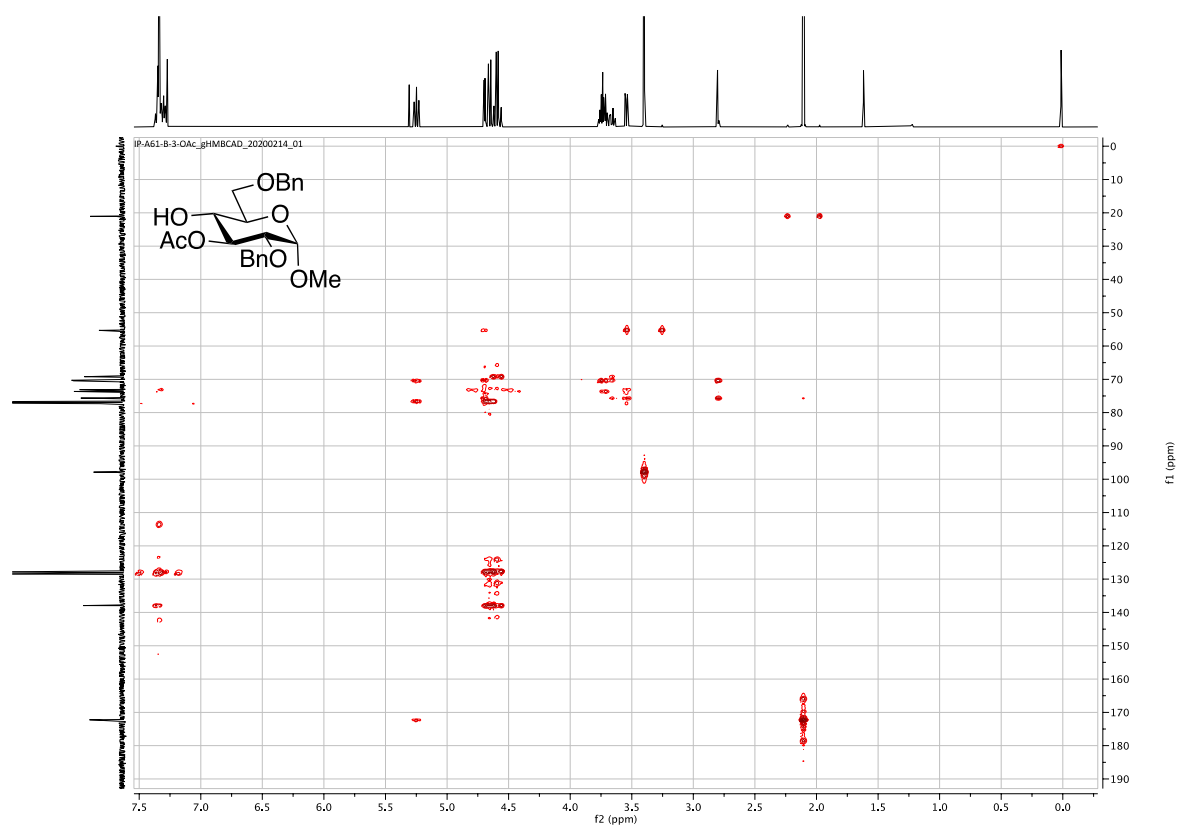
COSY NMR (500 MHz, Chloroform-*d*) S43



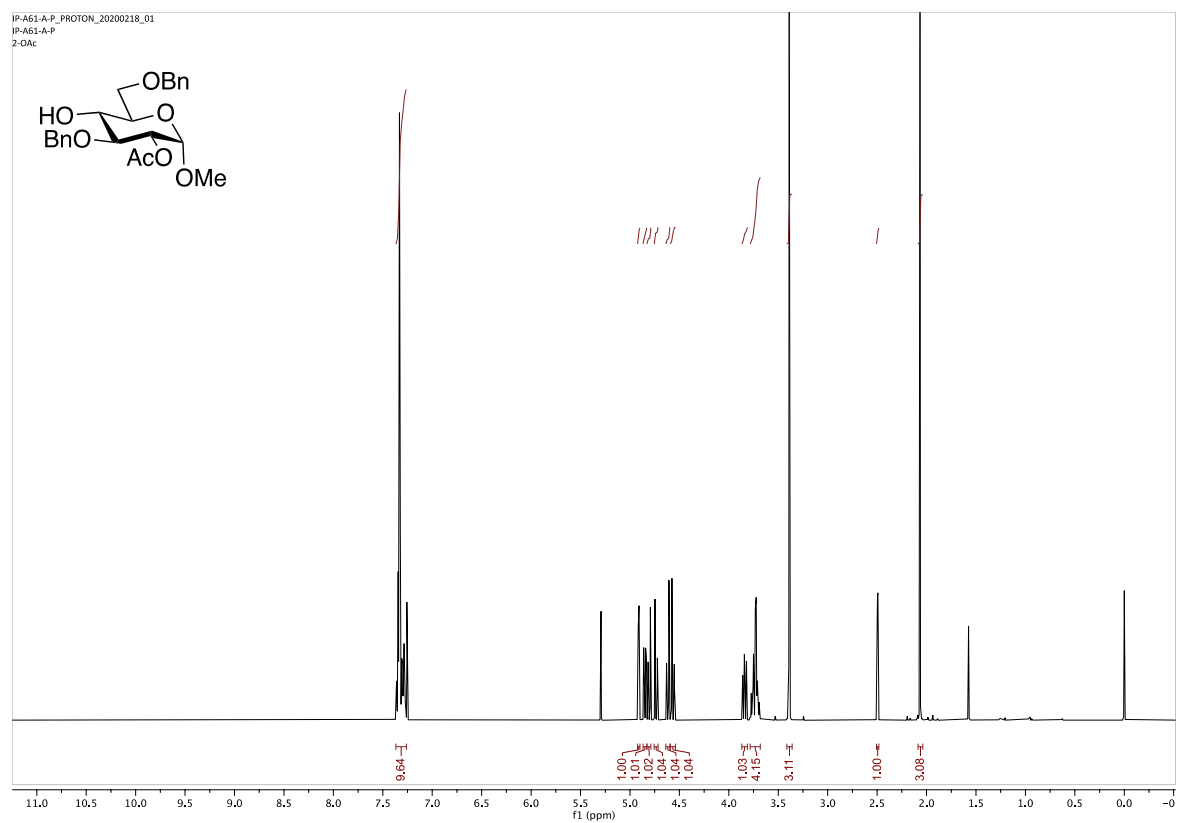
HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) S43



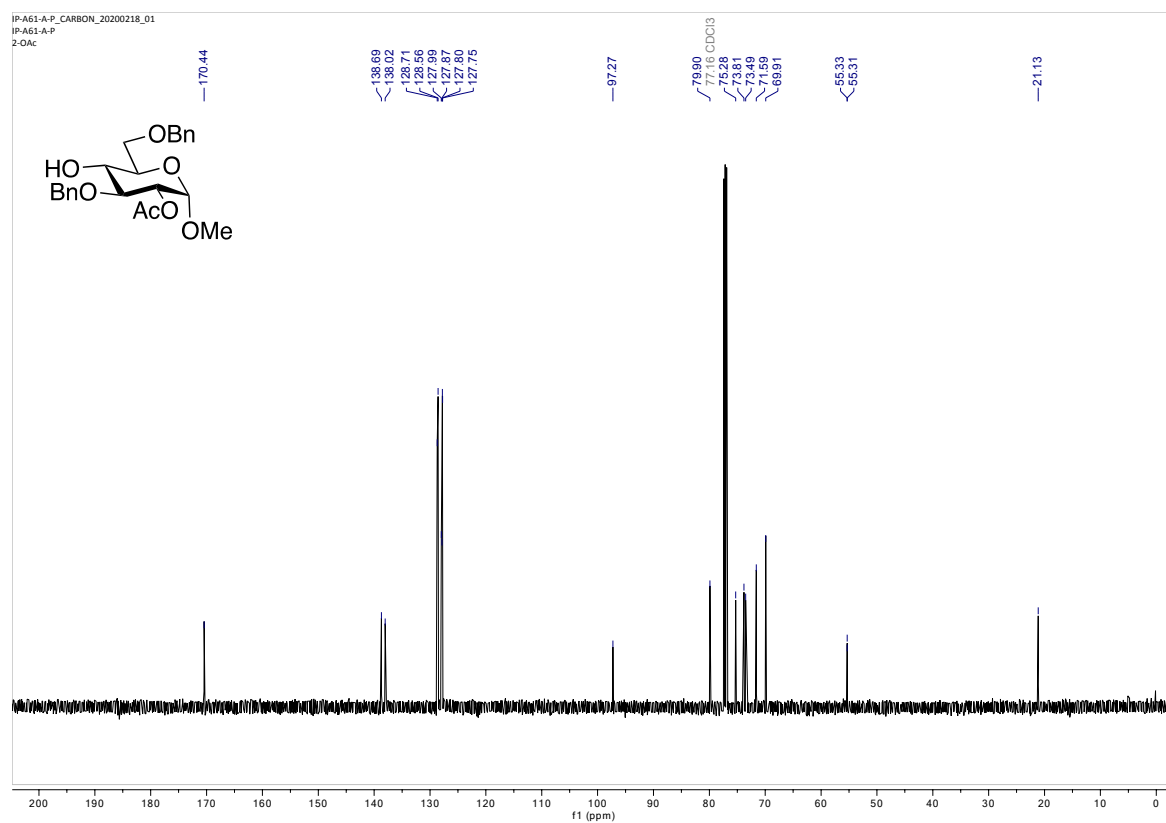
HMBC NMR (500 MHz x 126 MHz, Chloroform-*d*) S43



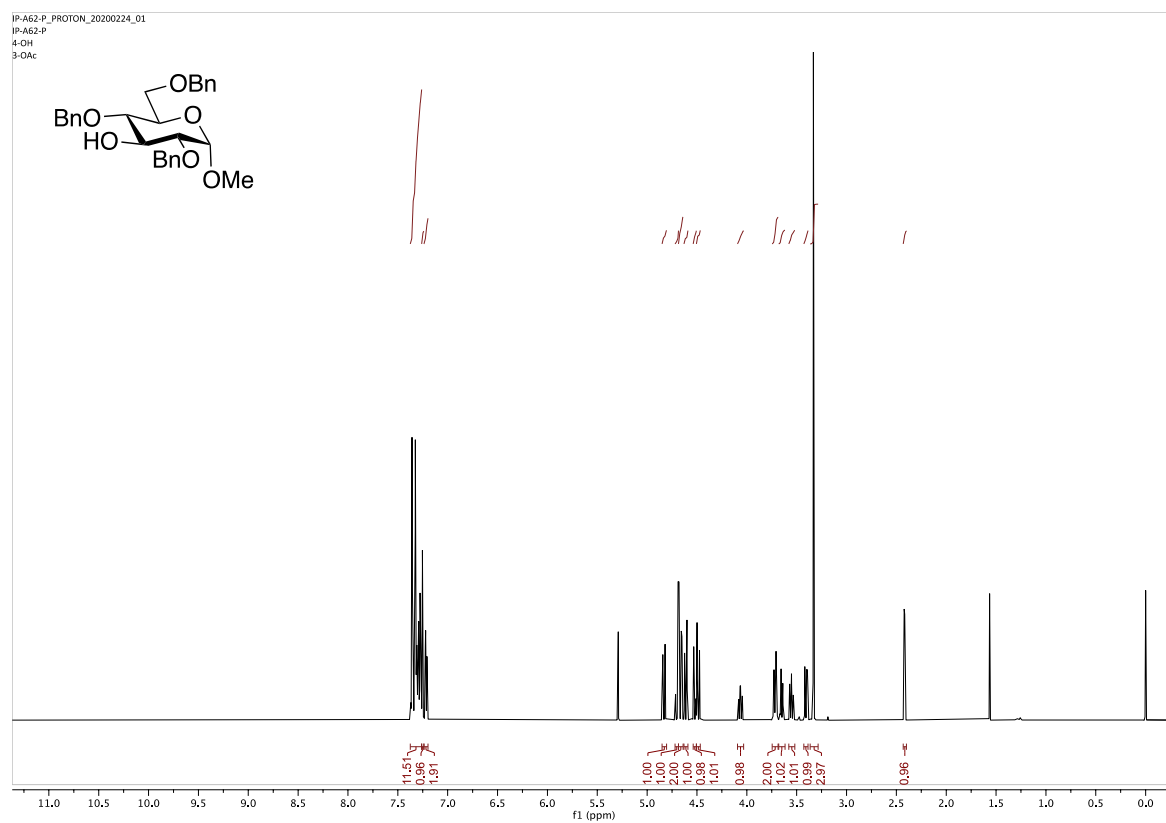
^1H NMR (500 MHz, Chloroform-*d*) S44



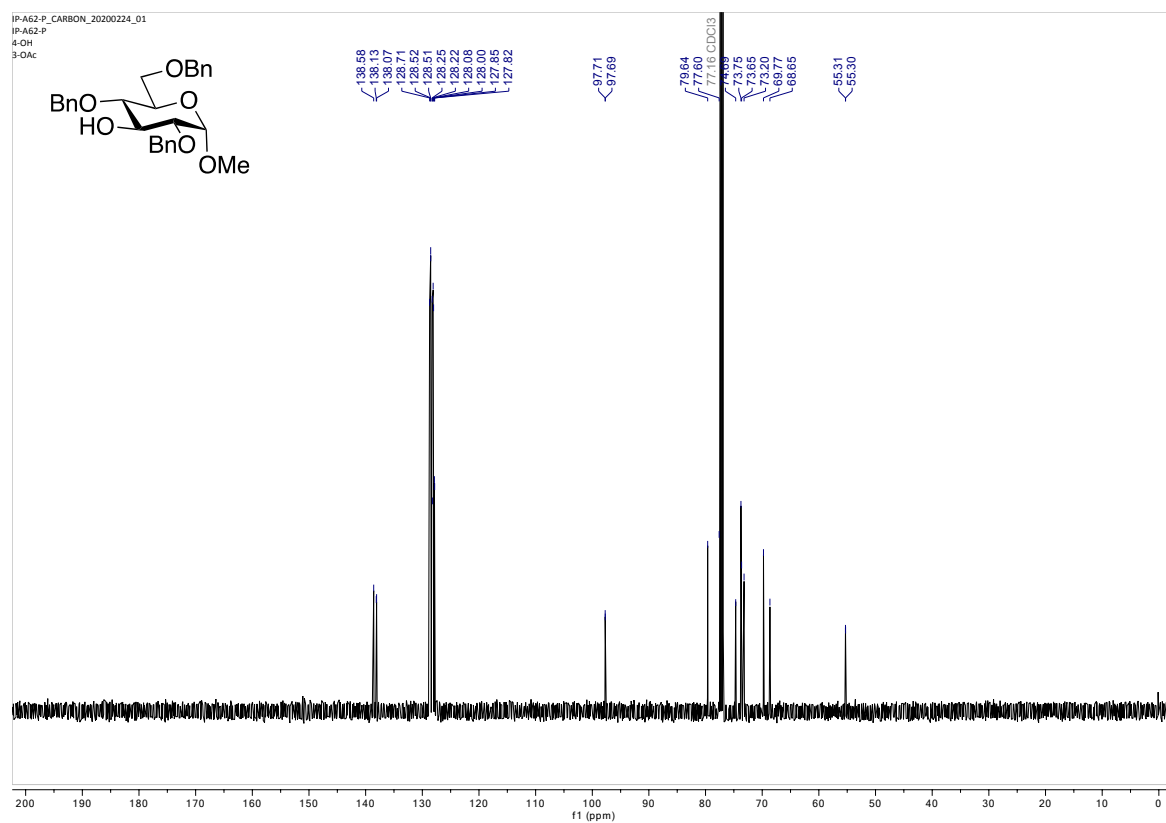
¹³C NMR (126 MHz, Chloroform-*d*) S44



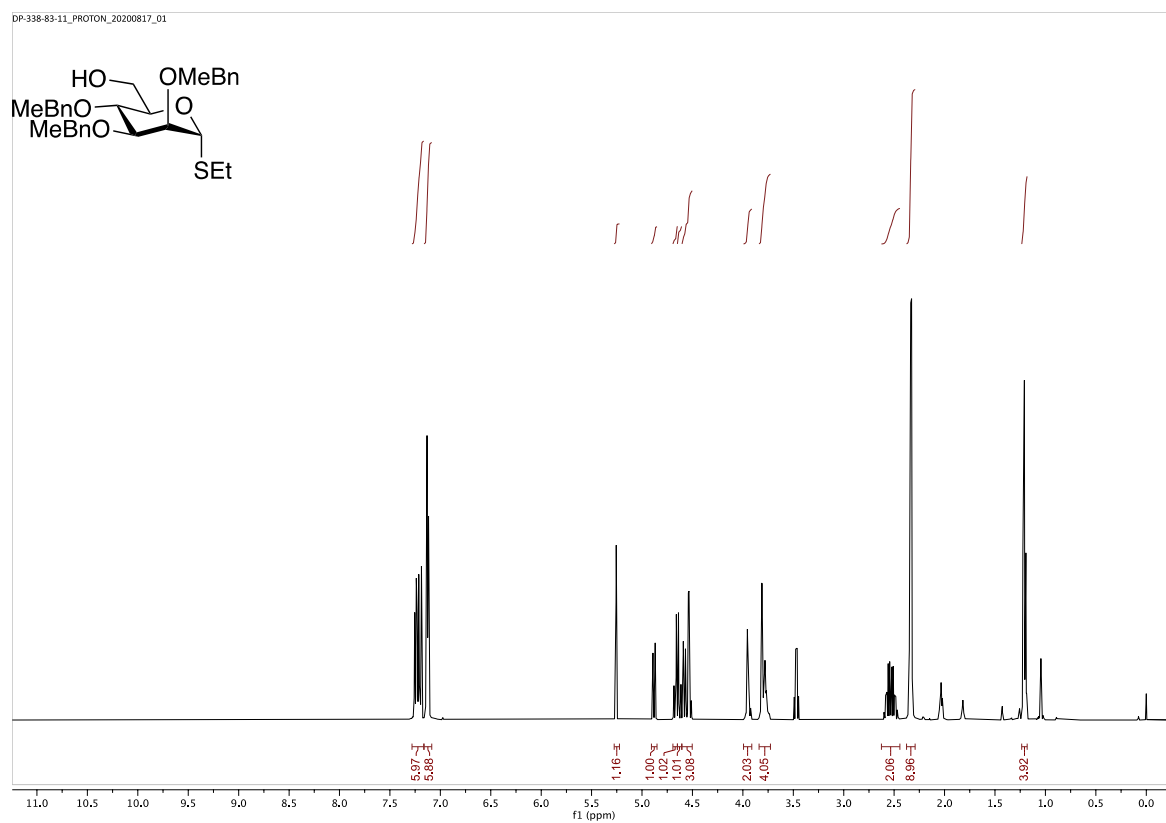
¹H NMR (500 MHz, Chloroform-*d*) 3c



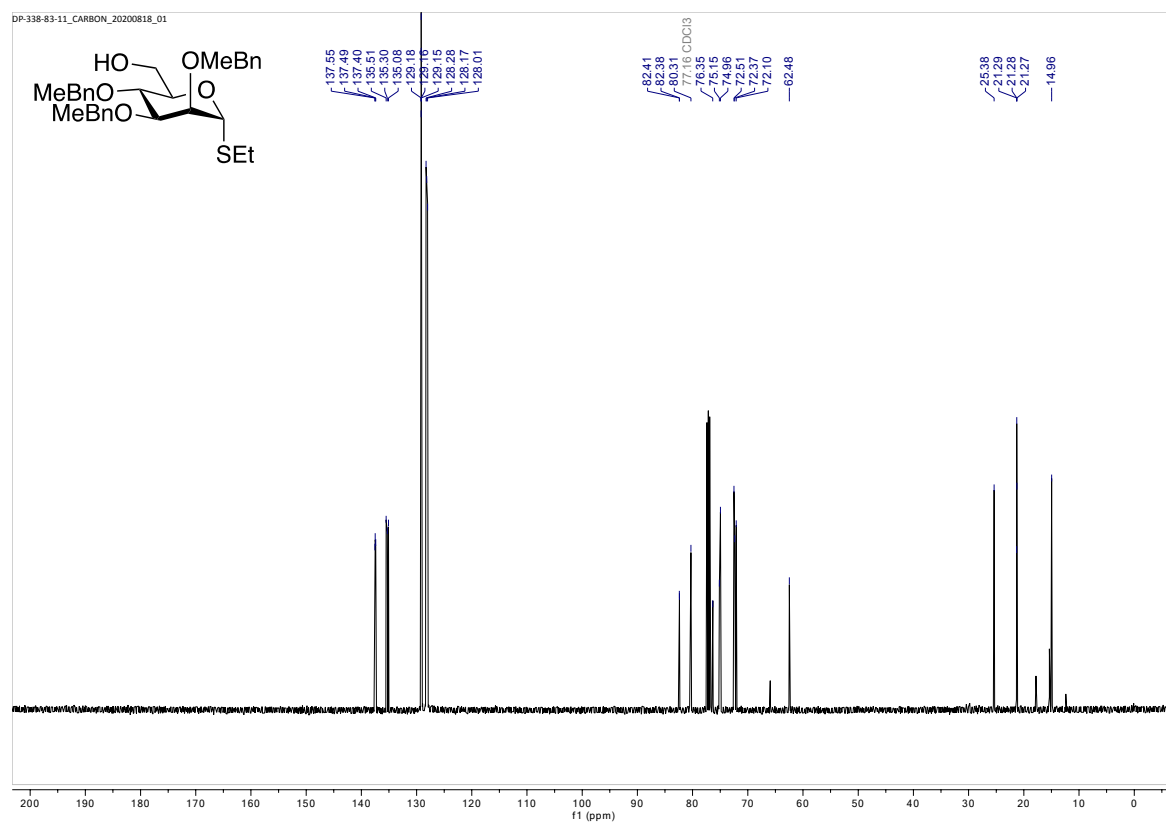
^{13}C NMR (126 MHz, Chloroform-*d*) 3c



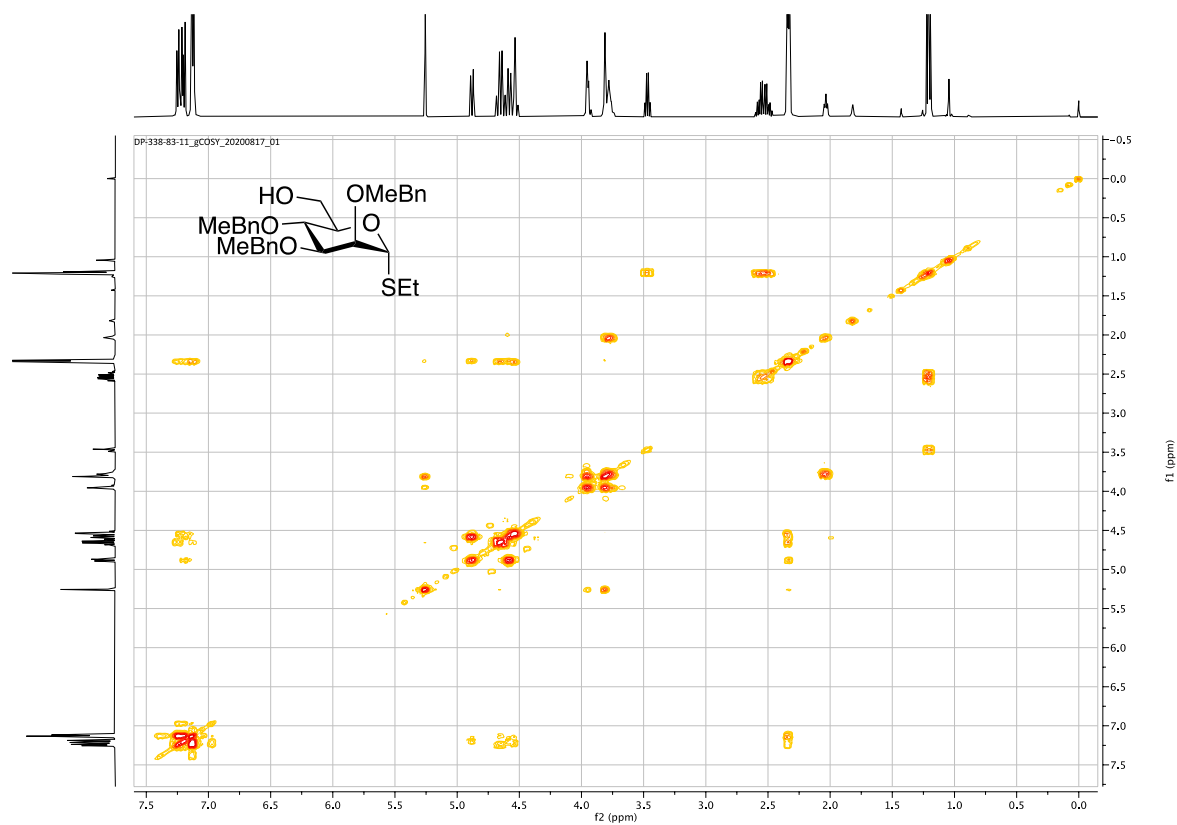
^1H NMR (500 MHz, Chloroform-*d*) 3i



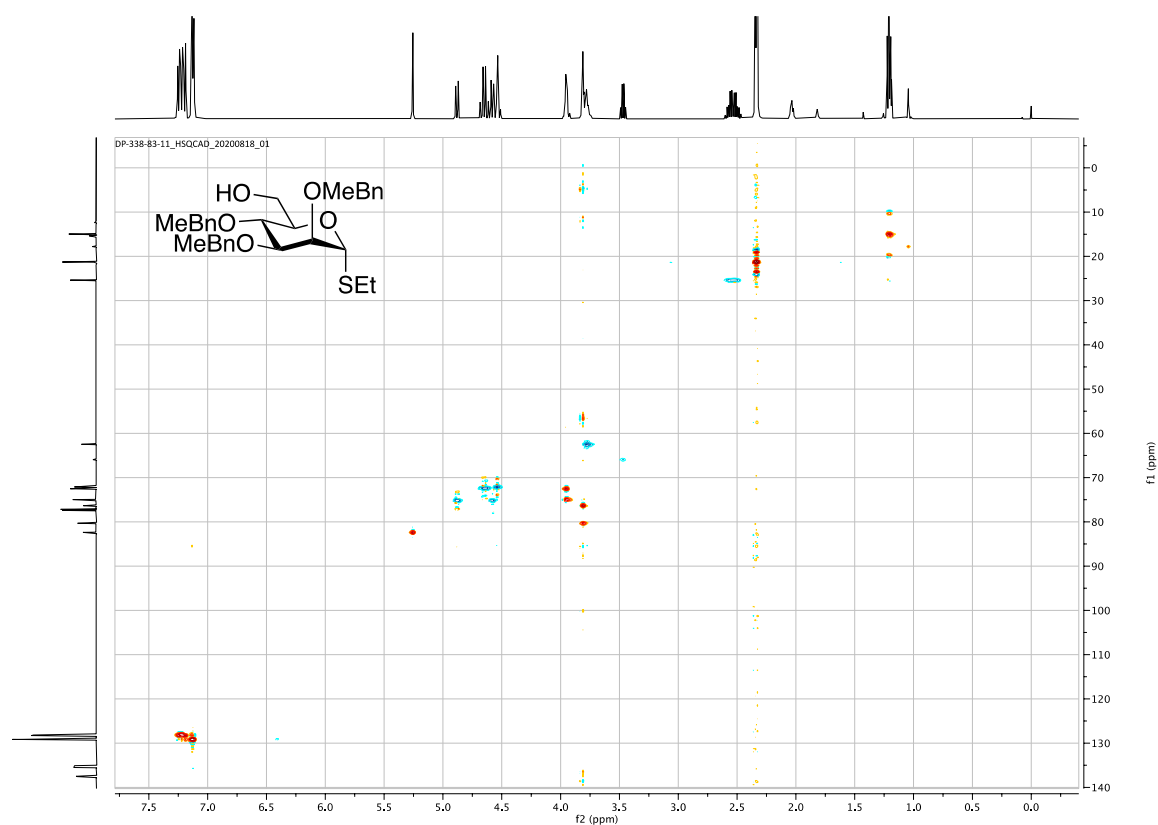
^{13}C NMR (126 MHz, Chloroform-*d*) 3i



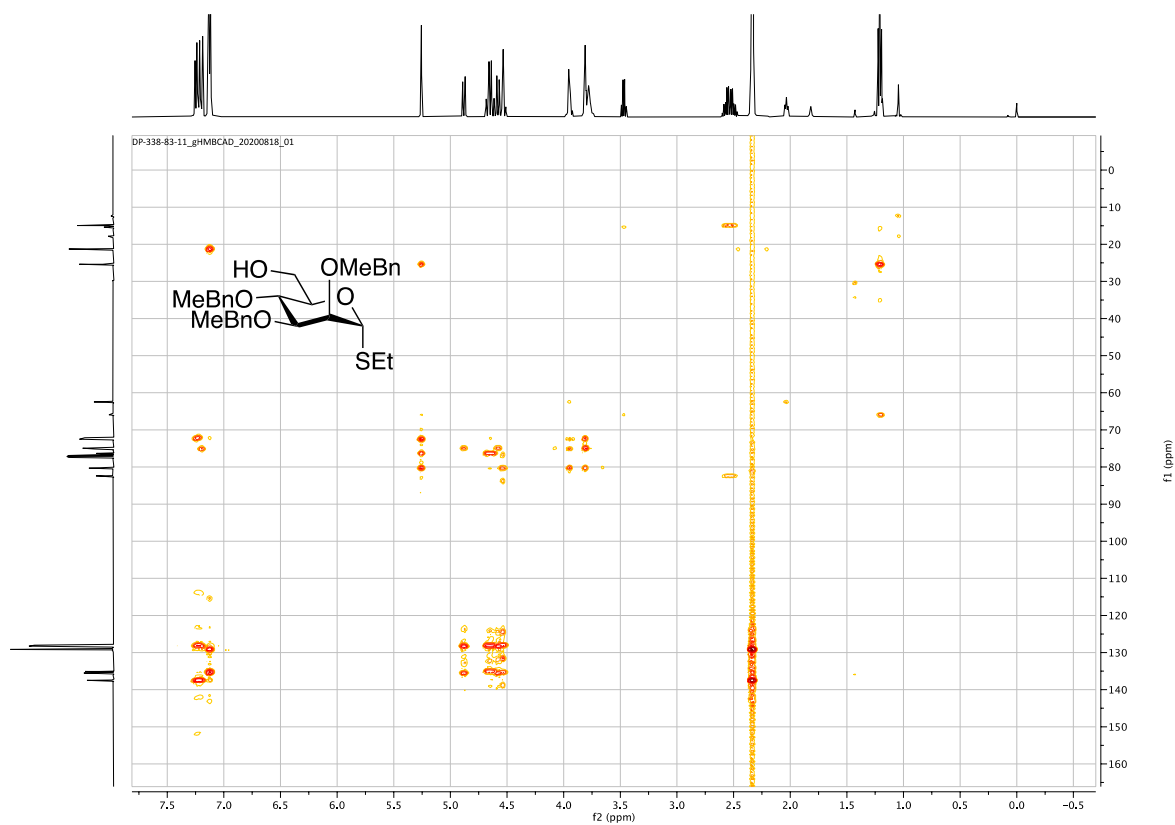
COSY NMR (500 MHz, Chloroform-*d*) 3i



HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) 3i

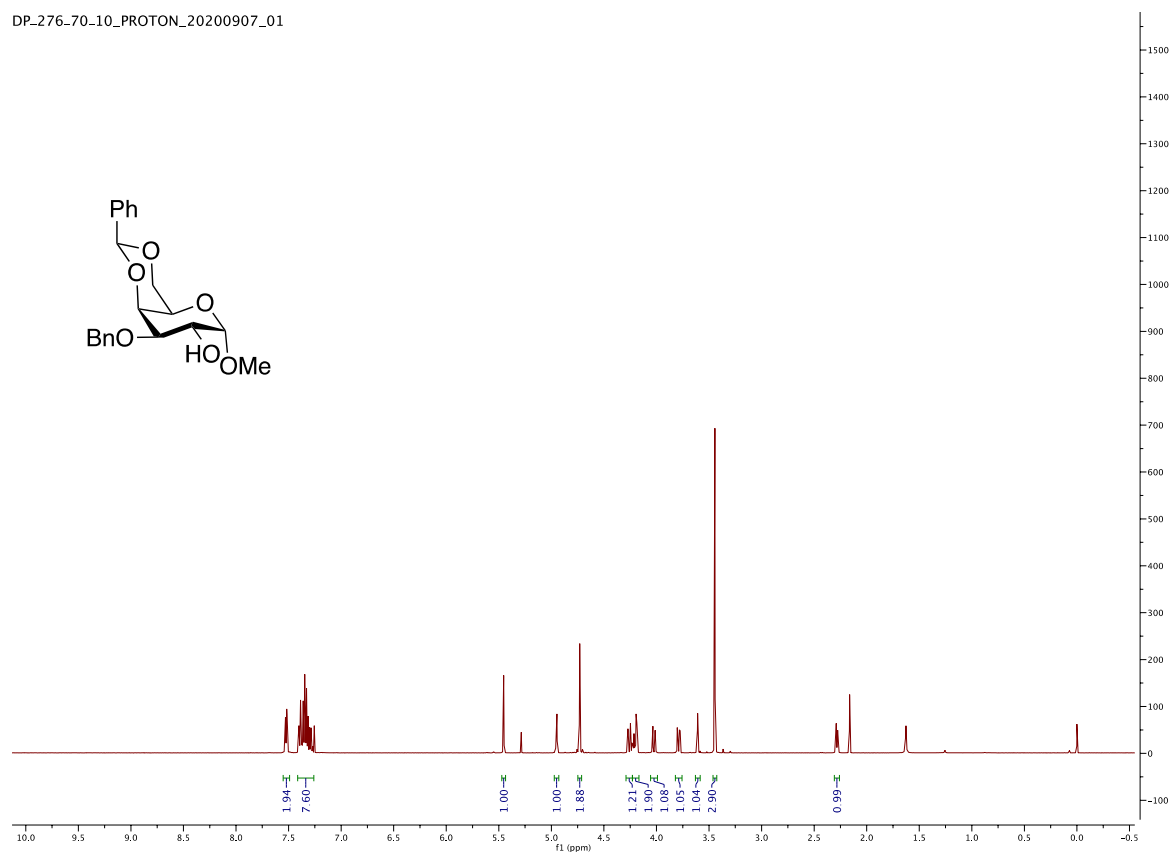


HMBC NMR (500 MHz x 126 MHz, Chloroform-*d*) 3i



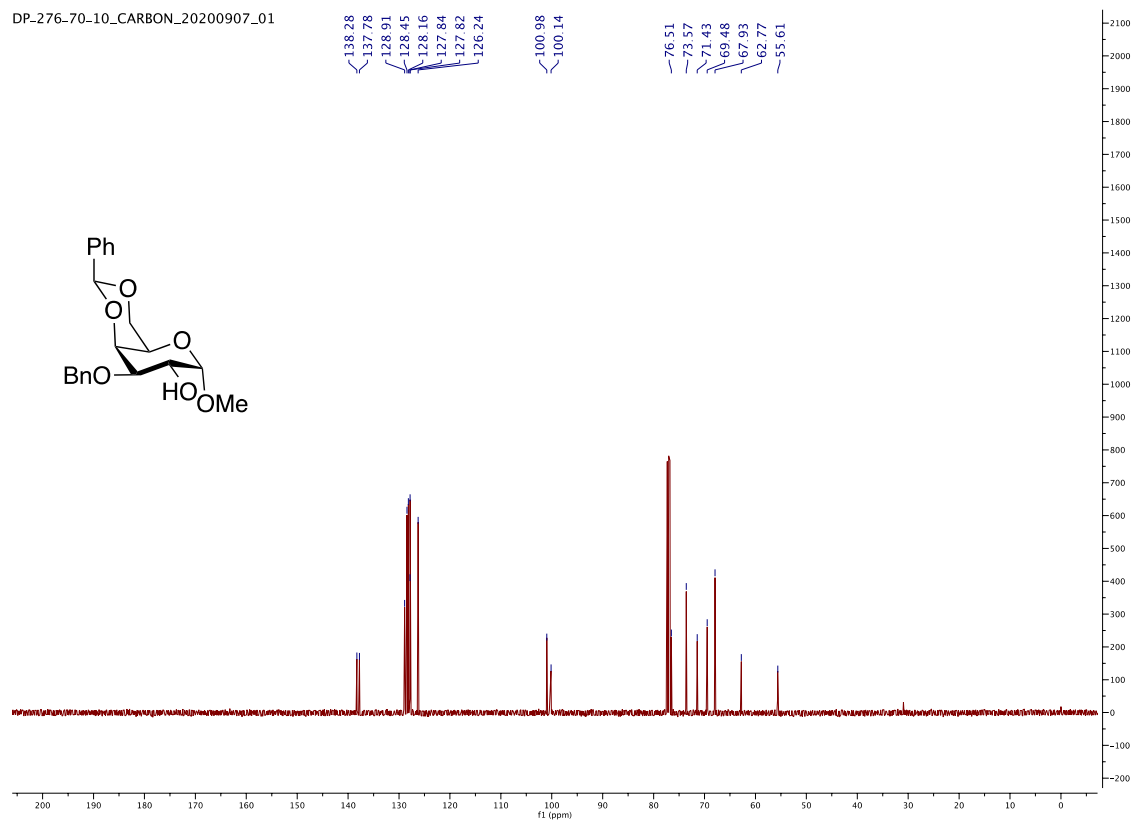
¹H NMR (500 MHz, Chloroform-*d*) 3j

DP-276-70-10_PROTON_20200907_01



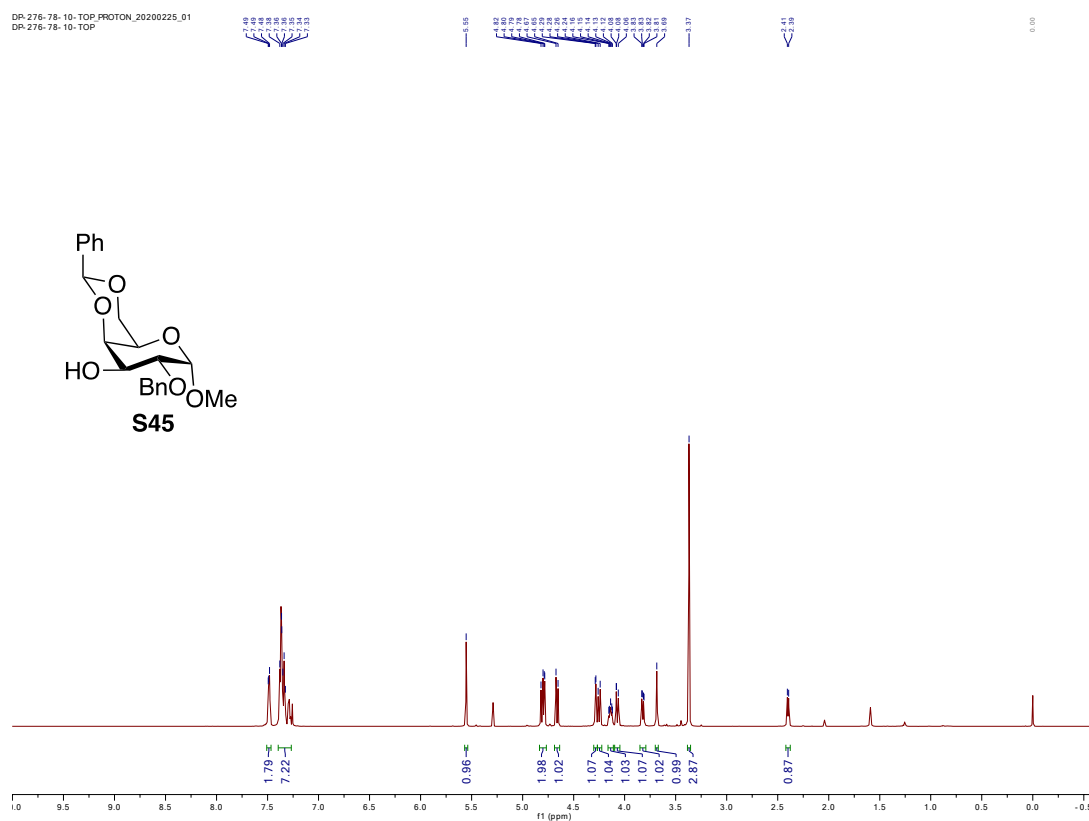
¹³C NMR (126 MHz, Chloroform-*d*) 3j

DP-276-70-10_CARBON_20200907_01



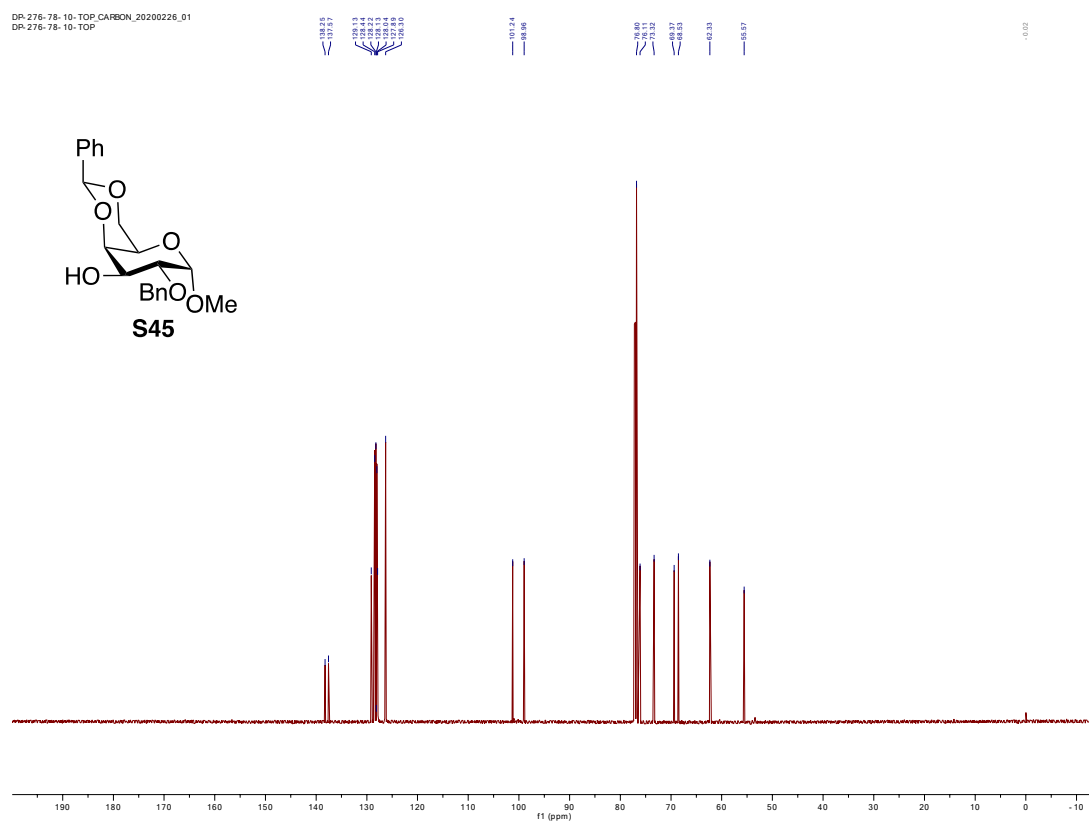
¹H NMR (500 MHz, Chloroform-*d*) S46

DP-276-78-10-TOP PROTON_20200225_01
DP-276-78-10-TOP

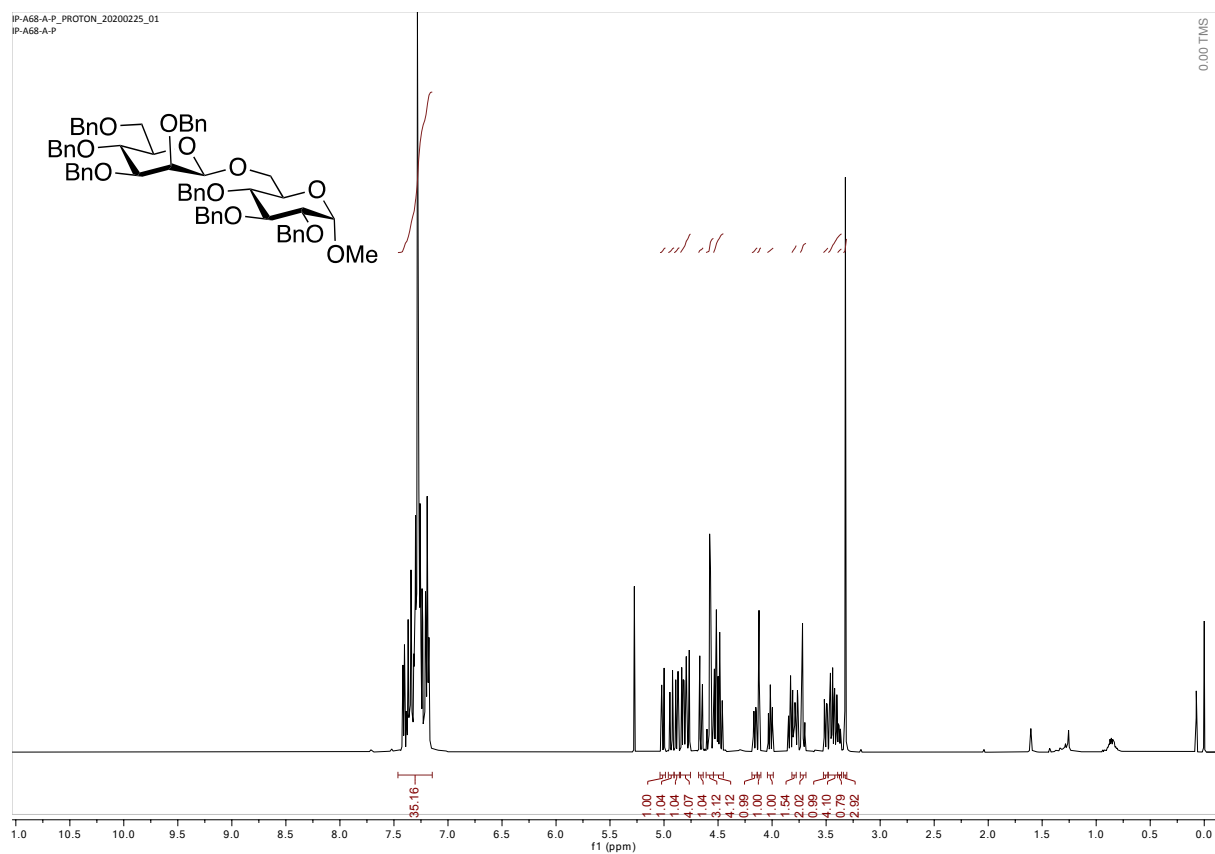


¹³C NMR (126 MHz, Chloroform-*d*) S46

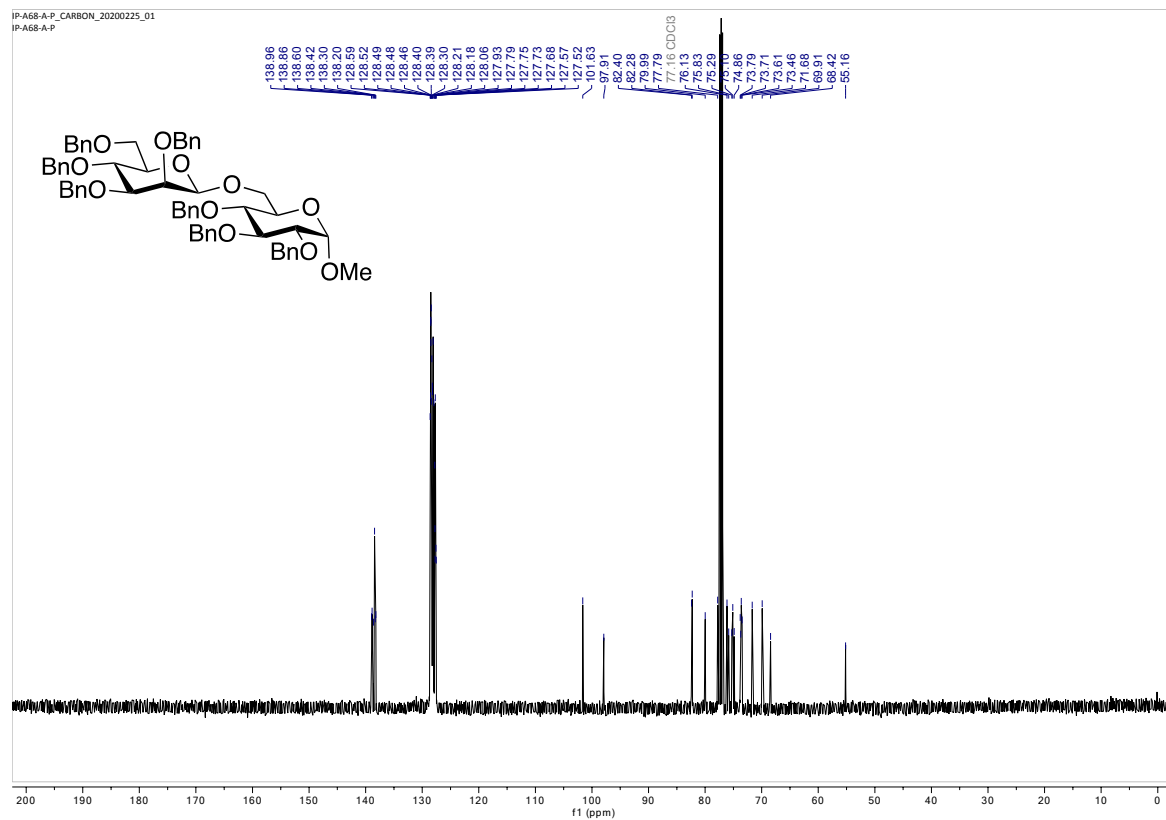
DP-276-78-10-TOP CARBON_20200226_01
DP-276-78-10-TOP



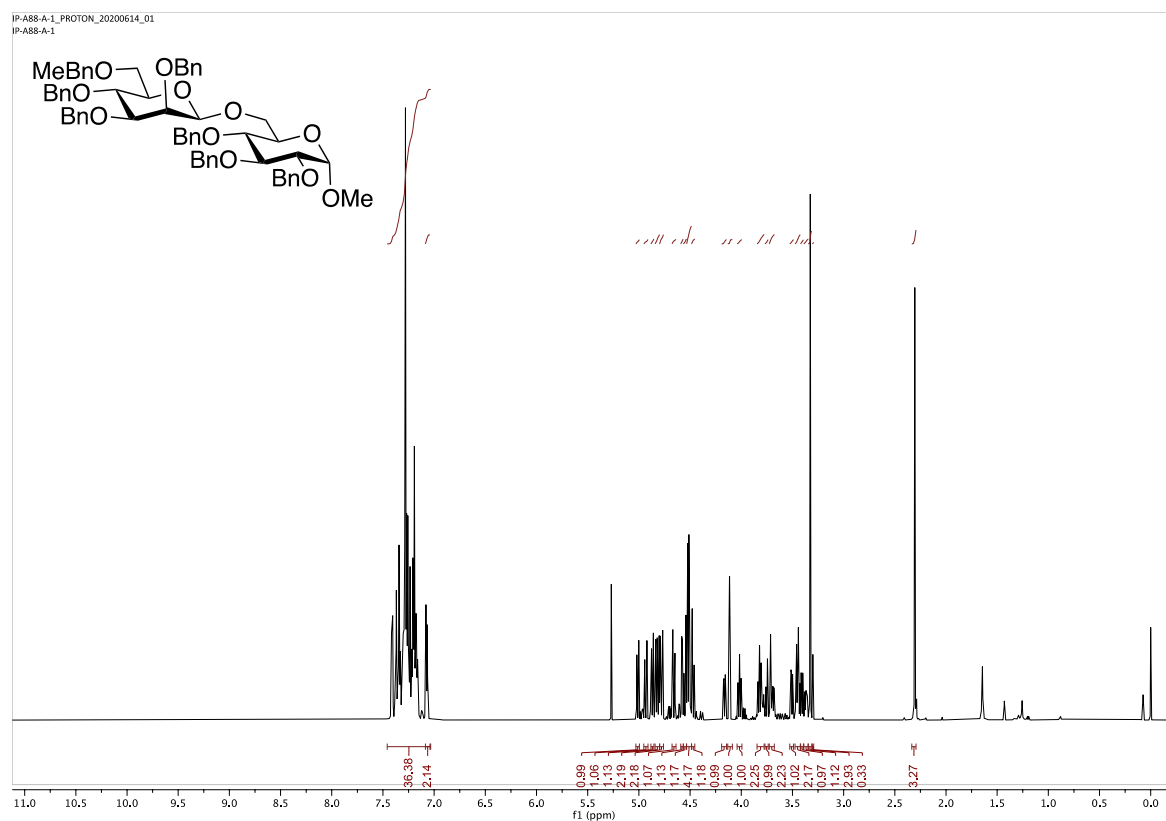
¹H NMR (500 MHz, Chloroform-*d*) 2a



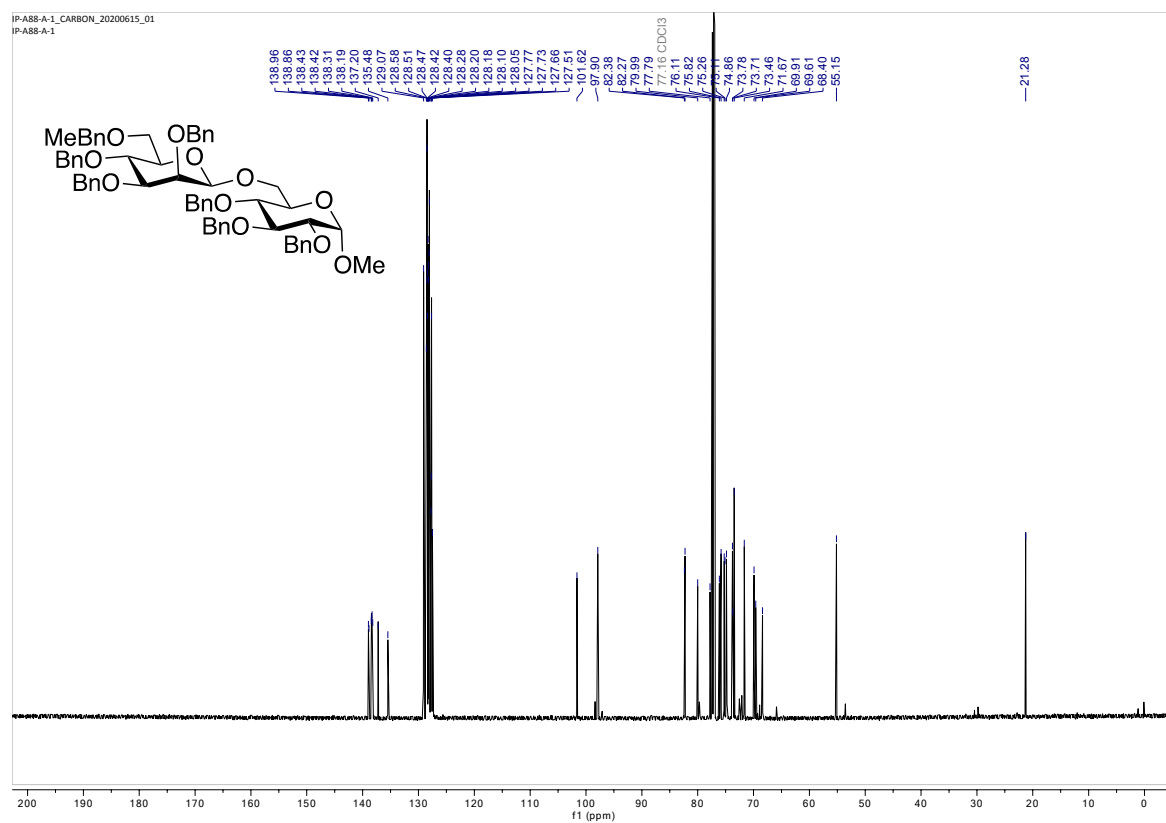
¹³C NMR (126 MHz, Chloroform-*d*) 2a



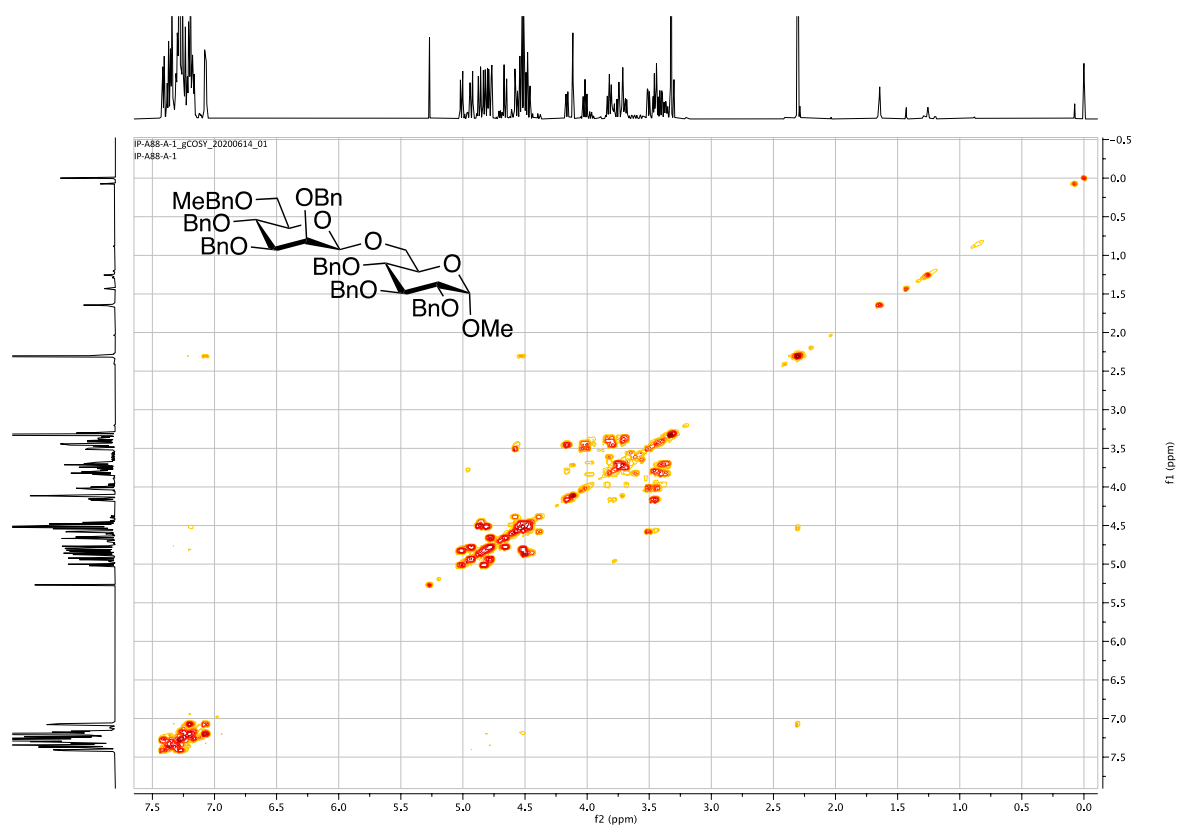
¹H NMR (600 MHz, Chloroform-*d*) 2b



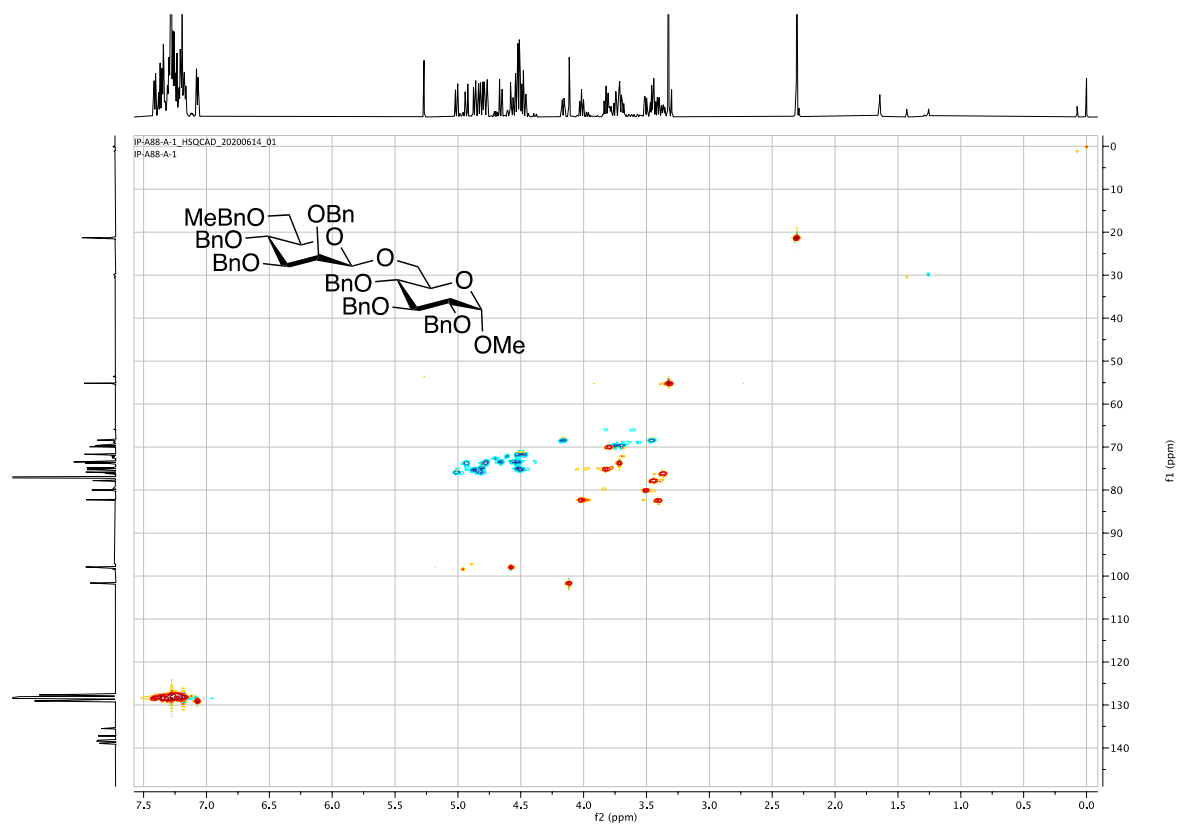
¹³C NMR (151 MHz, Chloroform-*d*) 2b



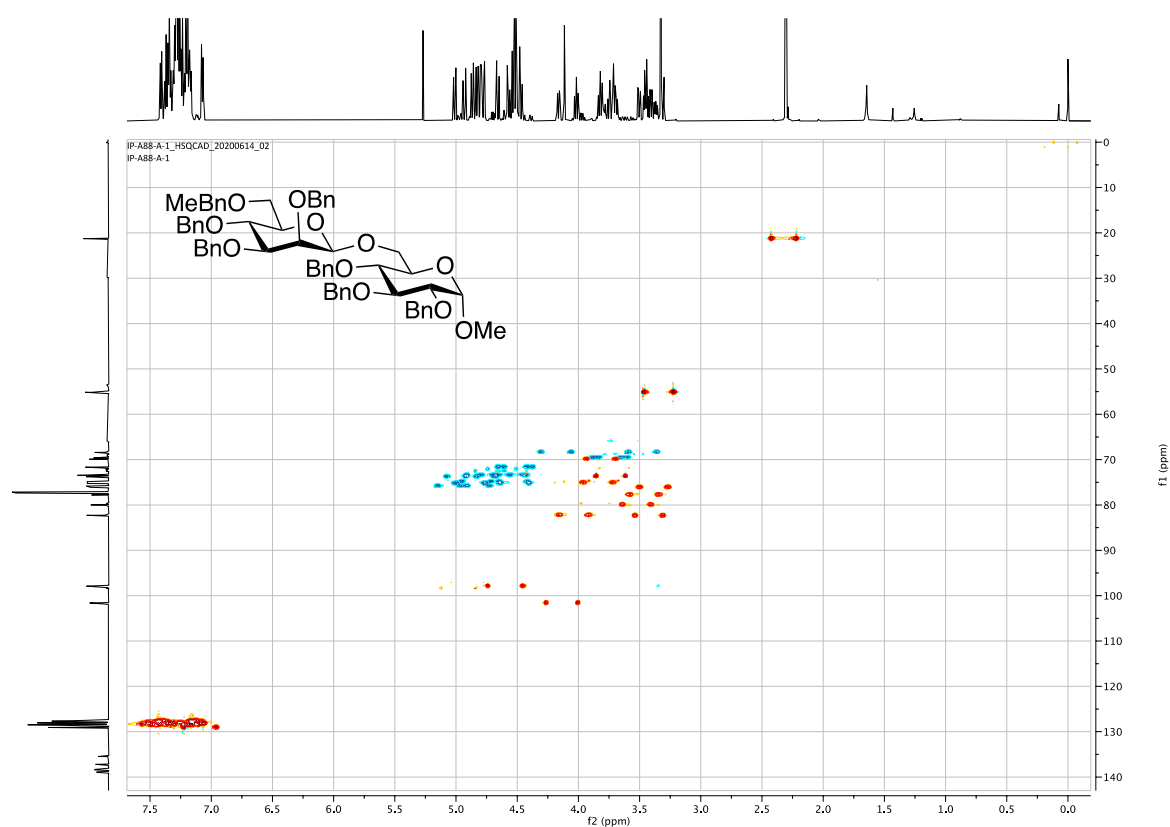
COSY NMR (600 MHz, Chloroform-*d*) 2b



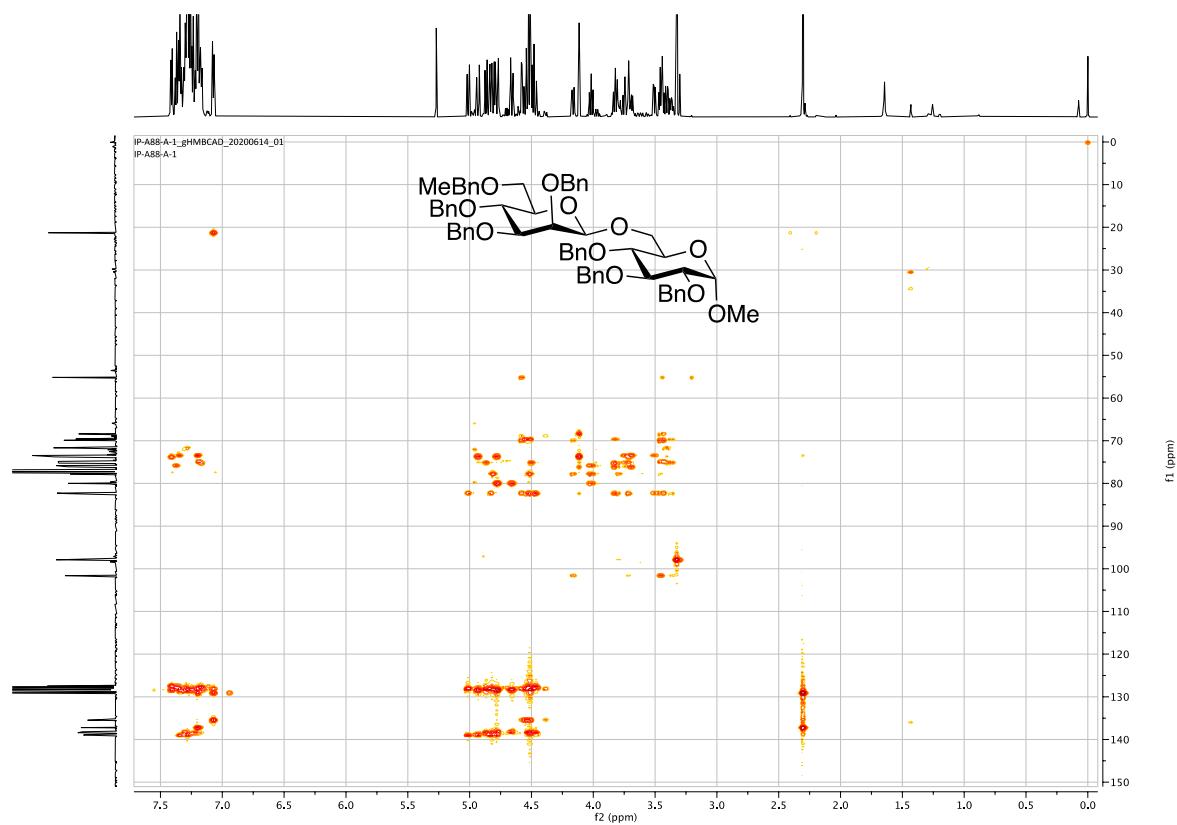
HSQC NMR (600 MHz x 151 MHz, Chloroform-*d*) 2b



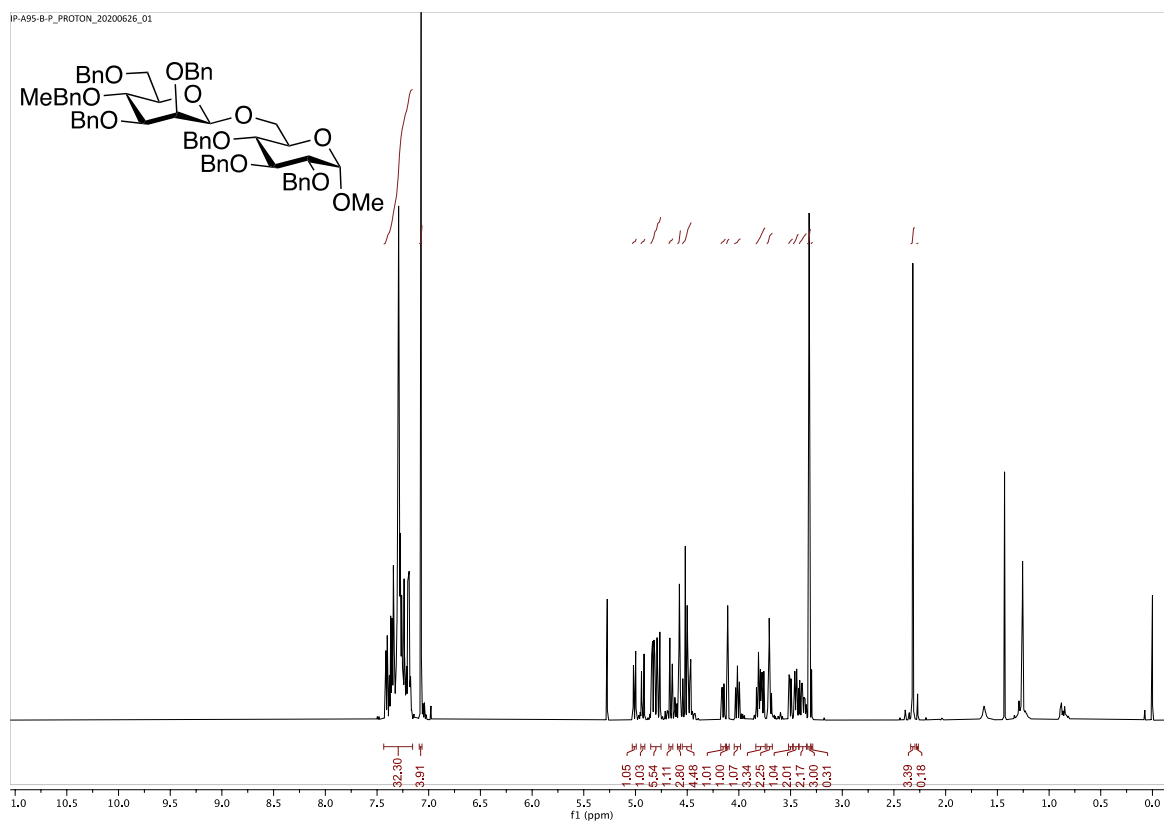
^{13}C - ^1H coupled HSQC NMR (600 MHz x 151 MHz, Chloroform-*d*) 2b



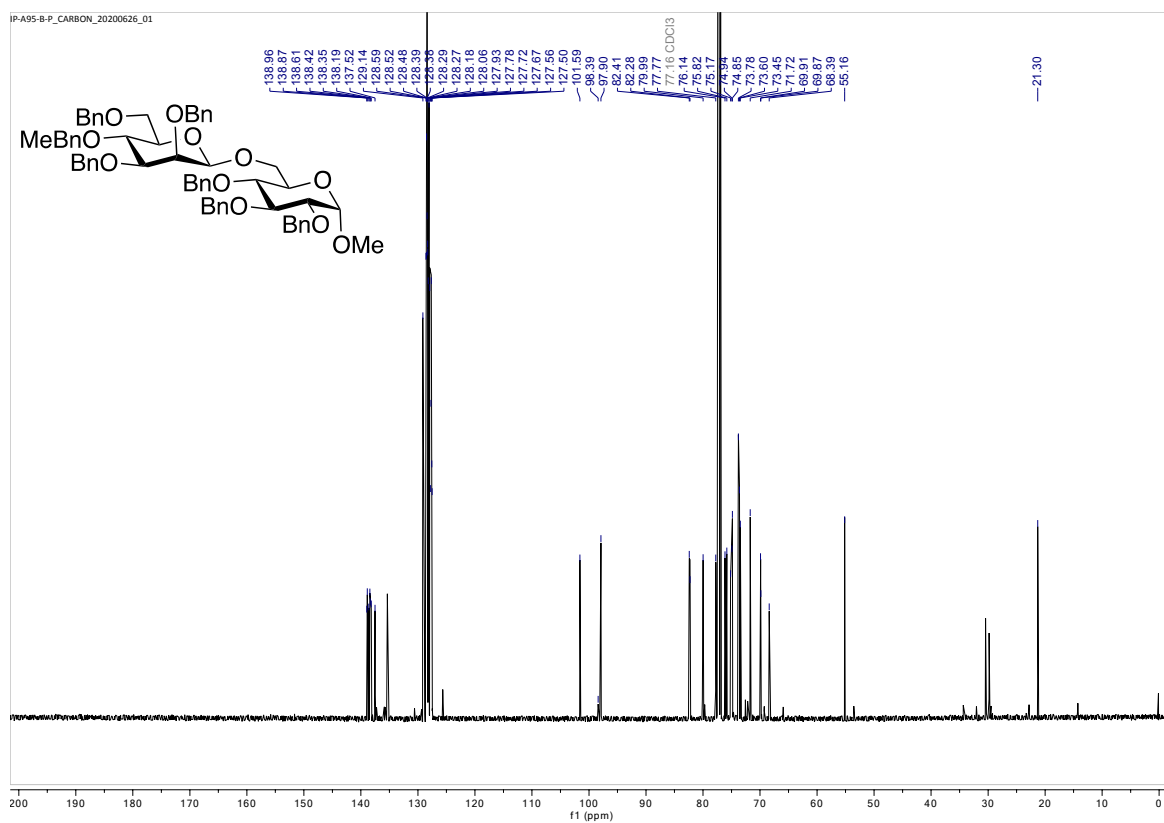
HMBC NMR (600 MHz x 151 MHz, Chloroform-*d*) 2b



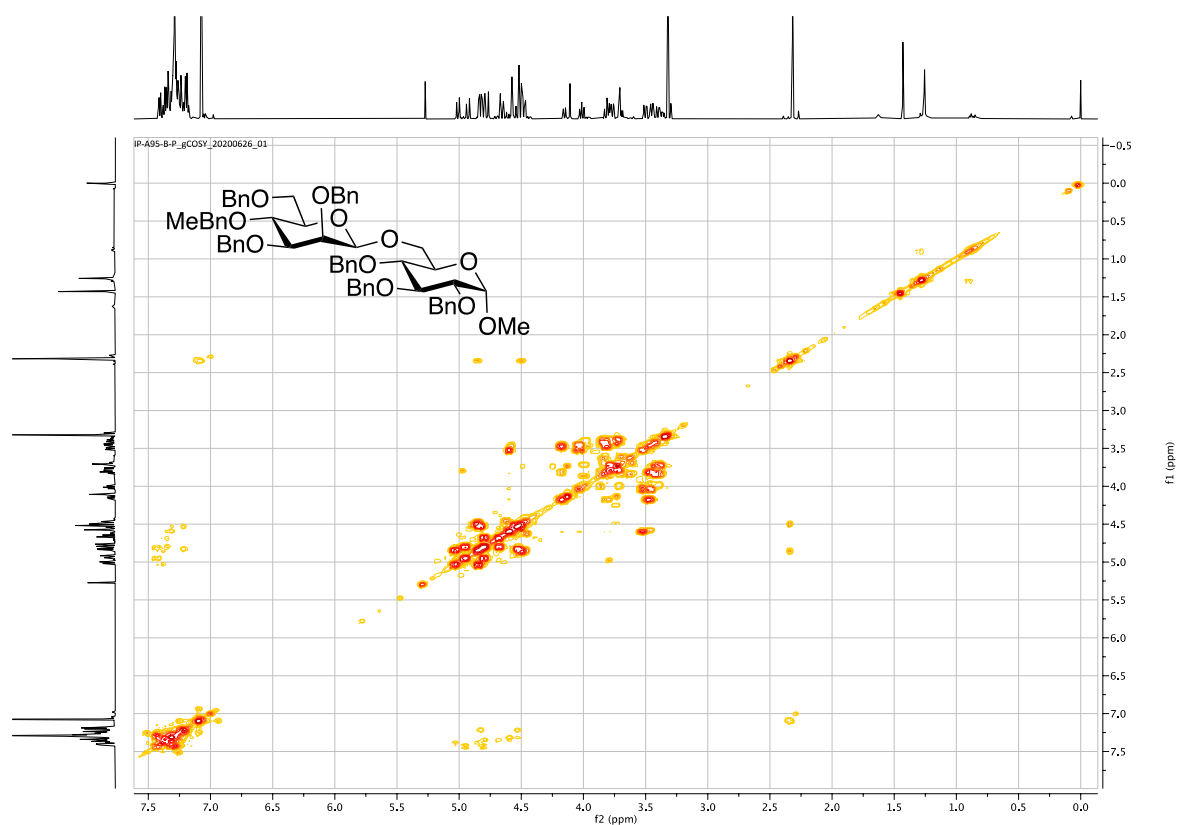
¹H NMR (500 MHz, Chloroform-*d*) 2c



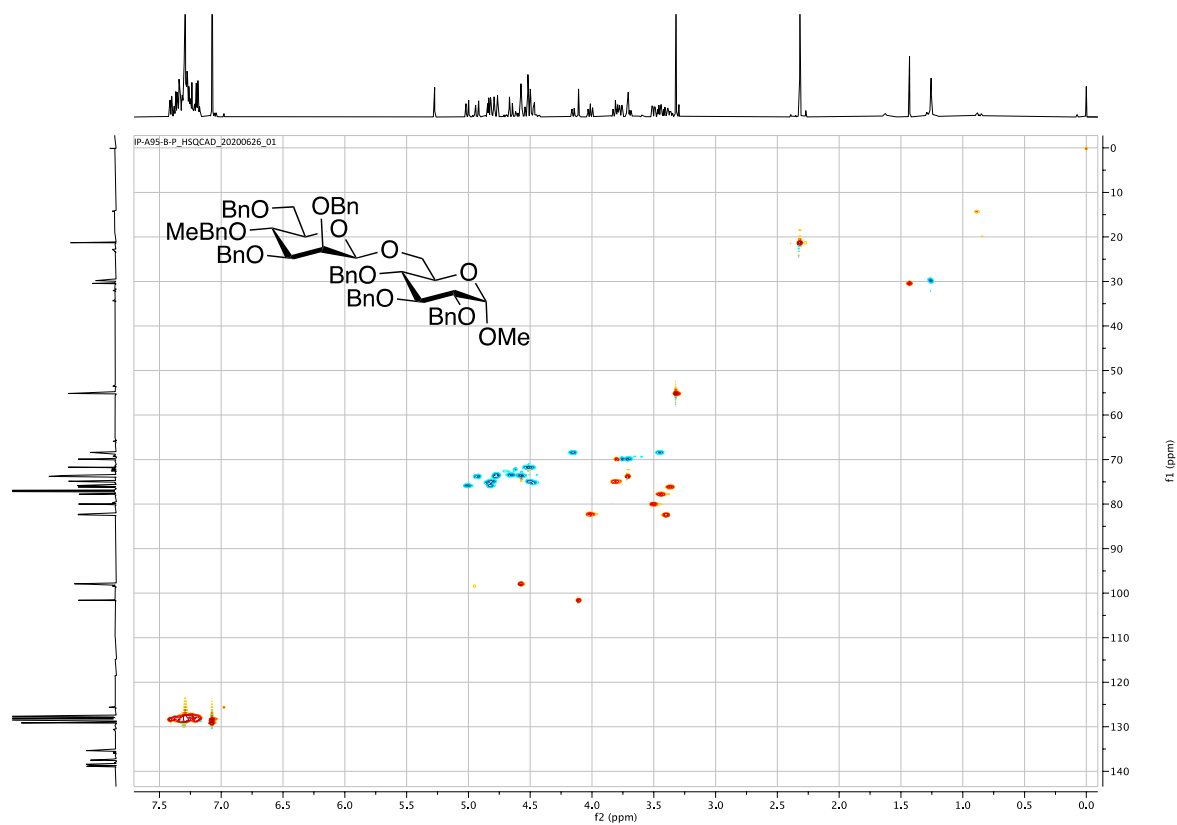
¹³C NMR (126 MHz, Chloroform-*d*) 2c



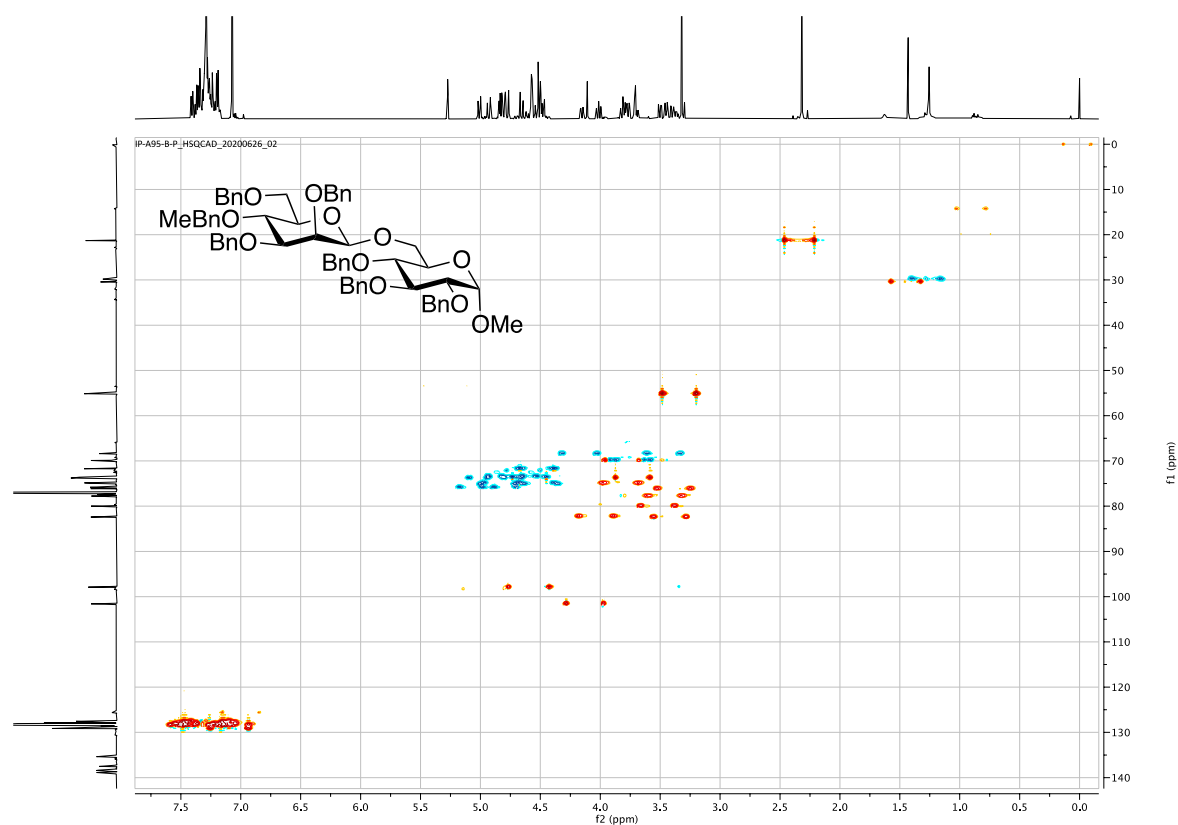
COSY NMR (500 MHz, Chloroform-*d*) 2c



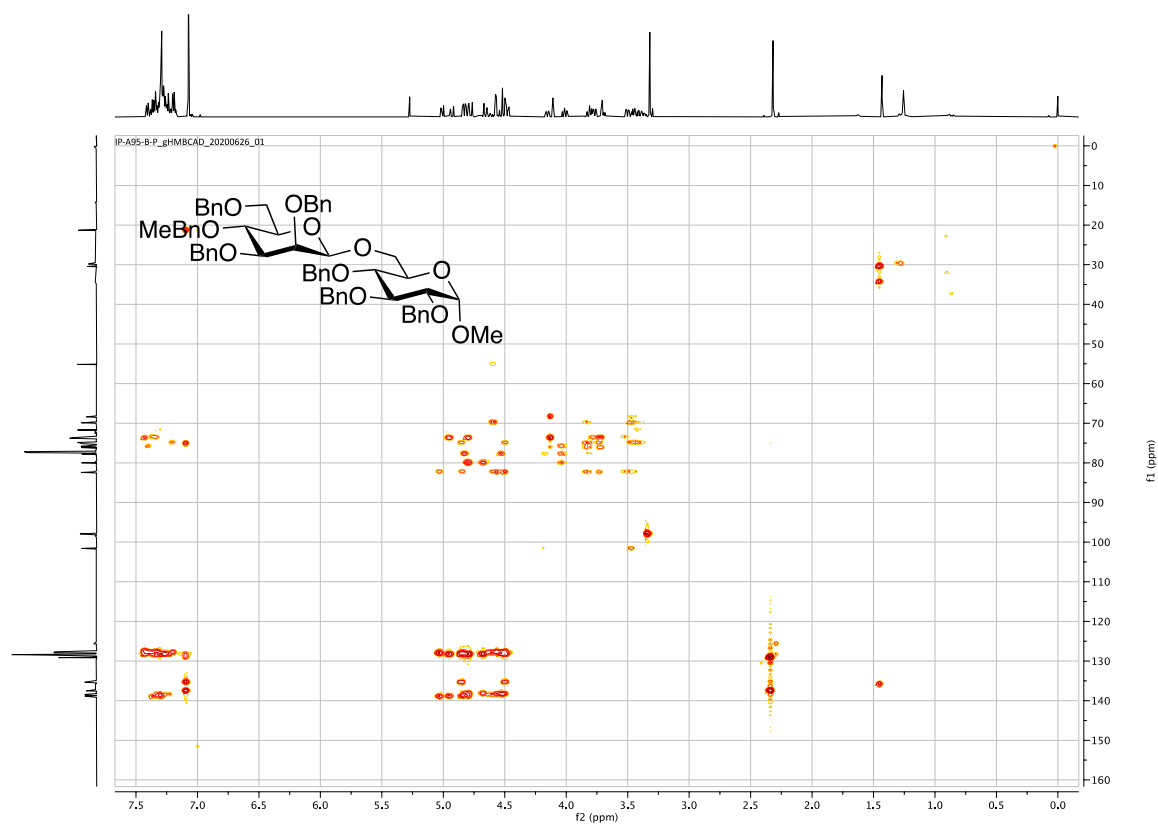
HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) 2c



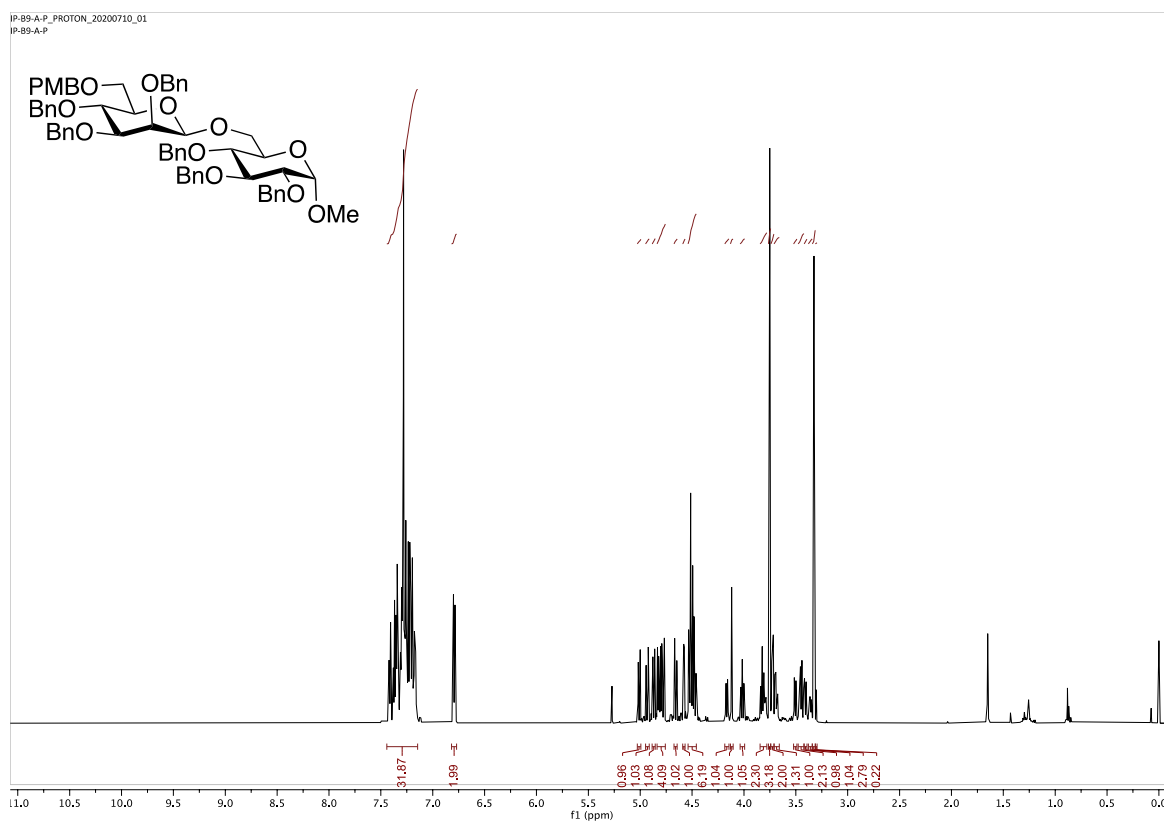
^{13}C - ^1H coupled HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) 2c



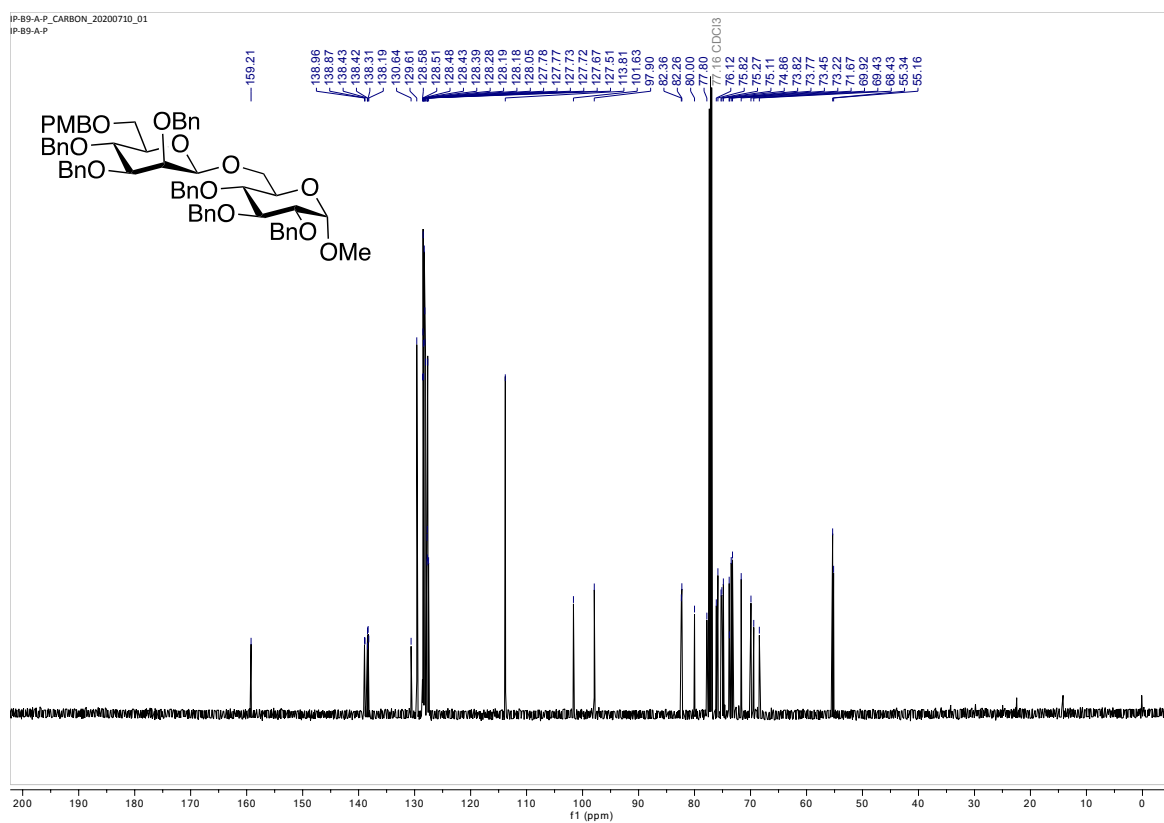
HMBC NMR (500 MHz x 126 MHz, Chloroform-*d*) 2c



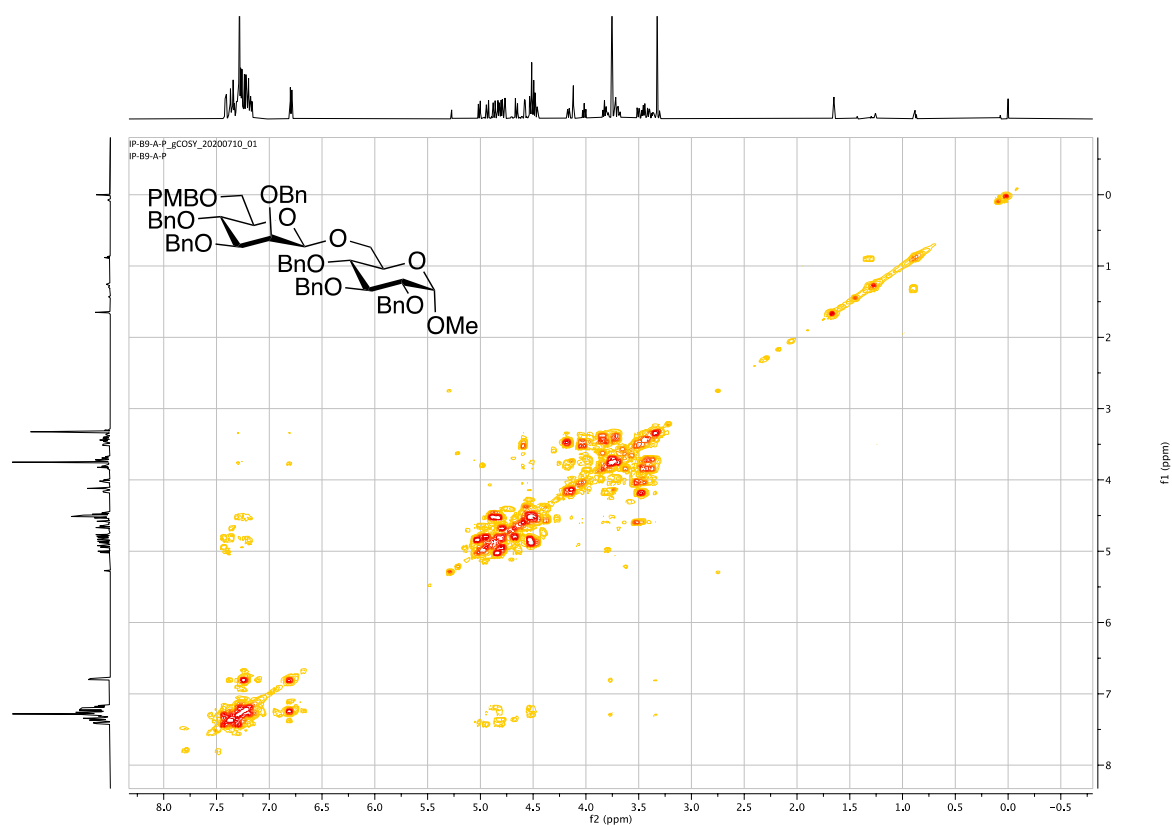
¹H NMR (600 MHz, Chloroform-*d*) 2d



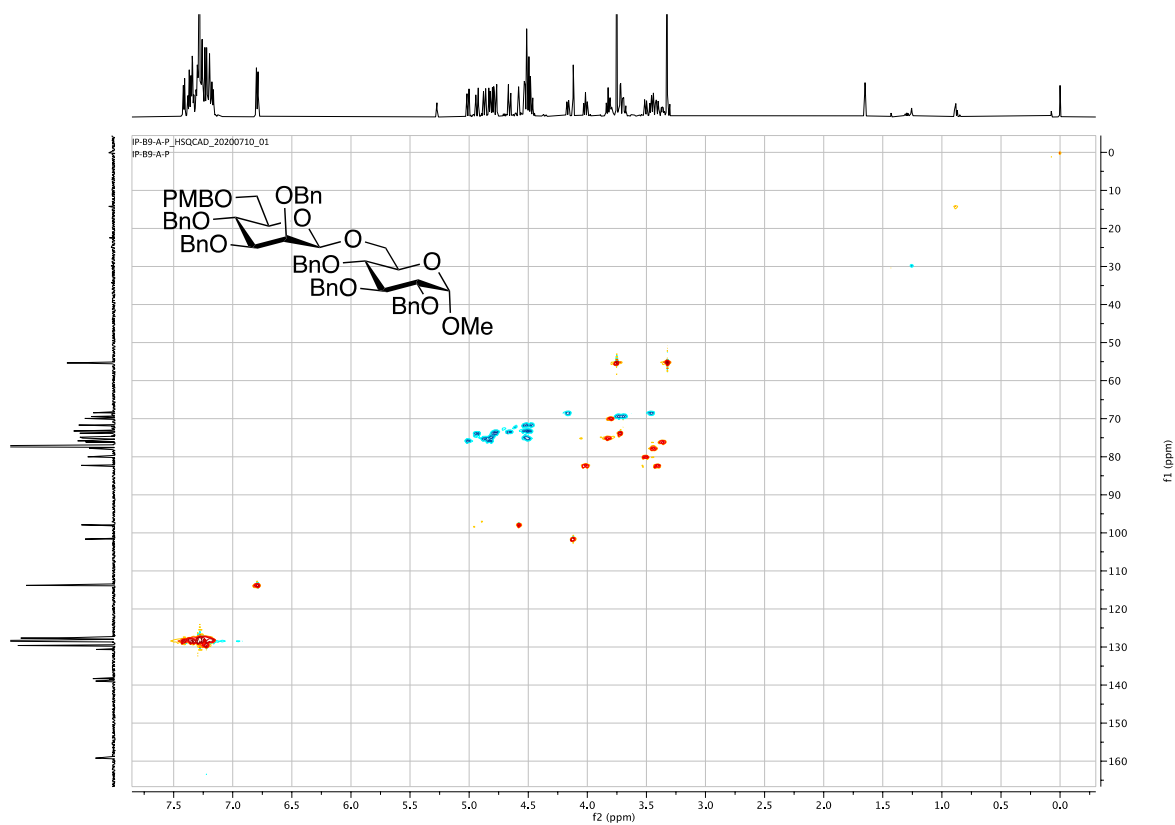
¹³C NMR (151 MHz, Chloroform-*d*) 2d



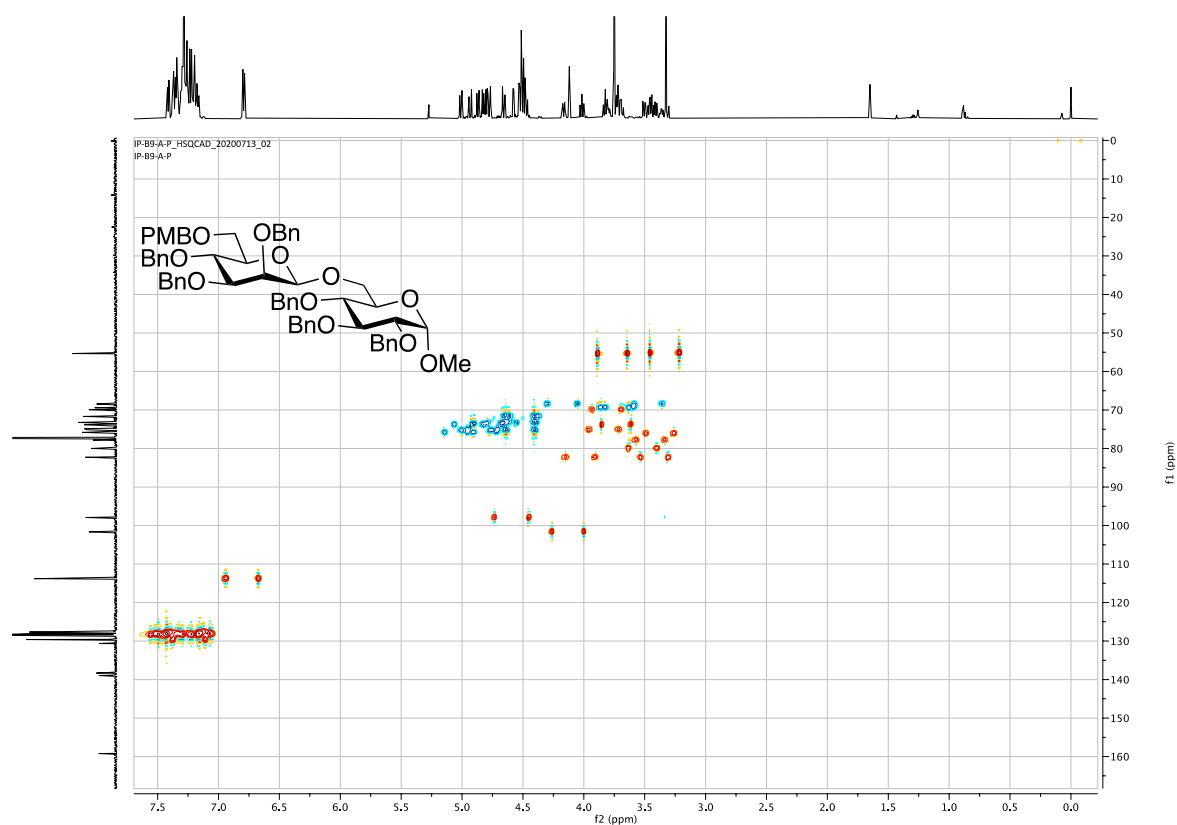
COSY NMR (600 MHz, Chloroform-*d*) 2d



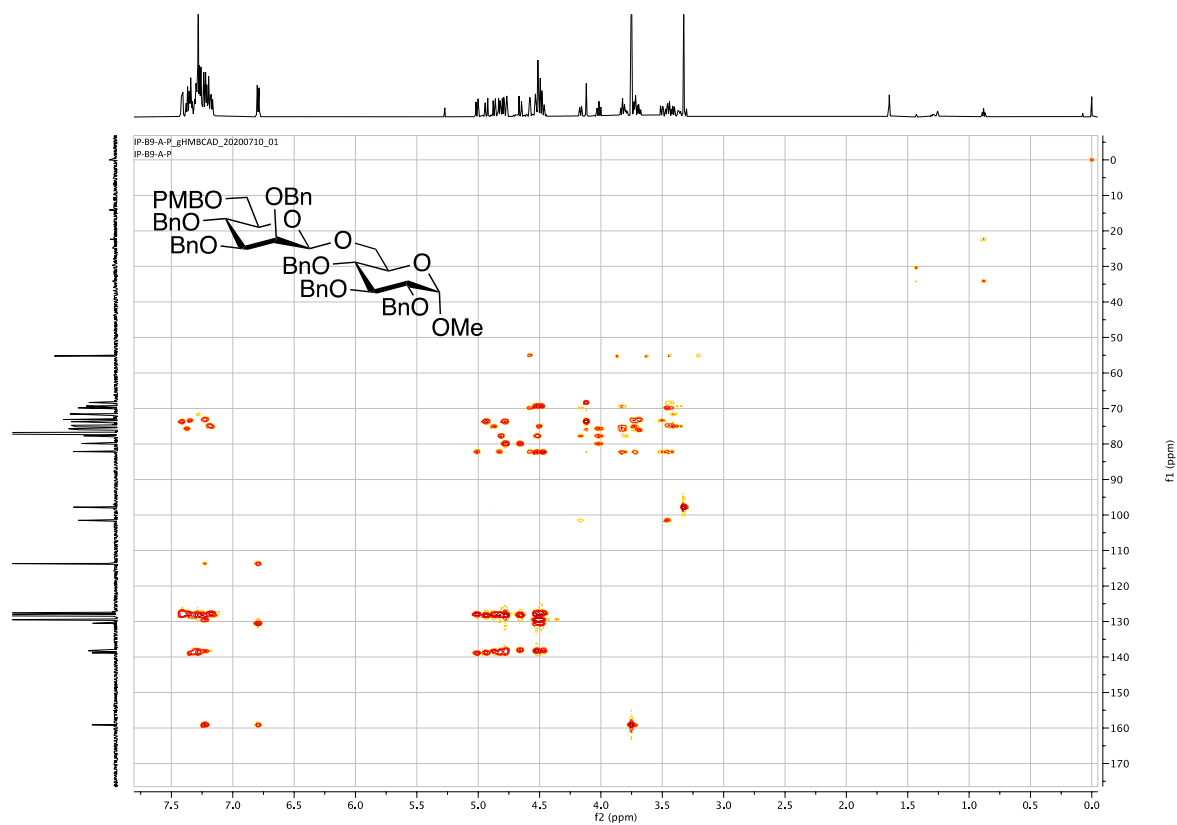
HSQC NMR (600 MHz x 151 MHz, Chloroform-*d*) 2d



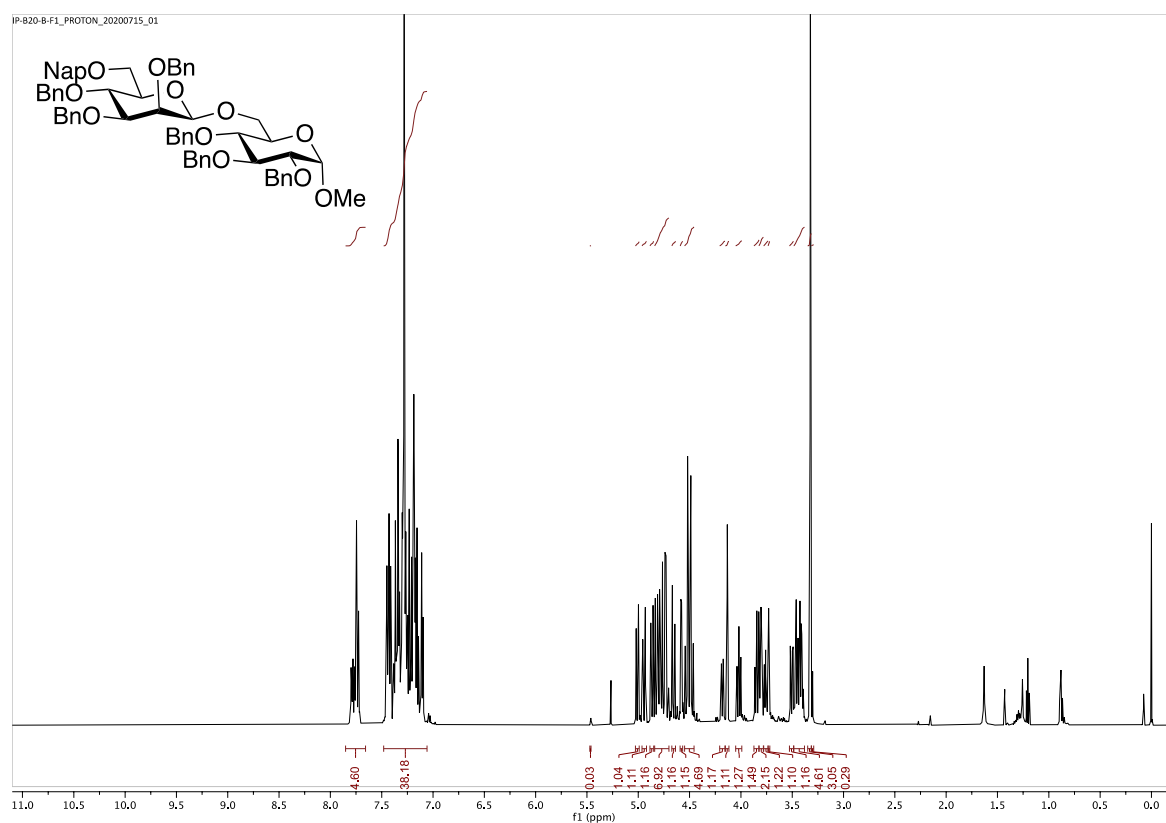
^{13}C - ^1H coupled HSQC NMR (600 MHz x 151 MHz, Chloroform-*d*) 2d



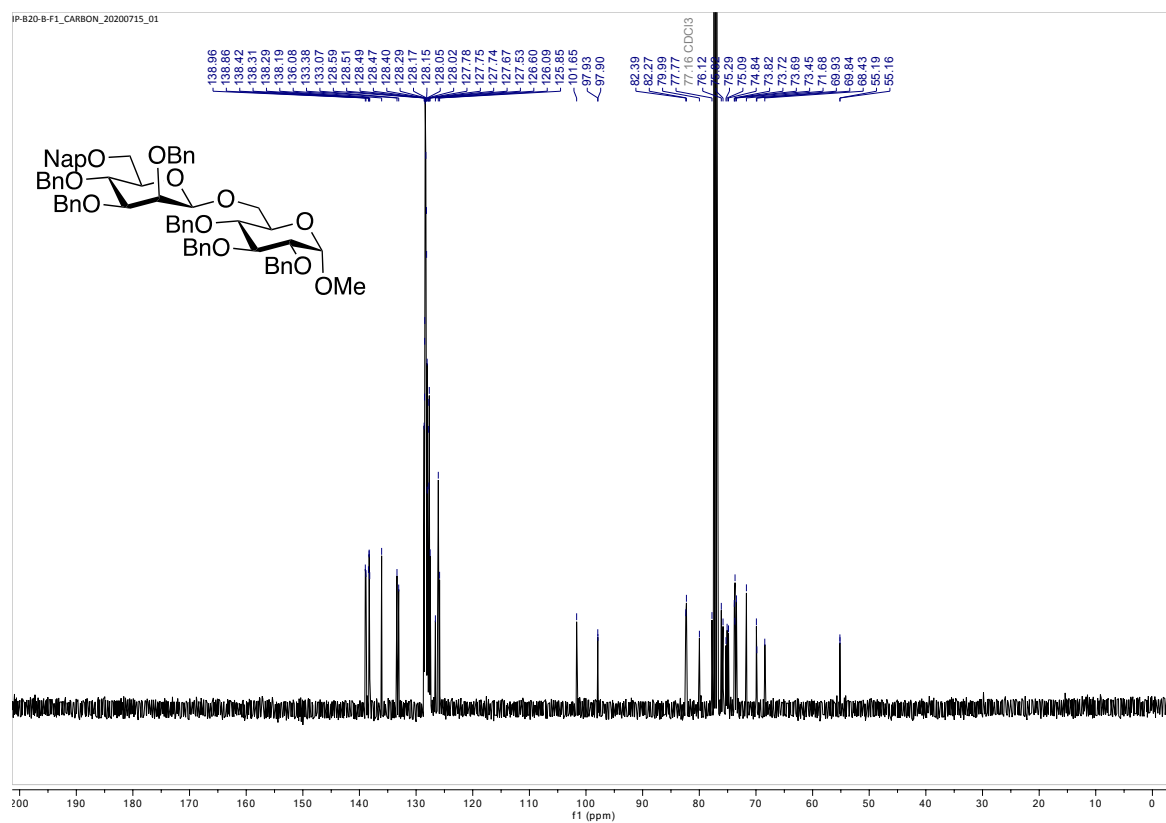
HMBC NMR (600 MHz x 151 MHz, Chloroform-*d*) 2d



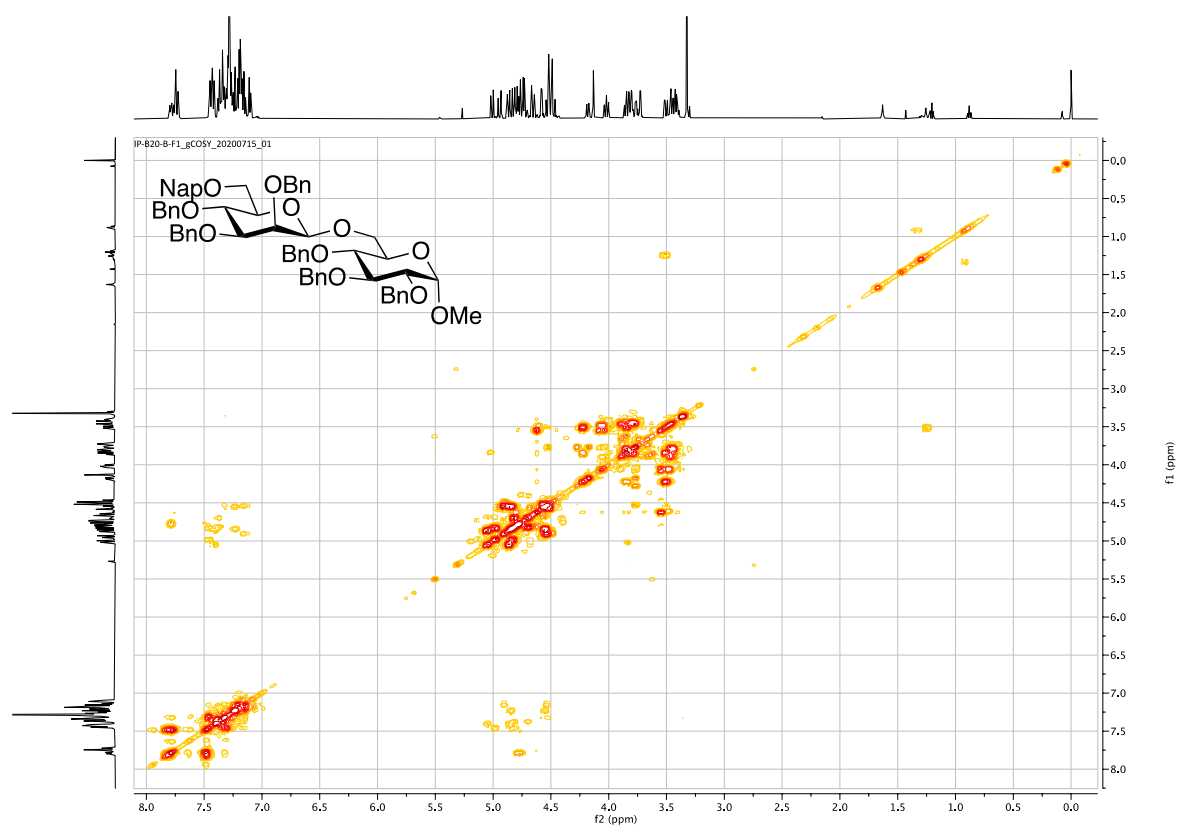
¹H NMR (500 MHz, Chloroform-*d*) 2e



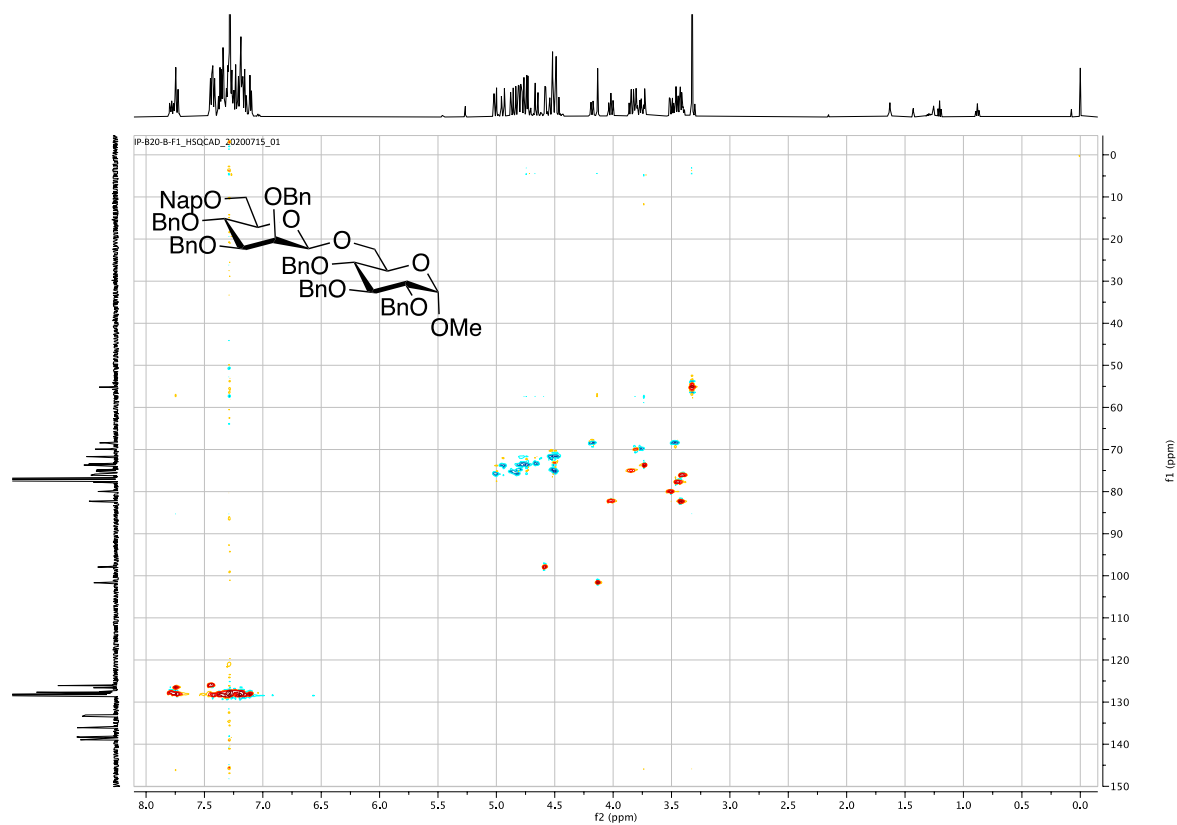
¹³C NMR (126 MHz, Chloroform-*d*) 2e



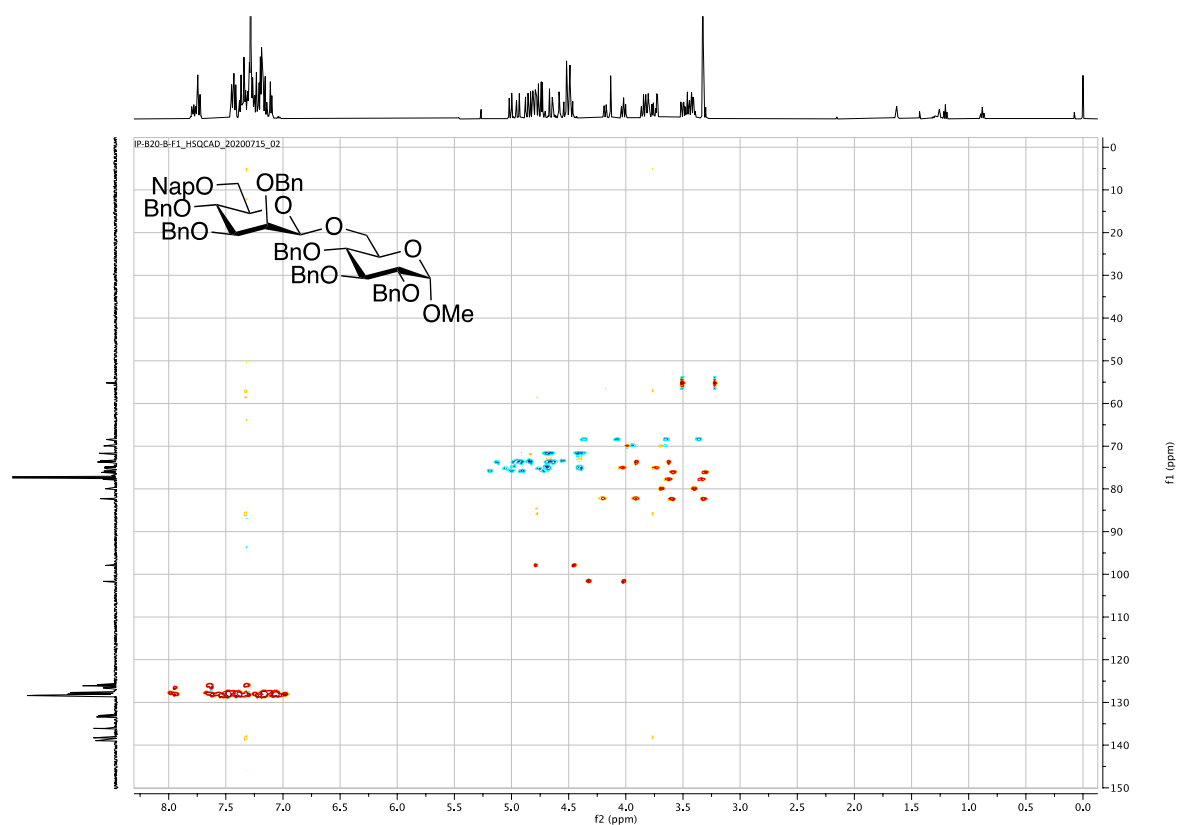
COSY NMR (500 MHz, Chloroform-*d*) 2e



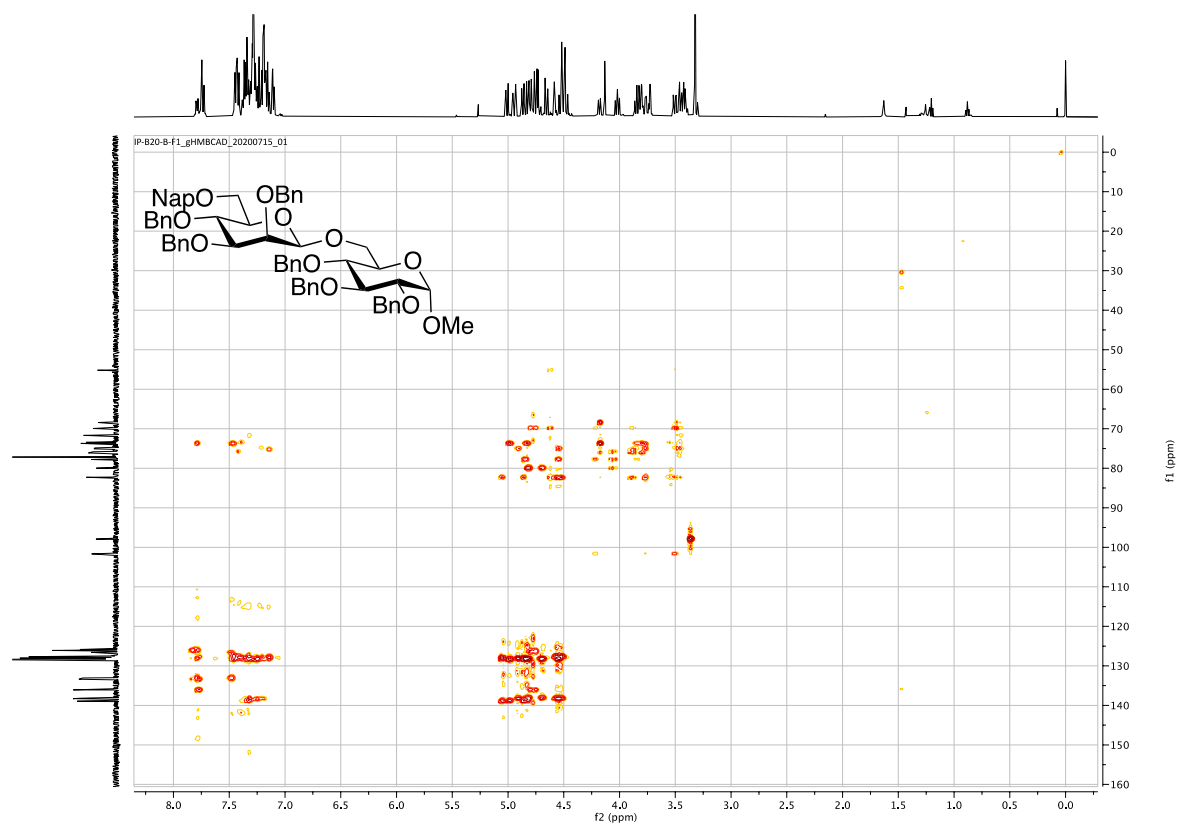
HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) 2e



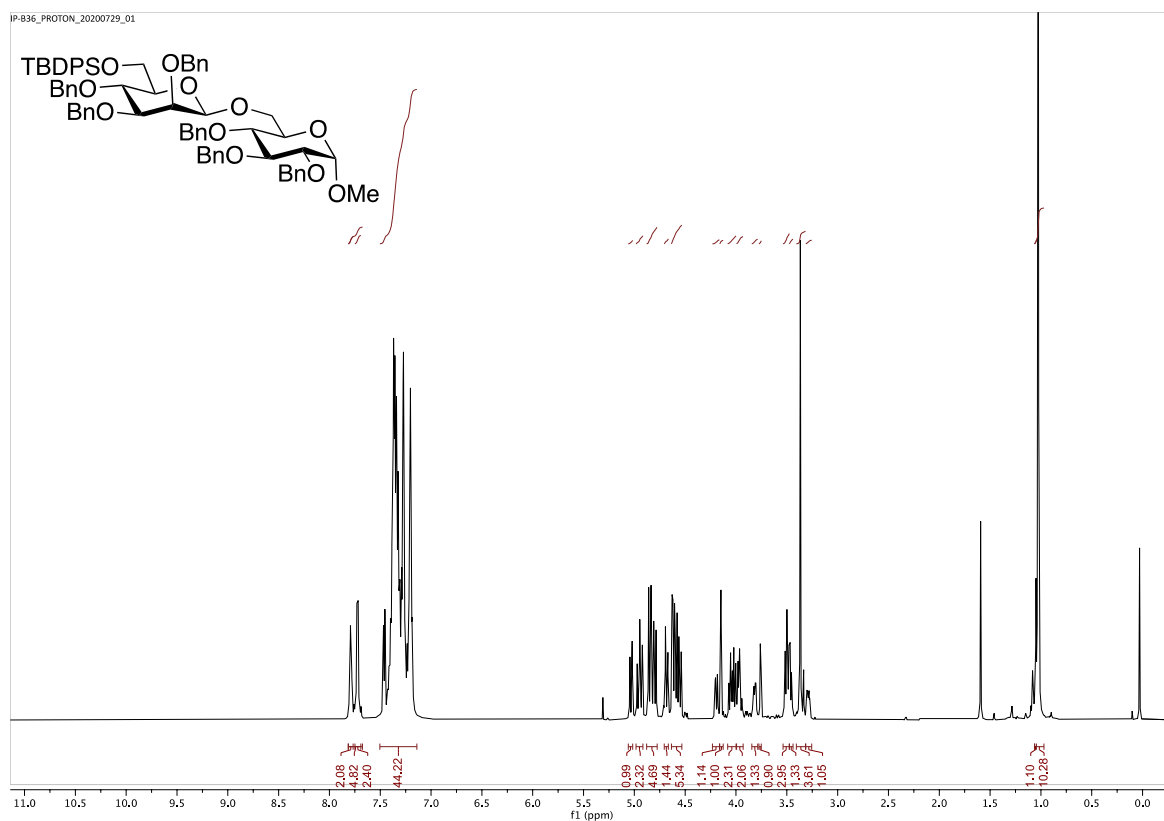
^{13}C - ^1H coupled HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) 2e



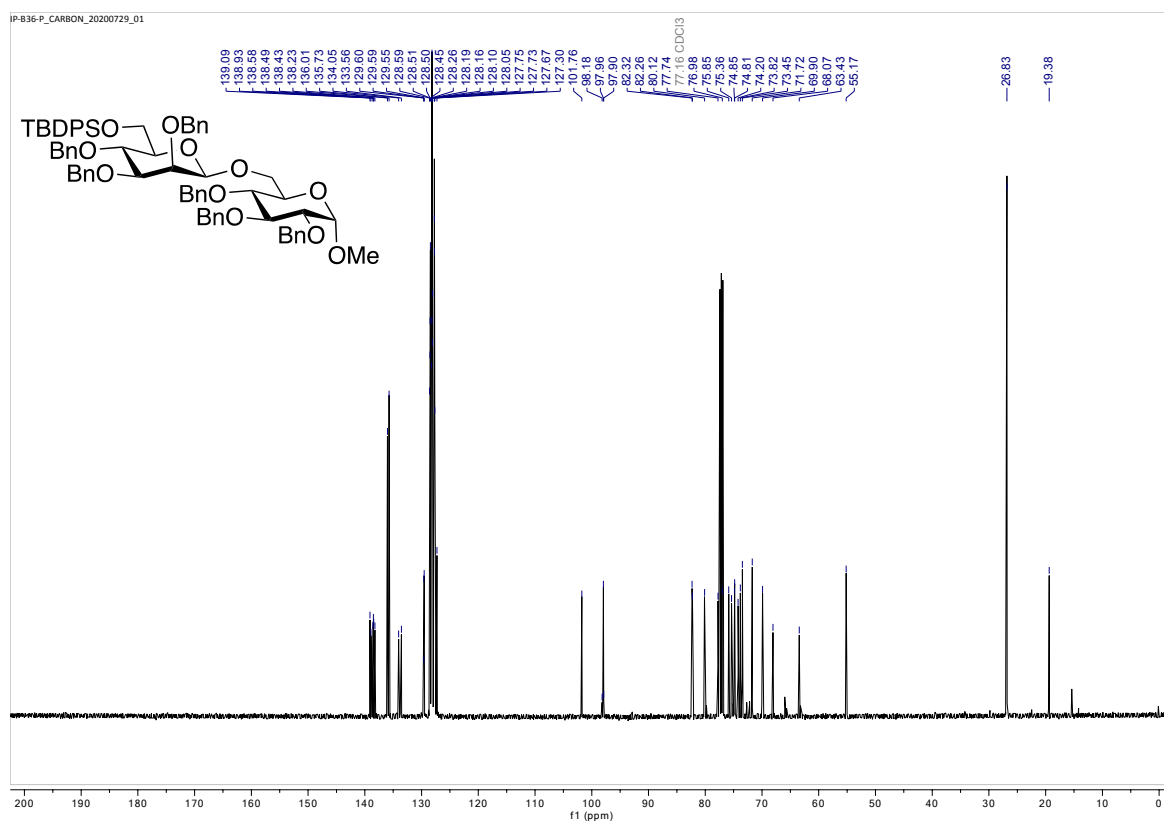
HMBC NMR (500 MHz x 126 MHz, Chloroform-*d*) 2e



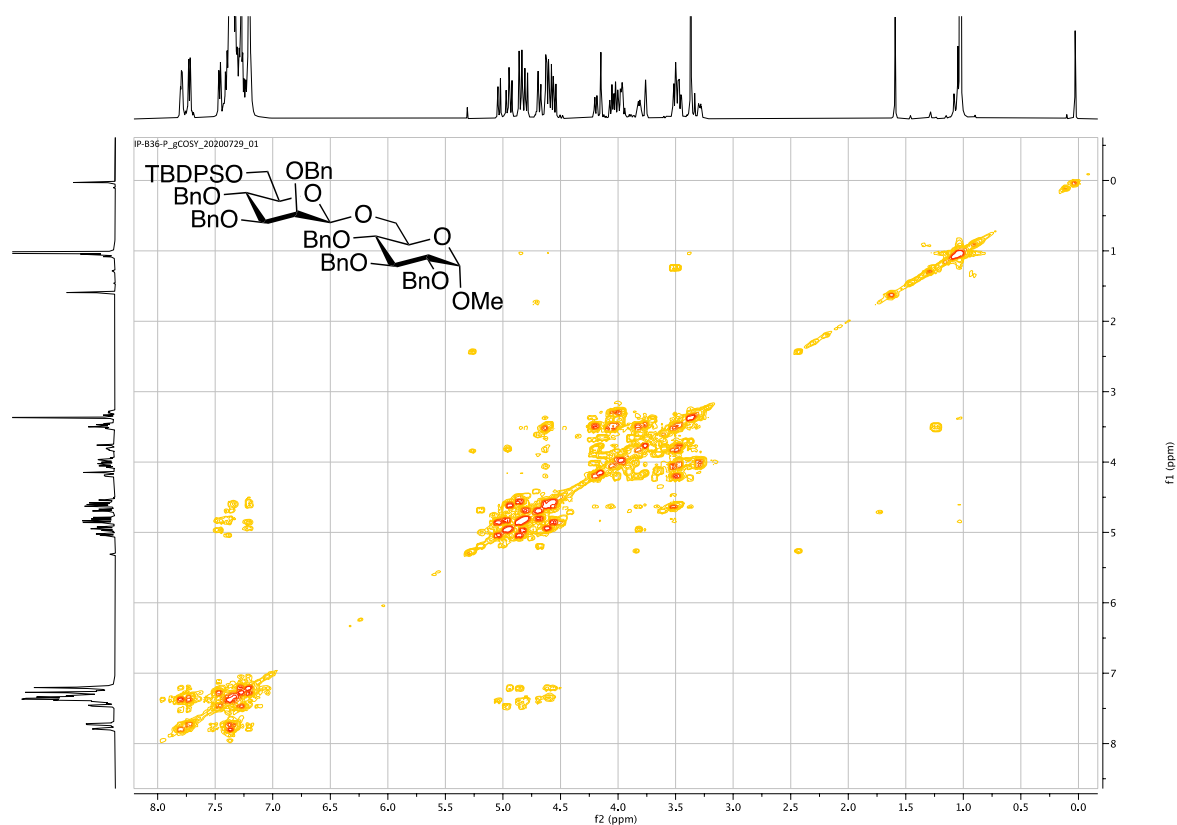
¹H NMR (500 MHz, Chloroform-*d*) 2f



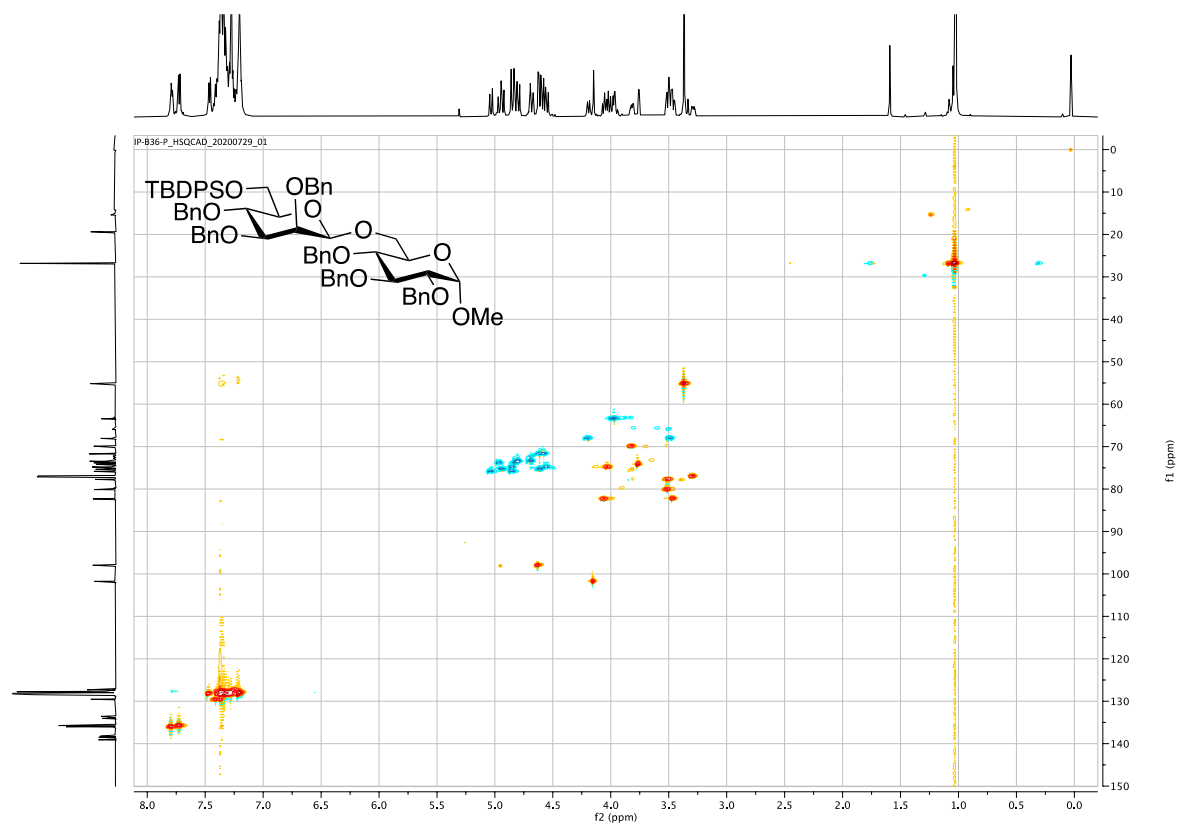
¹³C NMR (126 MHz, Chloroform-*d*) 2f



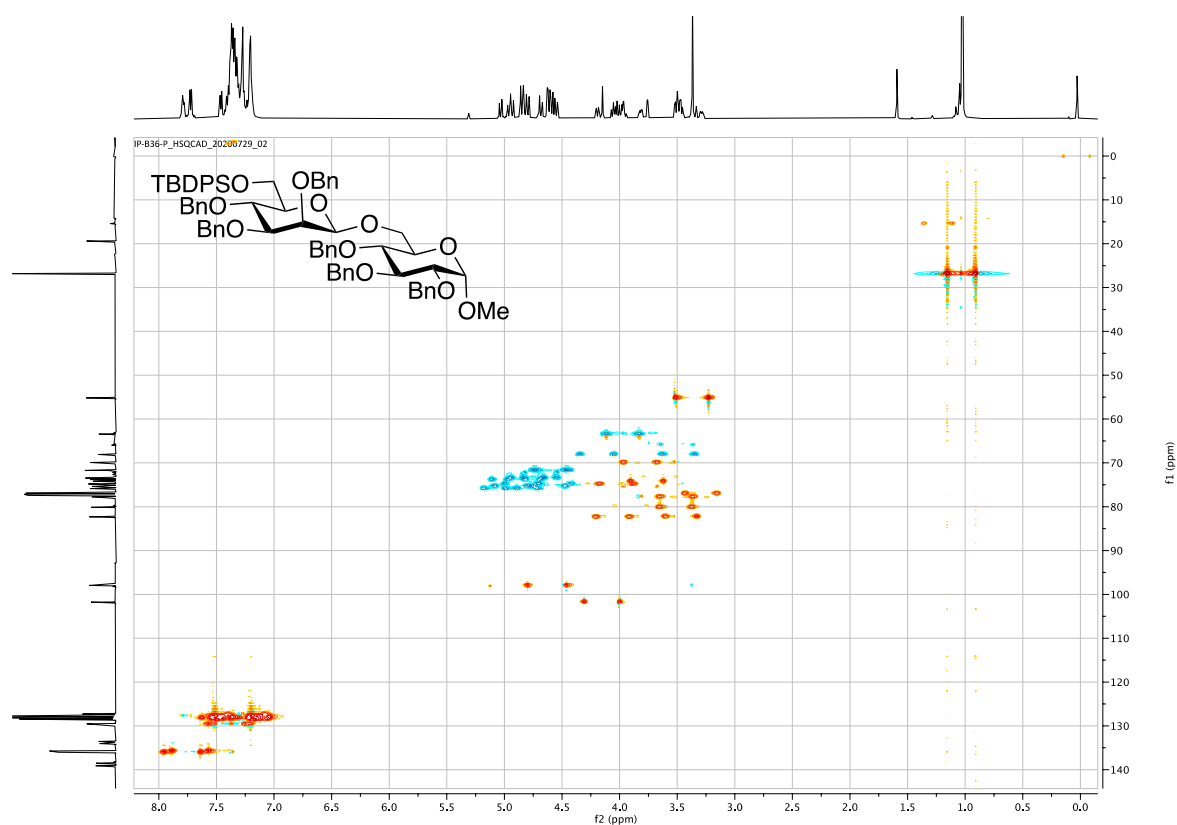
COSY NMR (500 MHz, Chloroform-*d*) 2f



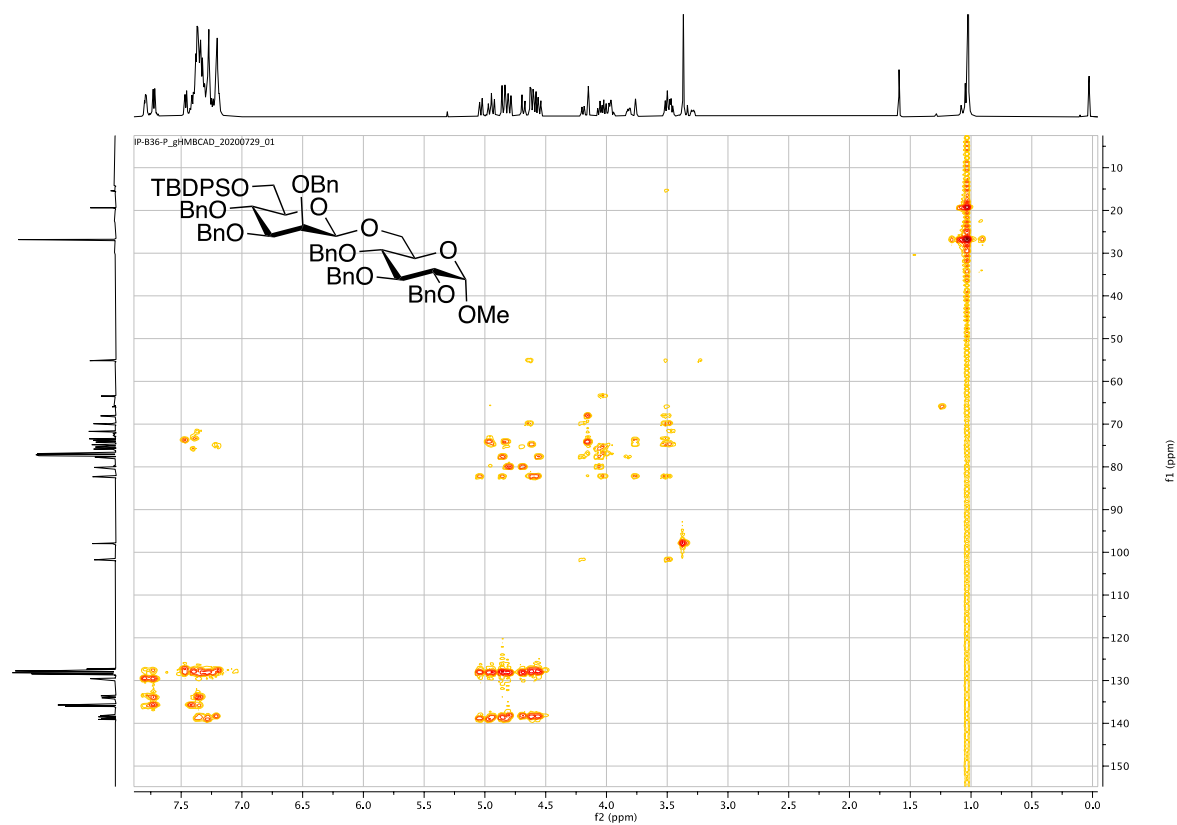
HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) 2f



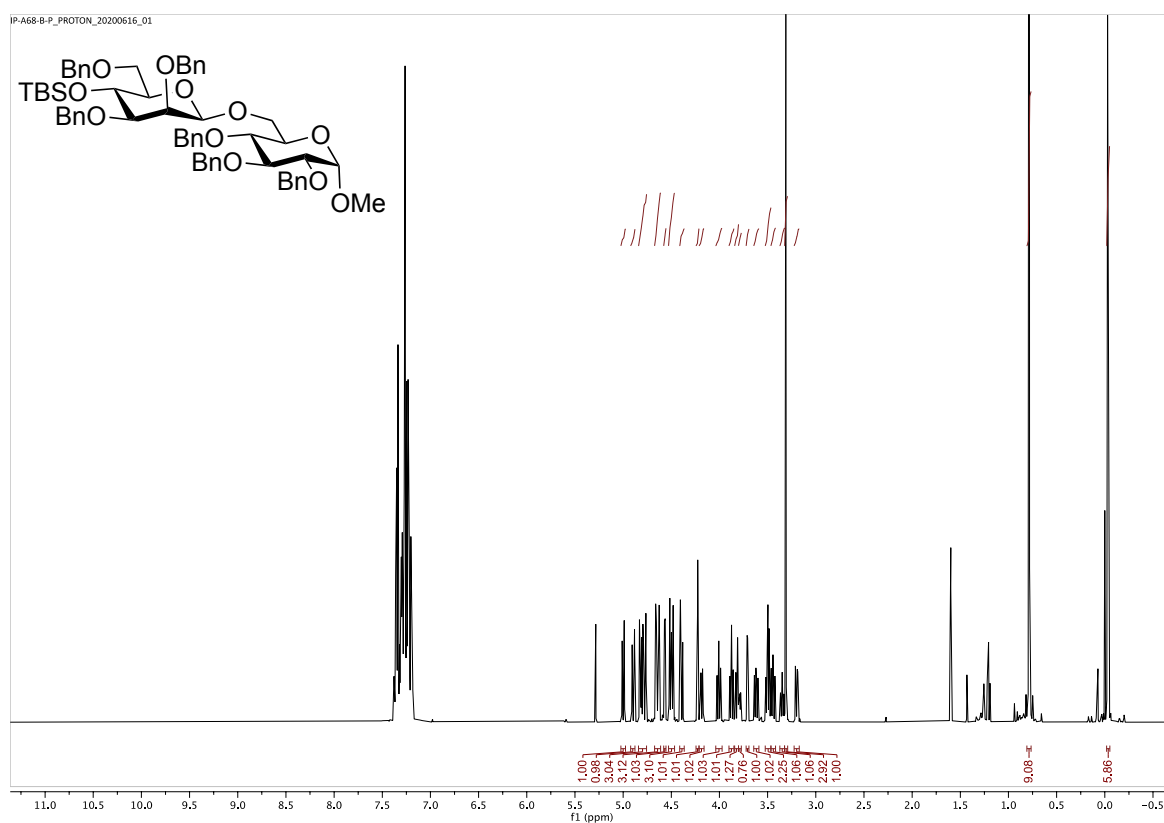
^{13}C - ^1H coupled HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) 2f



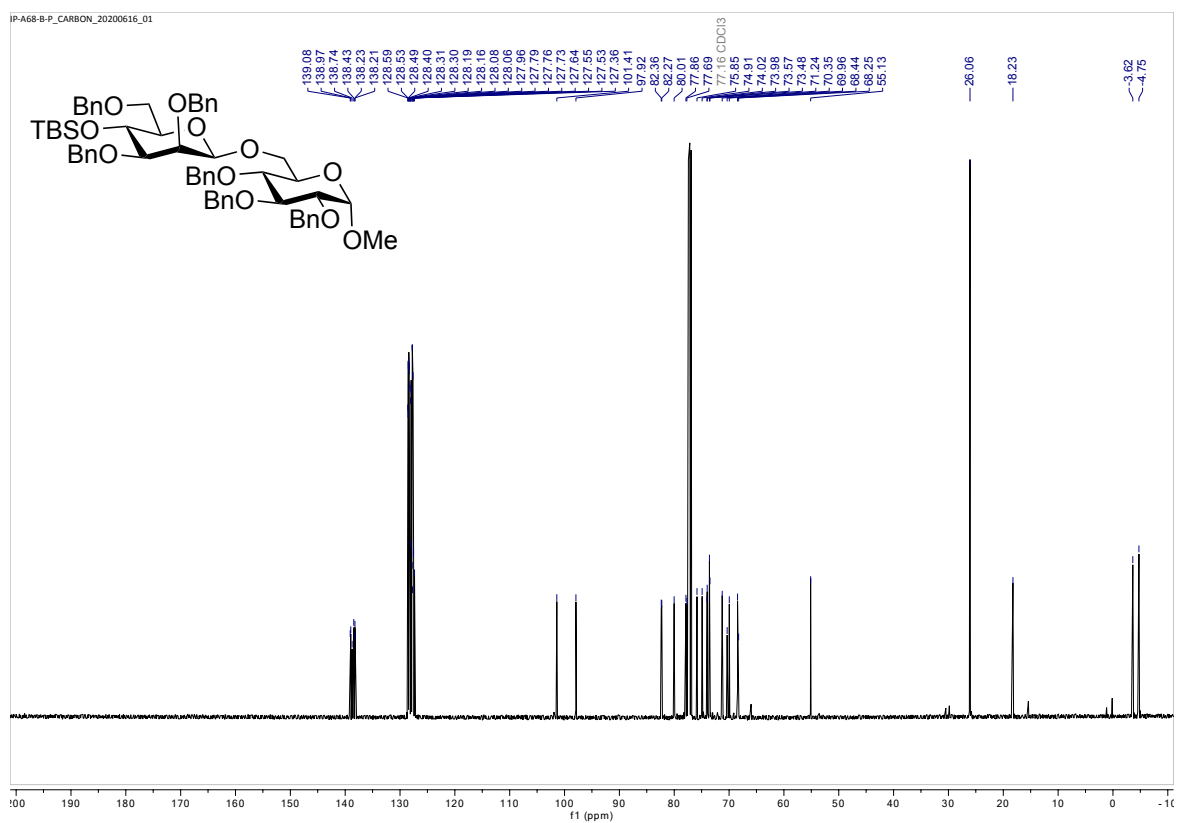
HMBC NMR (500 MHz x 126 MHz, Chloroform-*d*) 2f



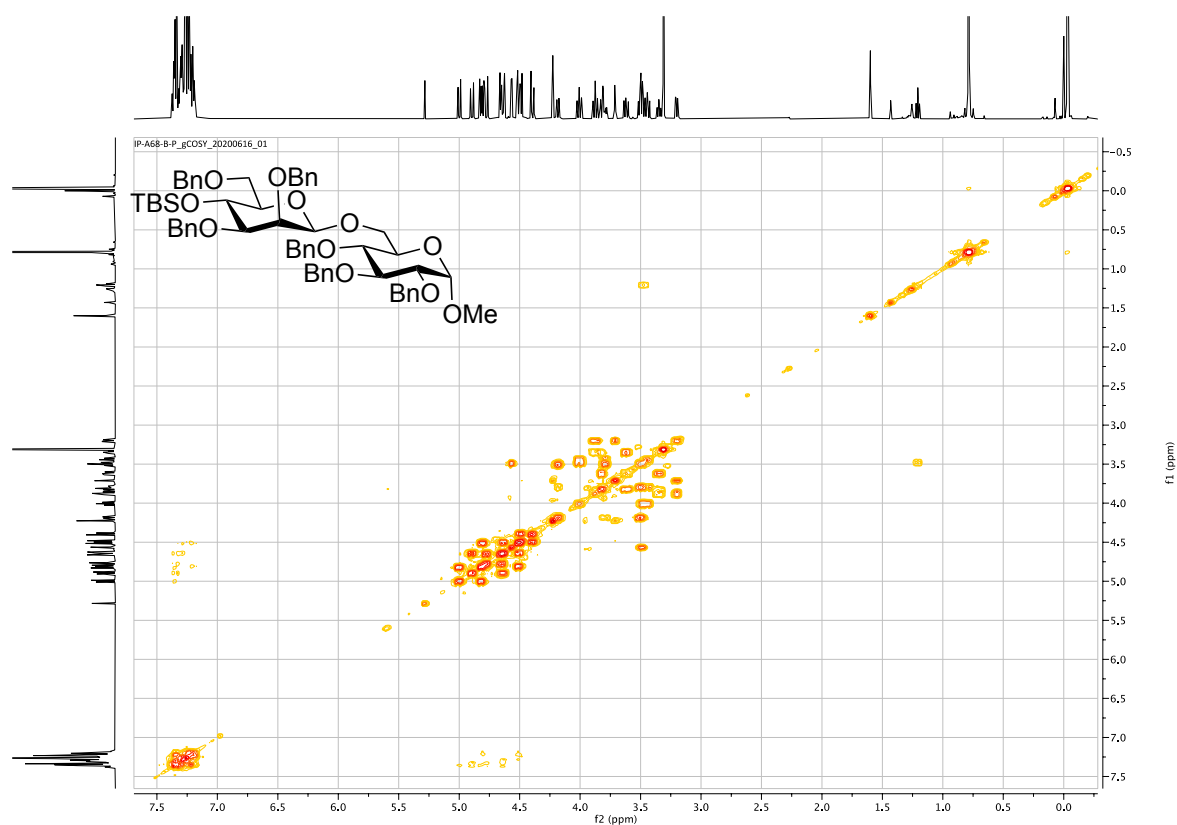
¹H NMR (500 MHz, Chloroform-*d*) 2g



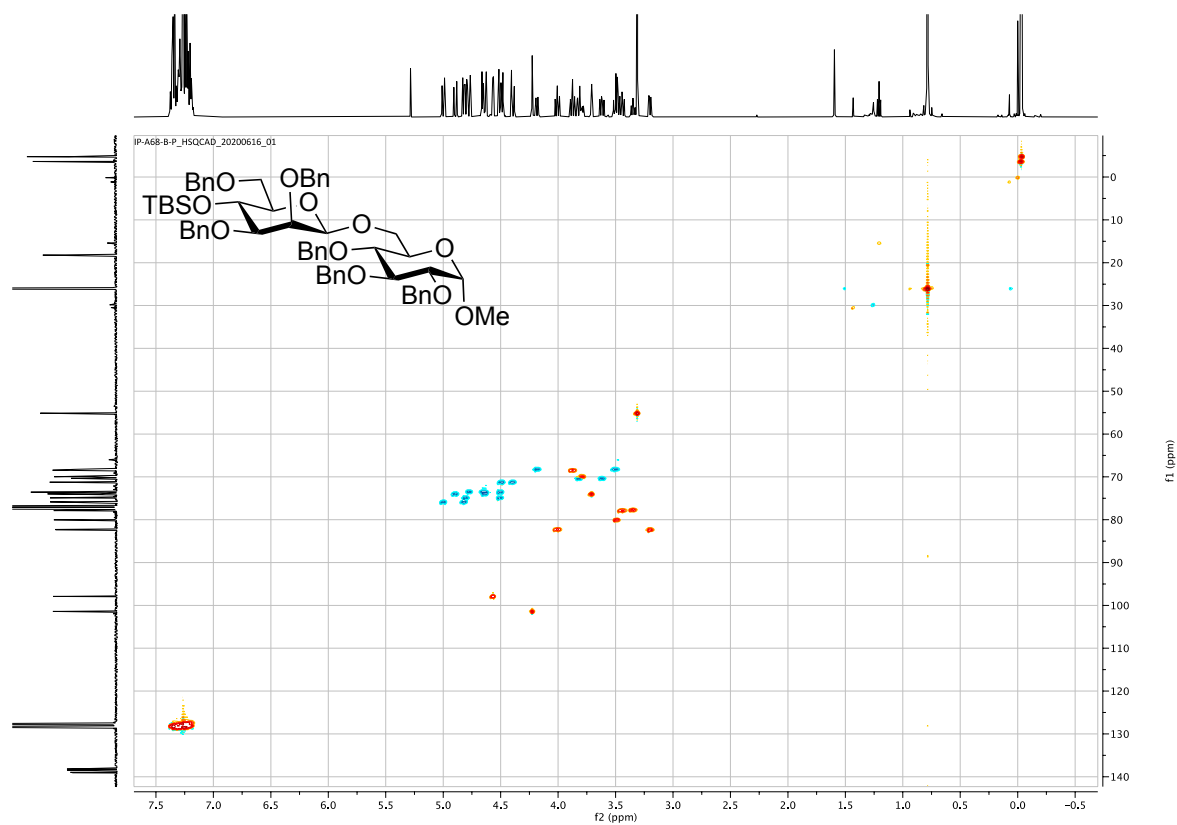
¹³C NMR (126 MHz, Chloroform-*d*) 2g



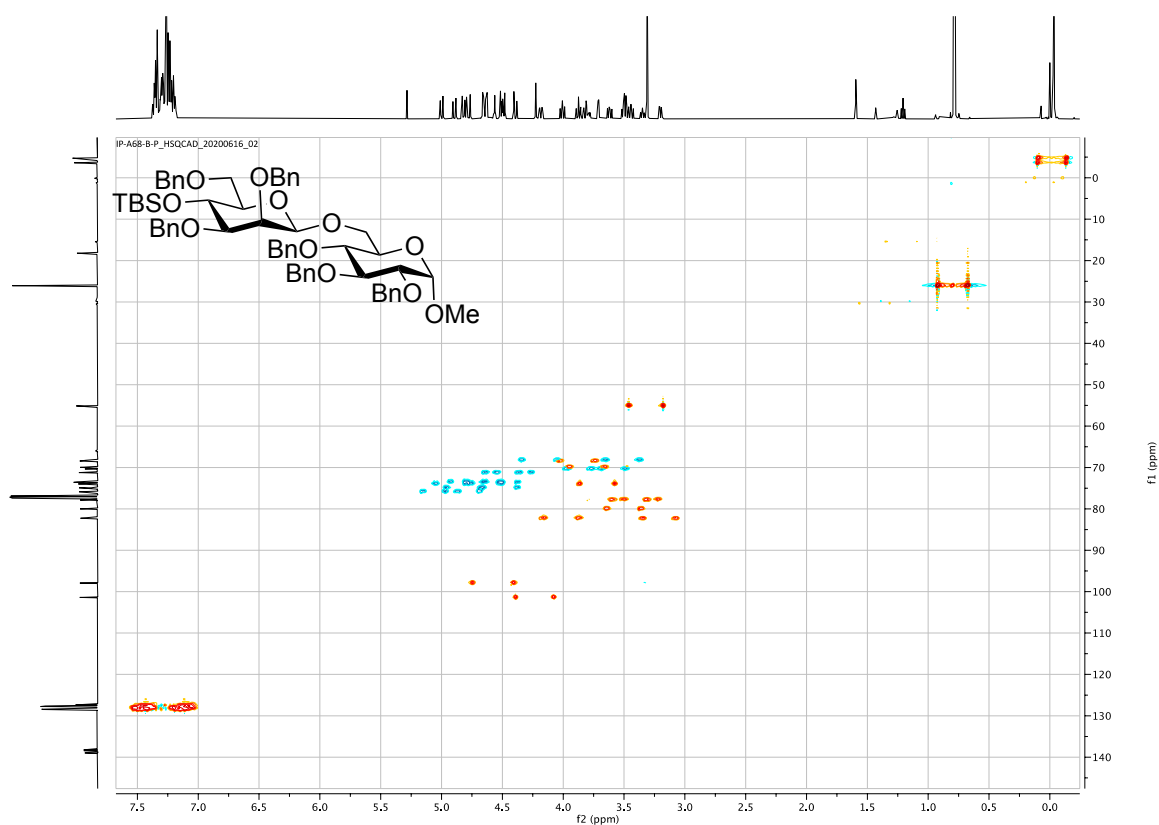
COSY NMR (500 MHz, Chloroform-*d*) 2g



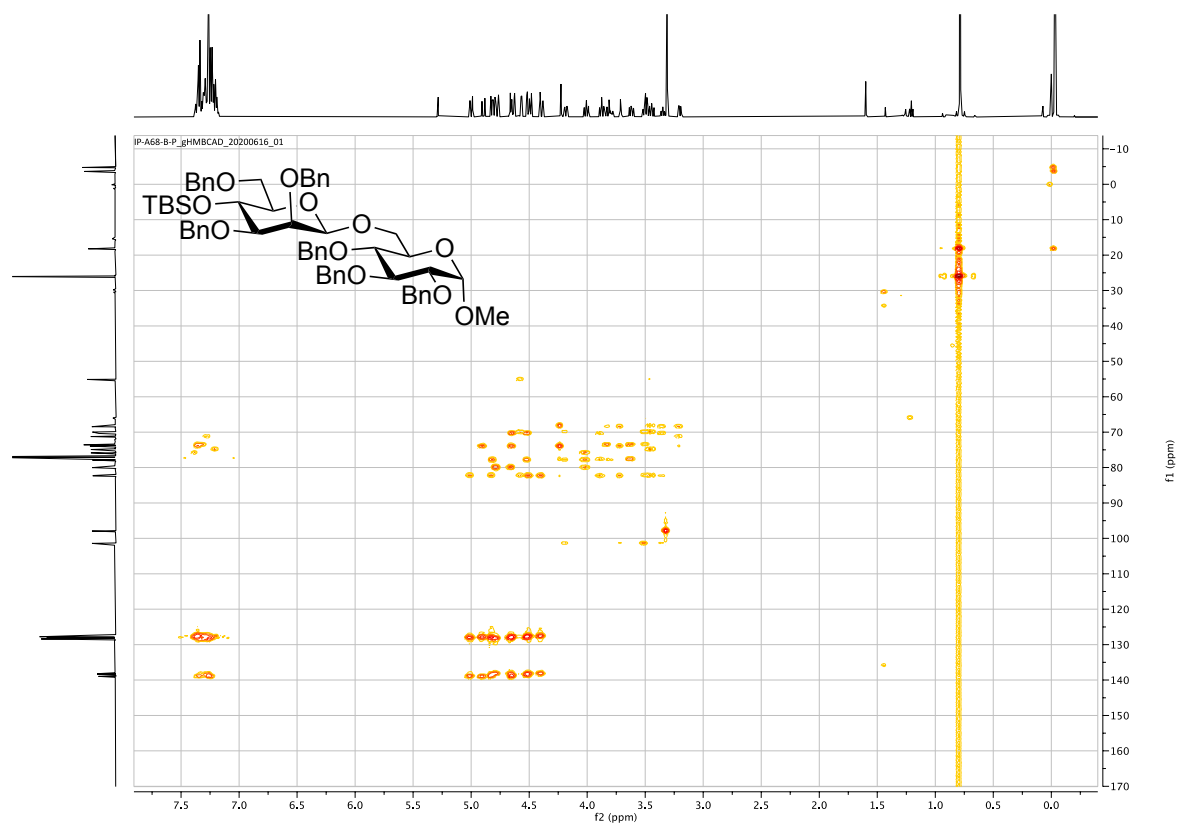
HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) 2g



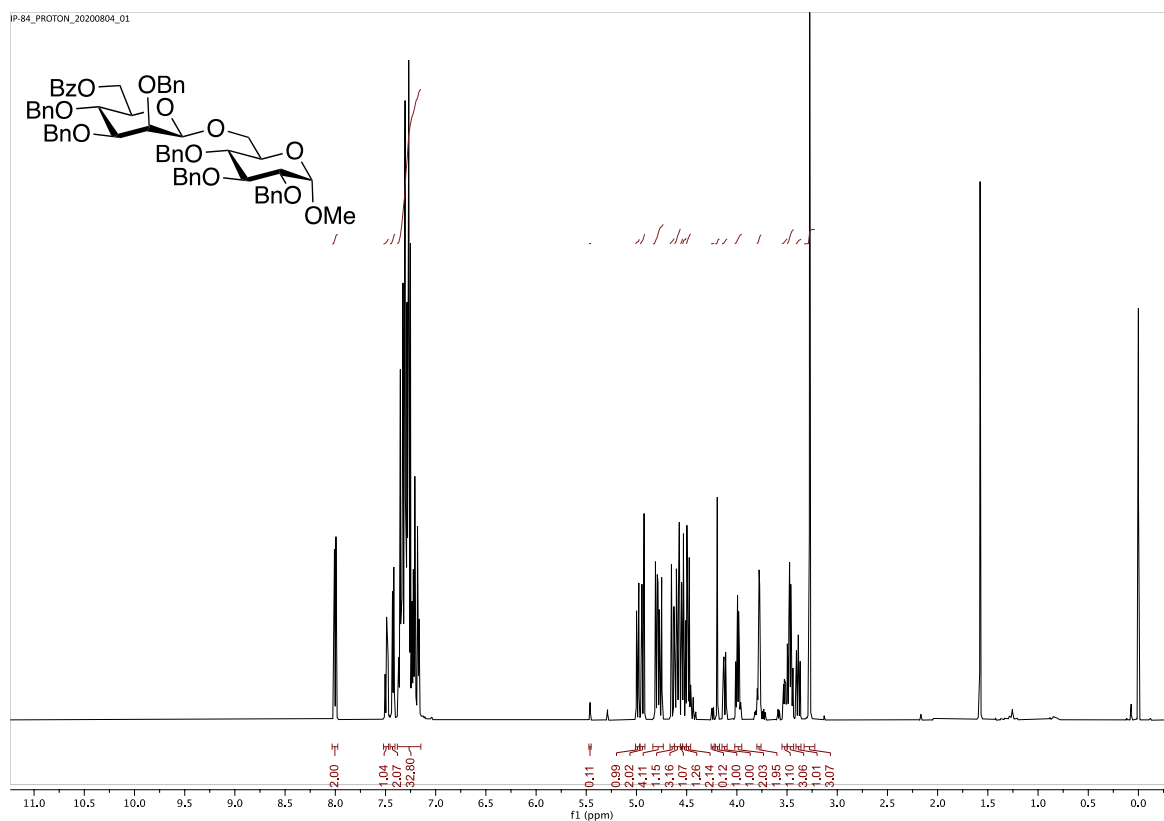
^{13}C - ^1H coupled HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) 2g



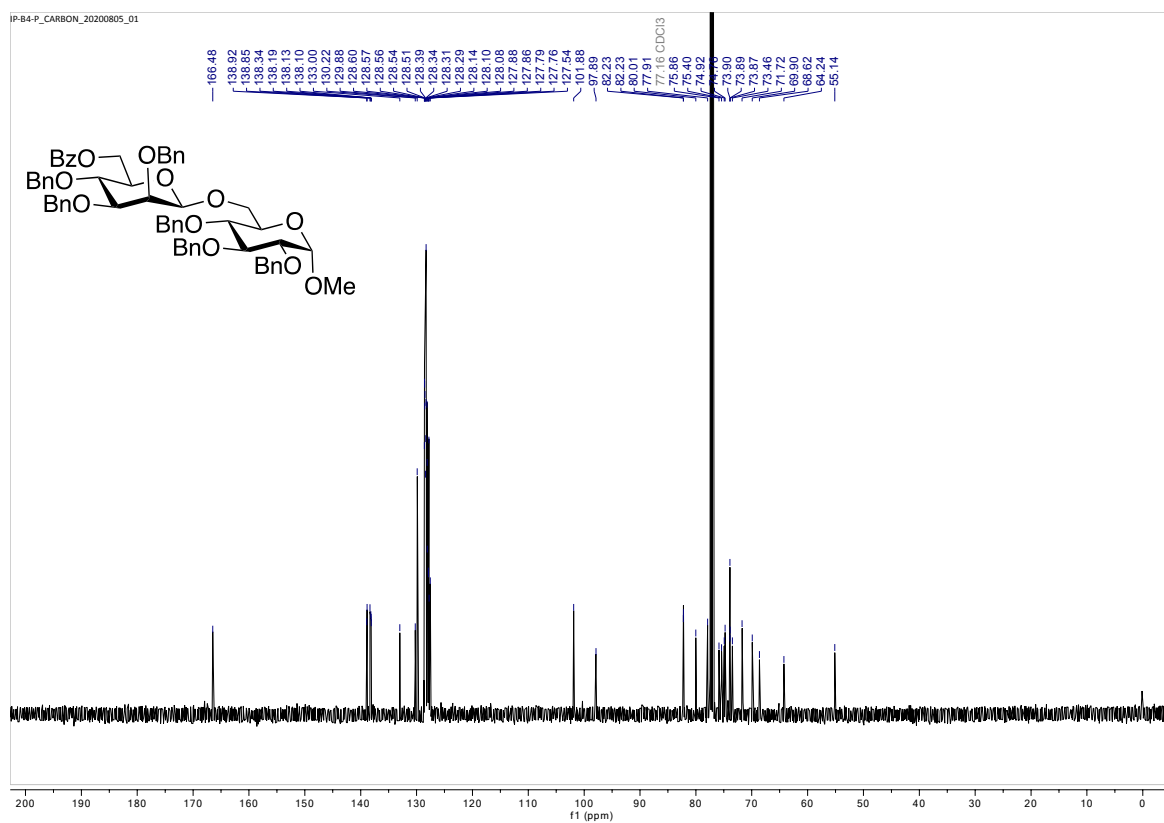
HMBC NMR (500 MHz x 126 MHz, Chloroform-*d*) 2g



¹H NMR (500 MHz, Chloroform-*d*) 2h

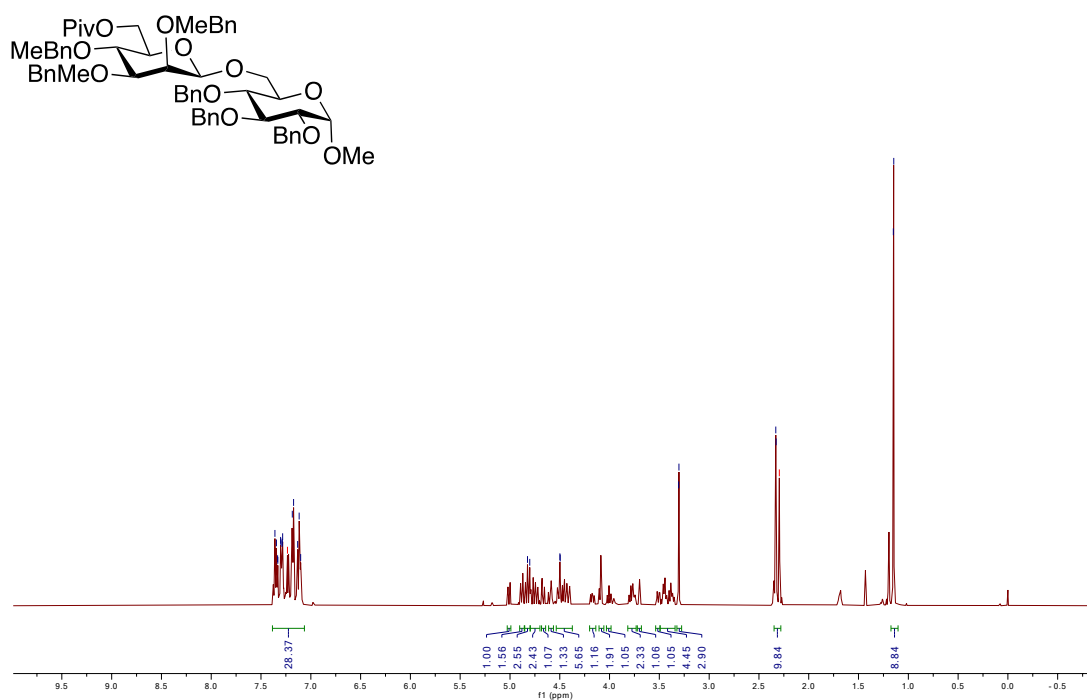


¹³C NMR (126 MHz, Chloroform-*d*) 2h



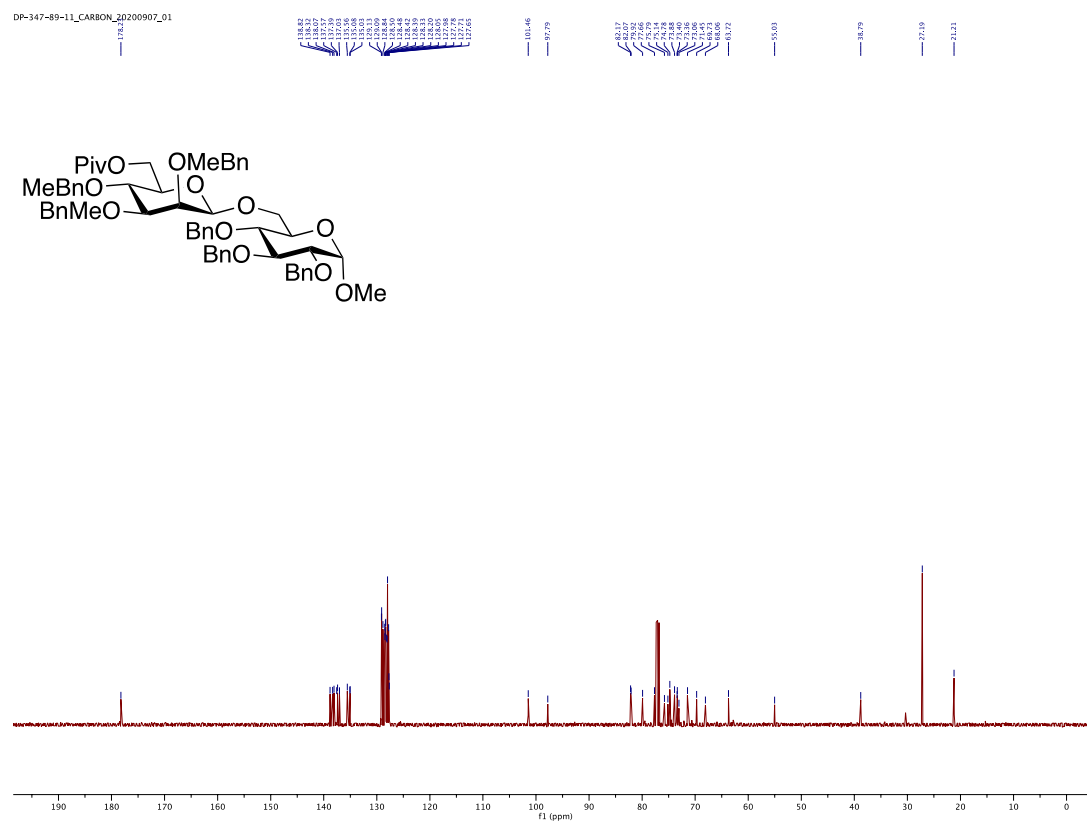
¹H NMR (500 MHz, Chloroform-*d*) 2i

DP-347-89-11_PROTON_20200907_01

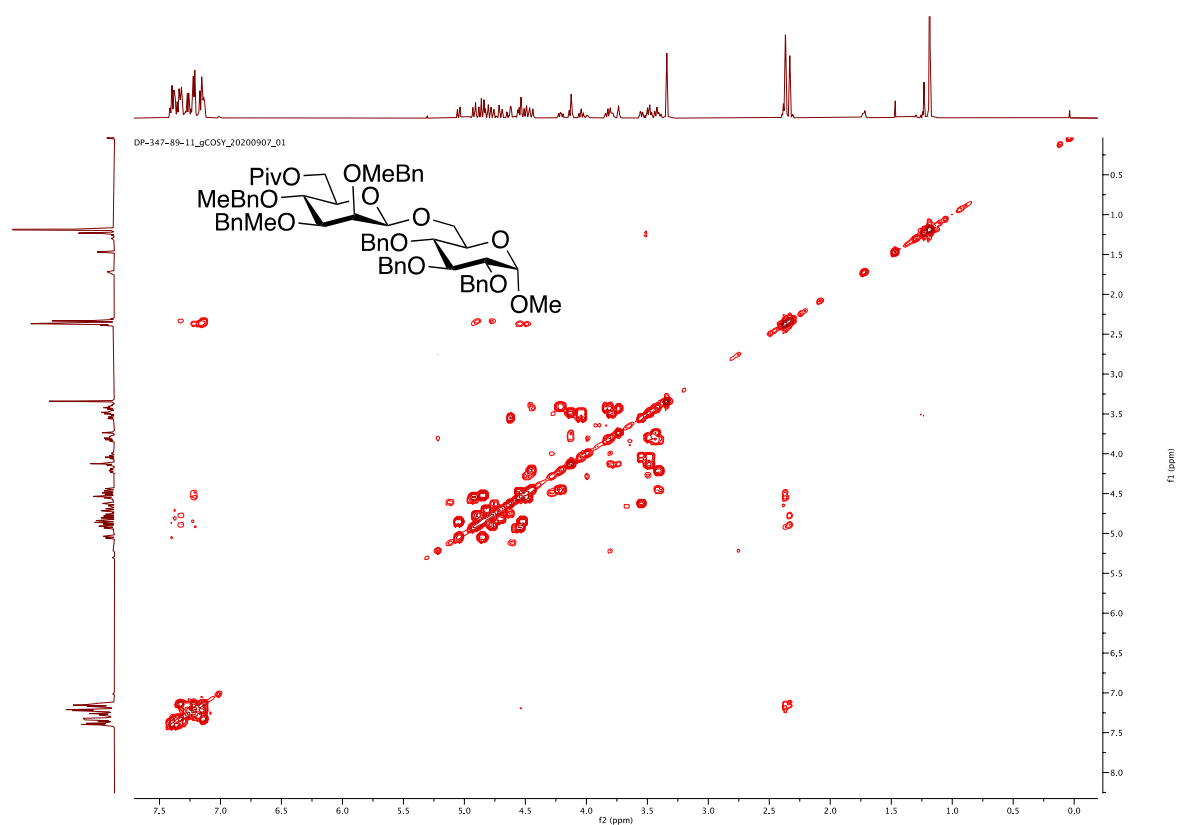


¹³C NMR (126 MHz, Chloroform-*d*) 2i

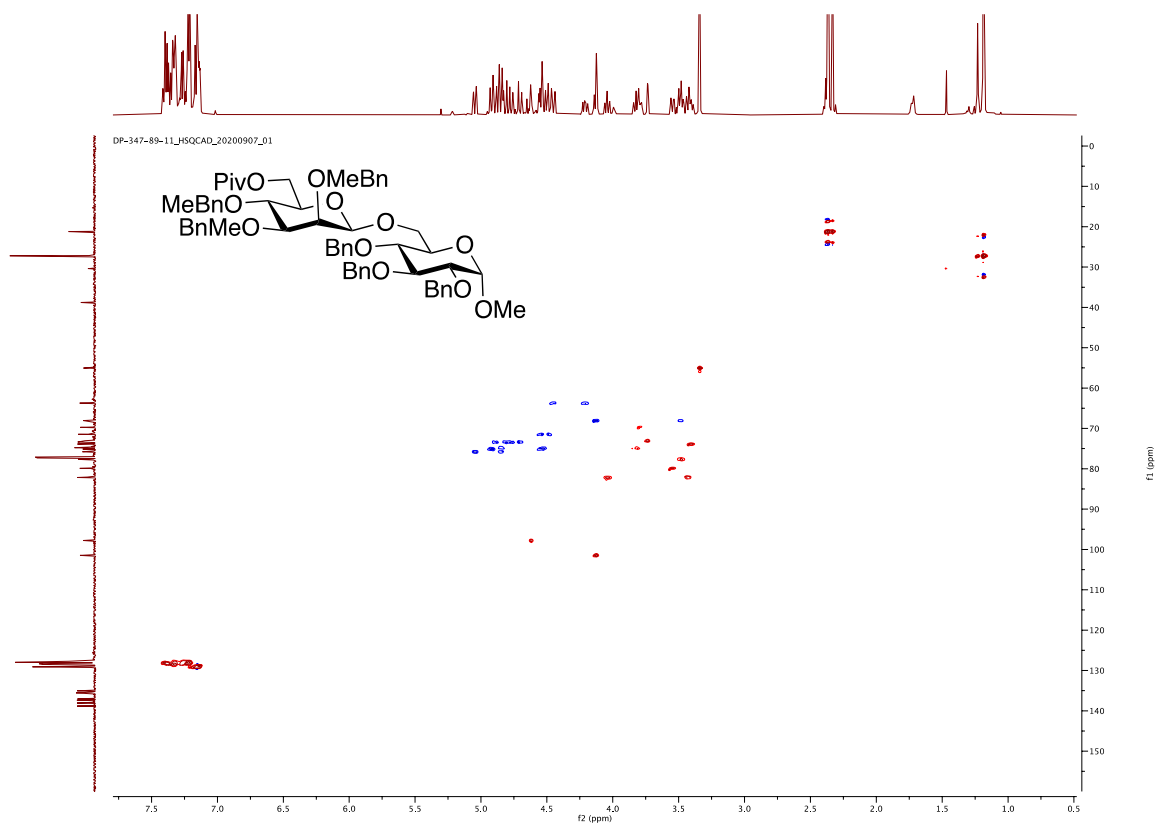
DP-347-89-11_CARBON_20200907_01



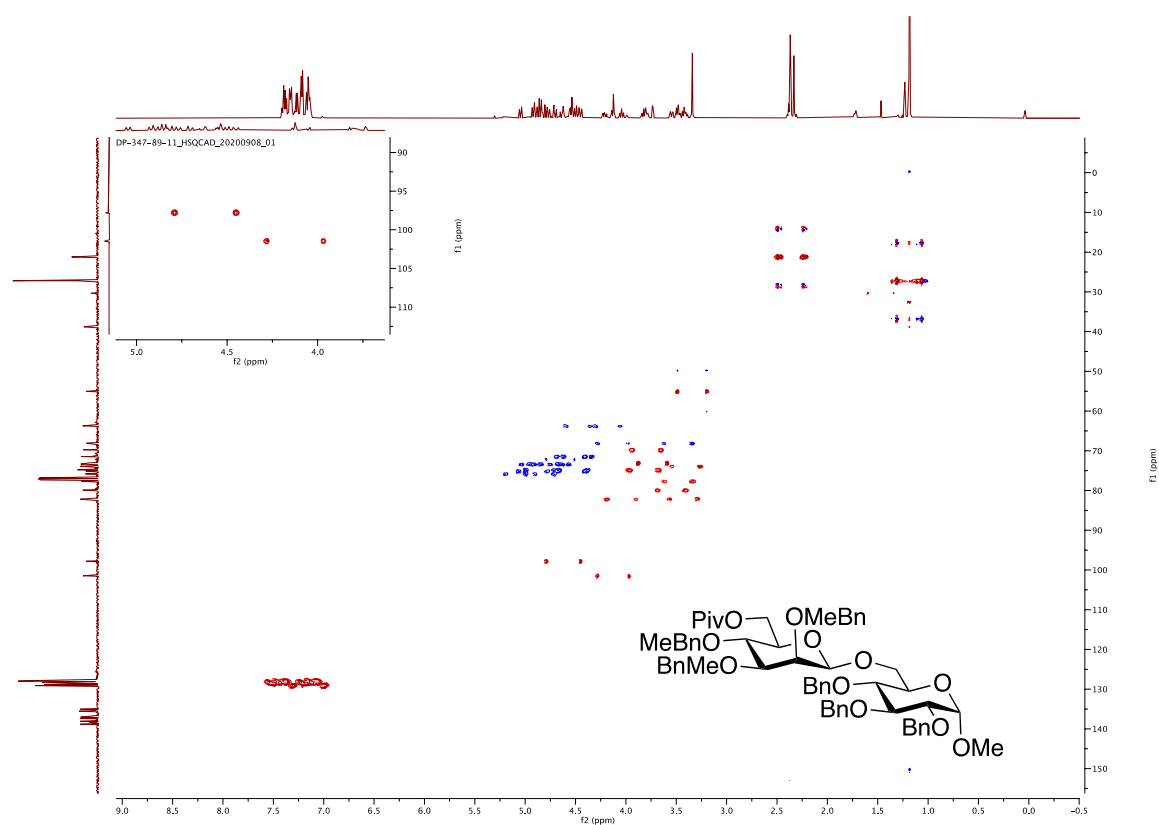
COSY NMR (500 MHz, Chloroform-*d*) 2i



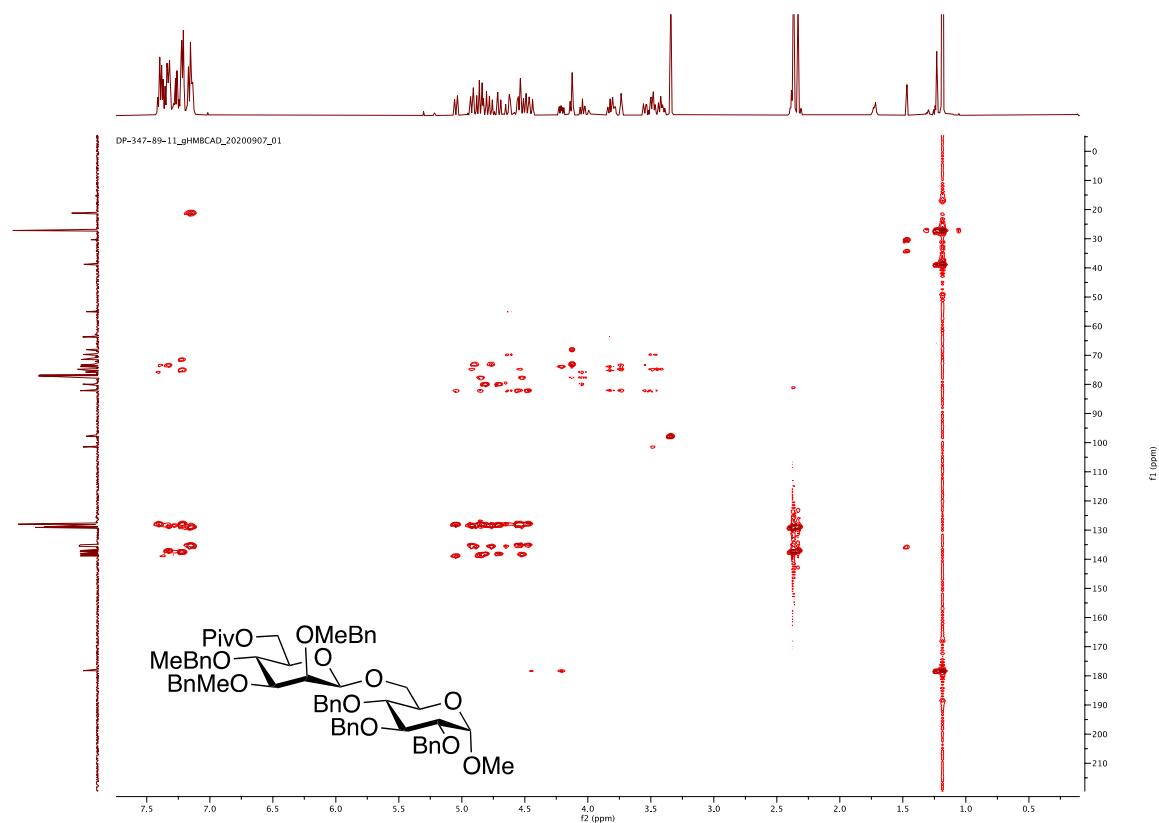
HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) 2i



^{13}C - ^1H coupled HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) 2i

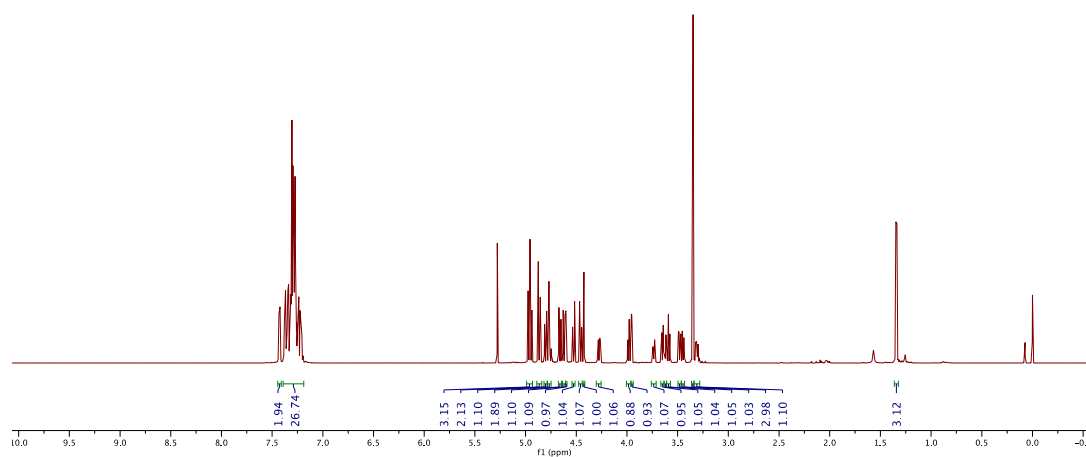
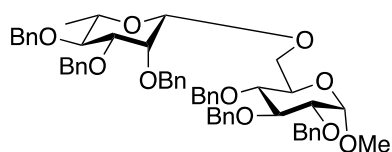


HMBC NMR (500 MHz x 126 MHz, Chloroform-*d*) 2i



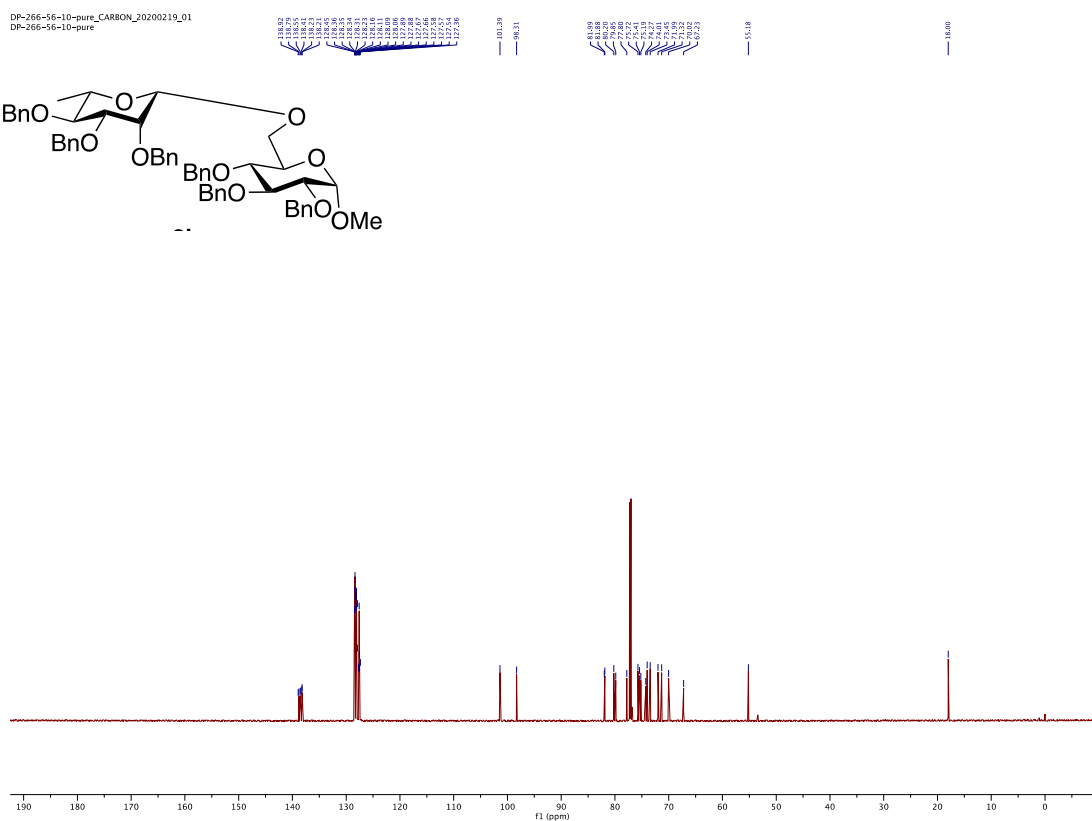
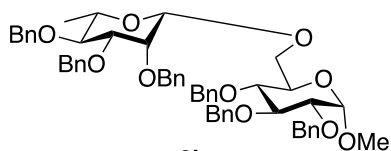
¹H NMR (600 MHz, Chloroform-*d*) 2j

DP-266-56-10-pure_PROTON_20200218_01
DP-266-56-10-pure

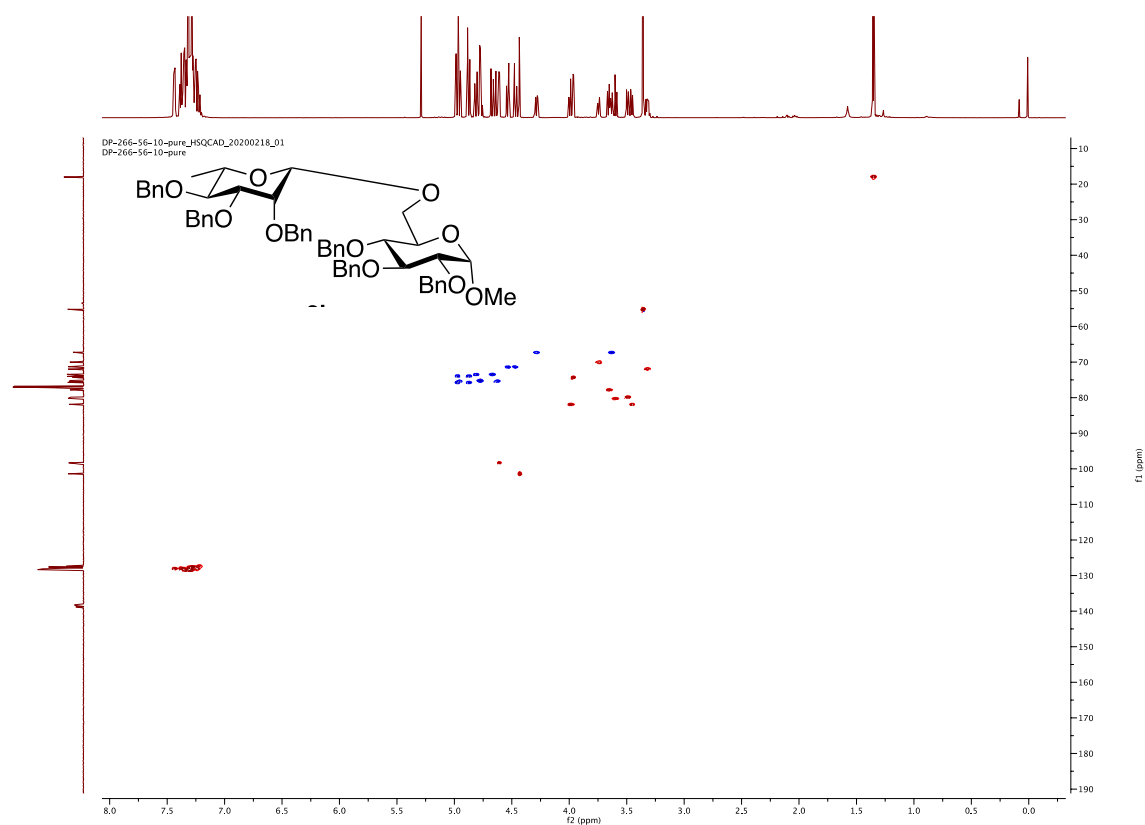


¹³C NMR (151 MHz, Chloroform-*d*) 2j

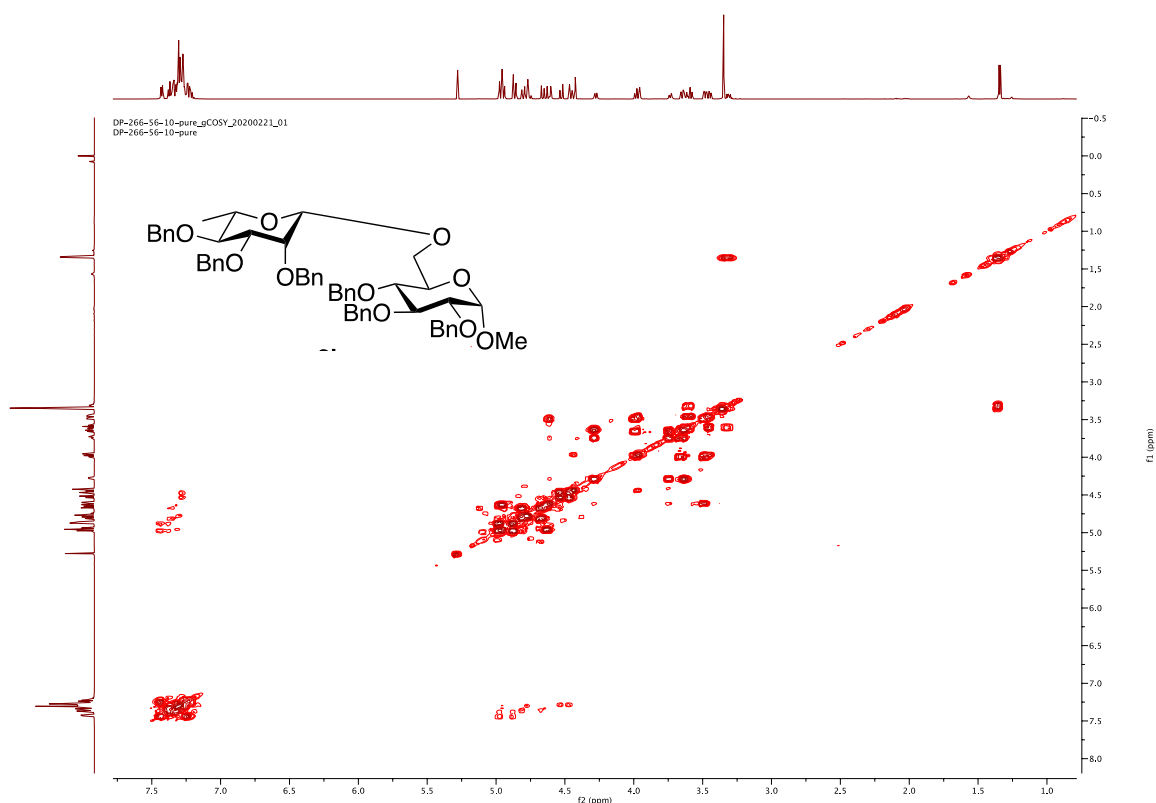
DP-266-56-10-pure CARBON_20200219_01
DP-266-56-10-pure



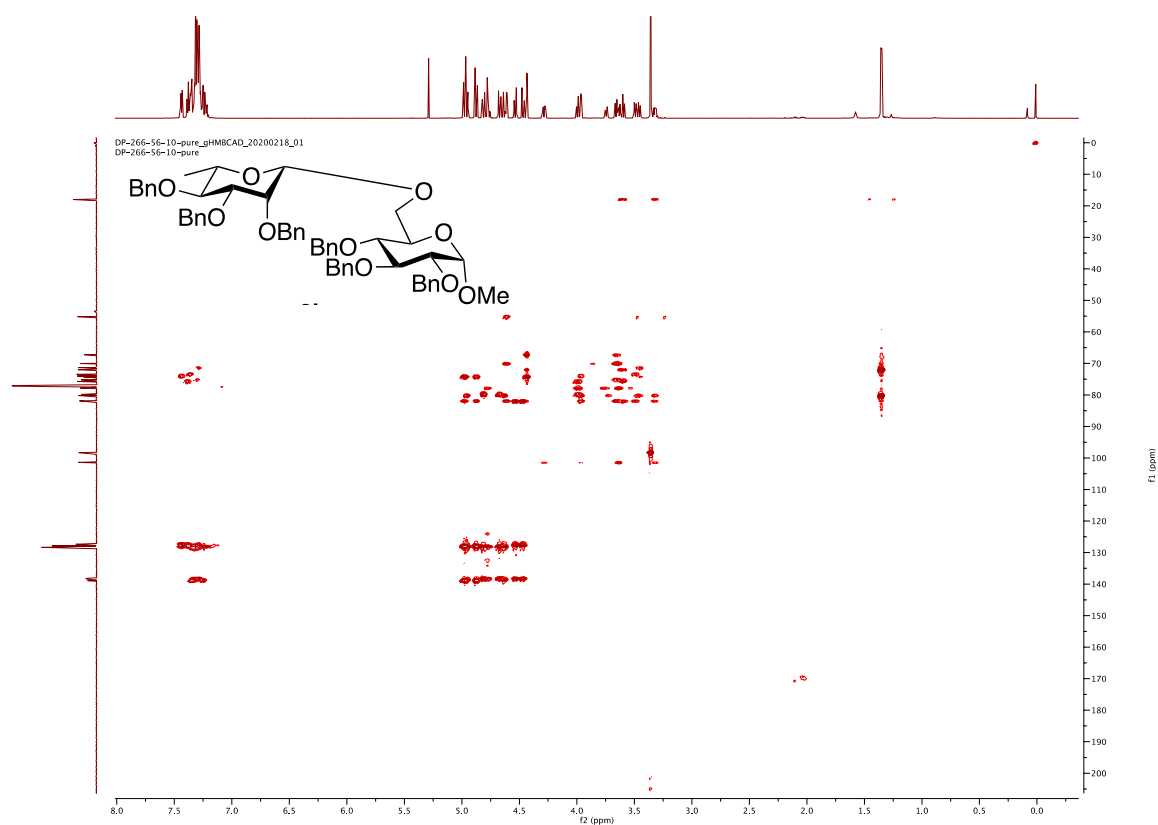
^{13}C - ^1H decoupled HSQC (600 x 151 MHz, Chloroform-*d*) 2j



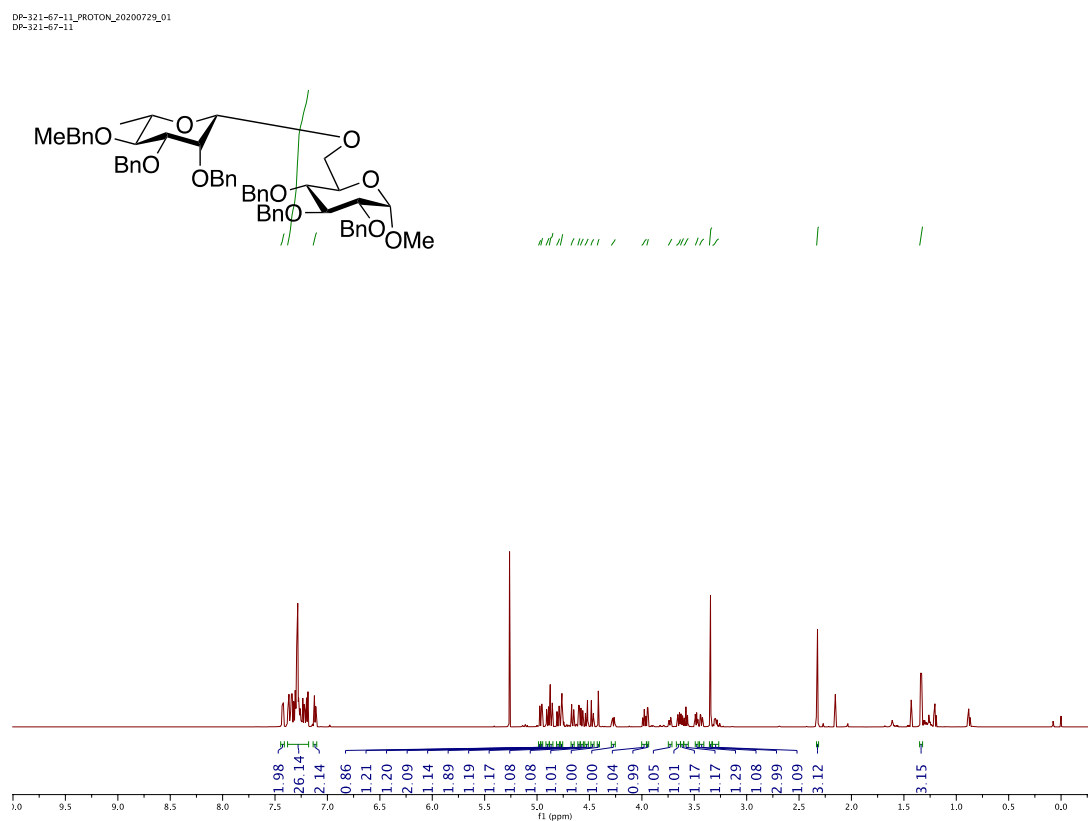
COSY (600 x 600 MHz, Chloroform-*d*) 2j



HMBC (600 x 151 MHz, Chloroform-*d*) 2j



¹H NMR (600 MHz, Chloroform-*d*) 2k

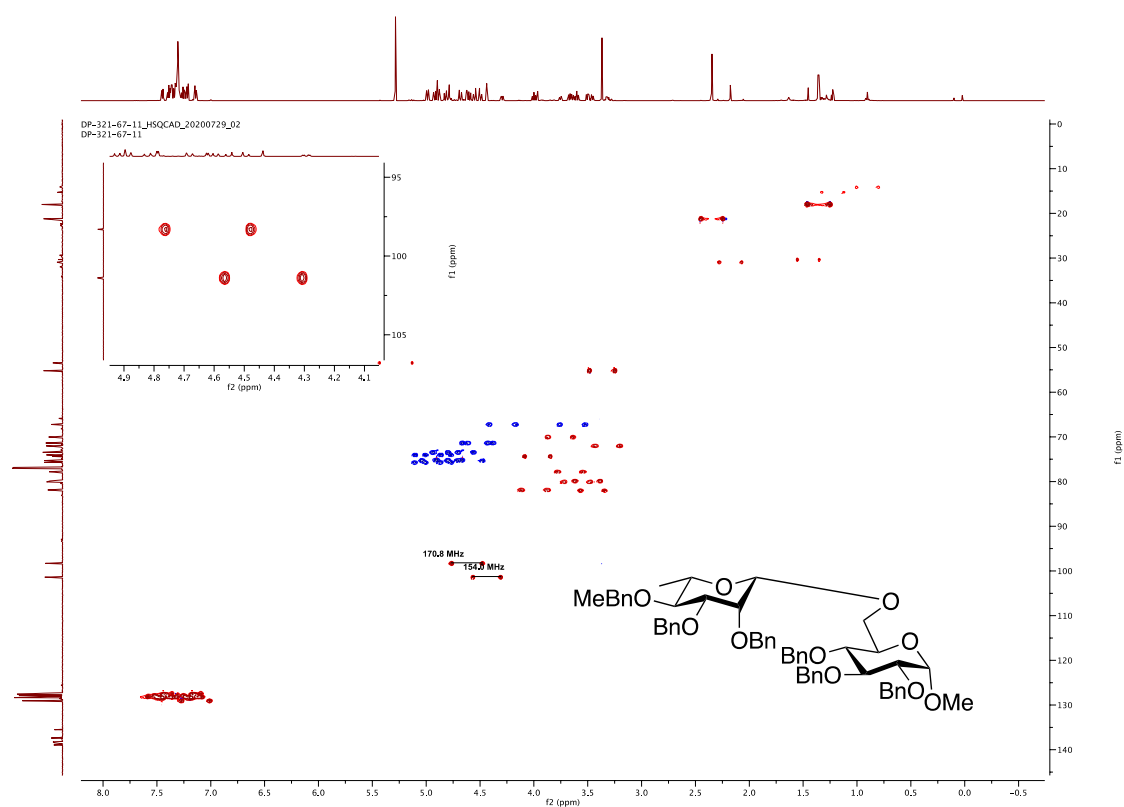


¹³C NMR (151 MHz, Chloroform-*d*) 2k

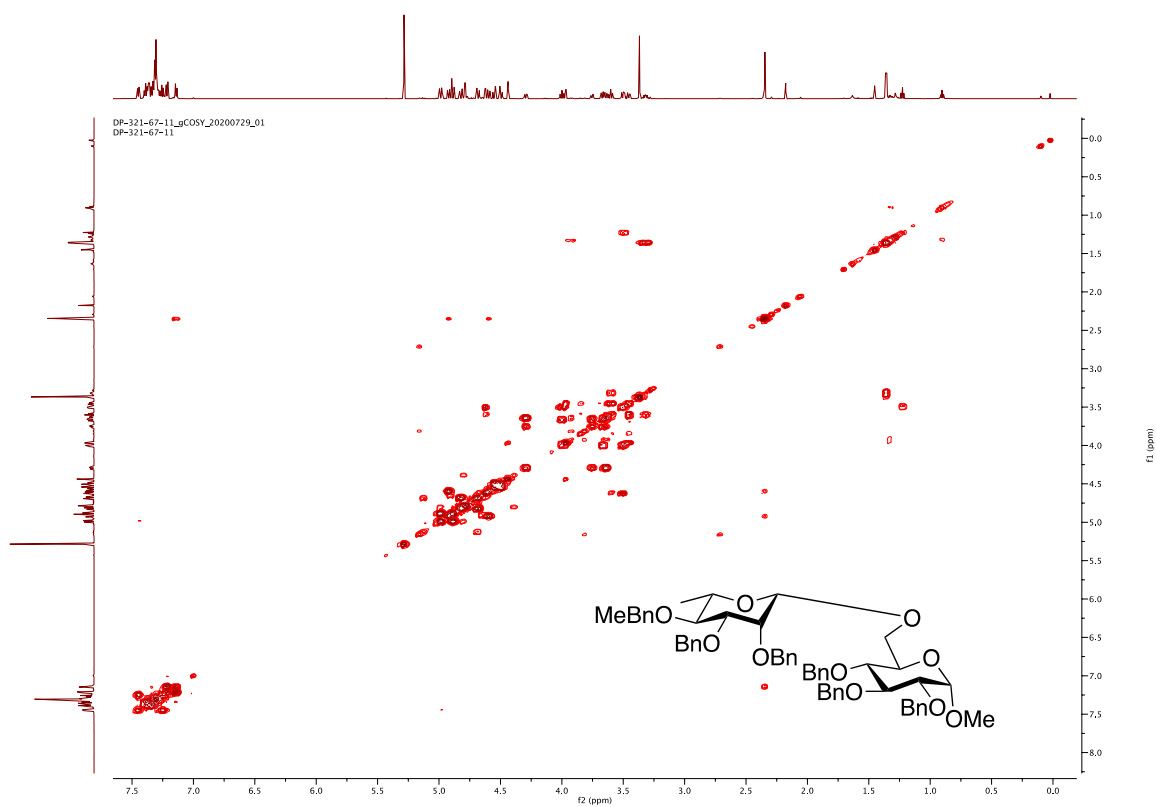
DP-321-67-11_CARBON_20200729_01
DP-321-67-11



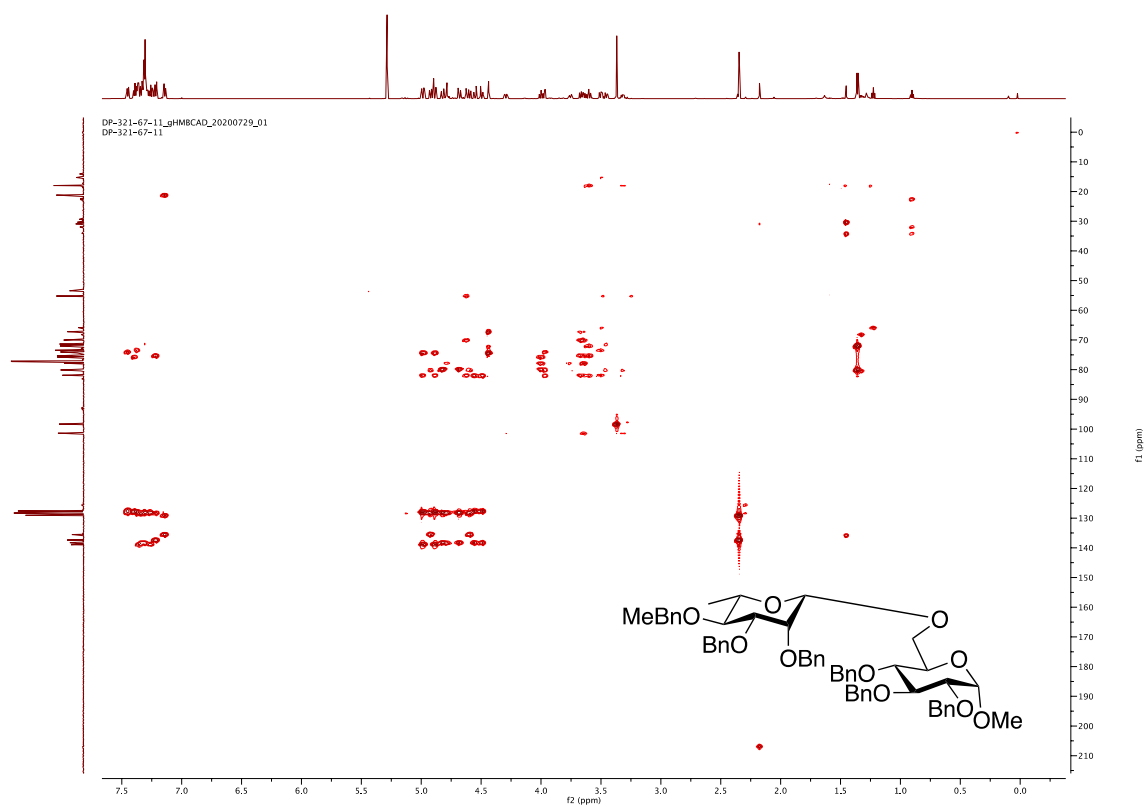
^{13}C - ^1H coupled HSQC (600 x 151 MHz, Chloroform-*d*) 2k



COSY (600 x 600 MHz, Chloroform-*d*) 2k

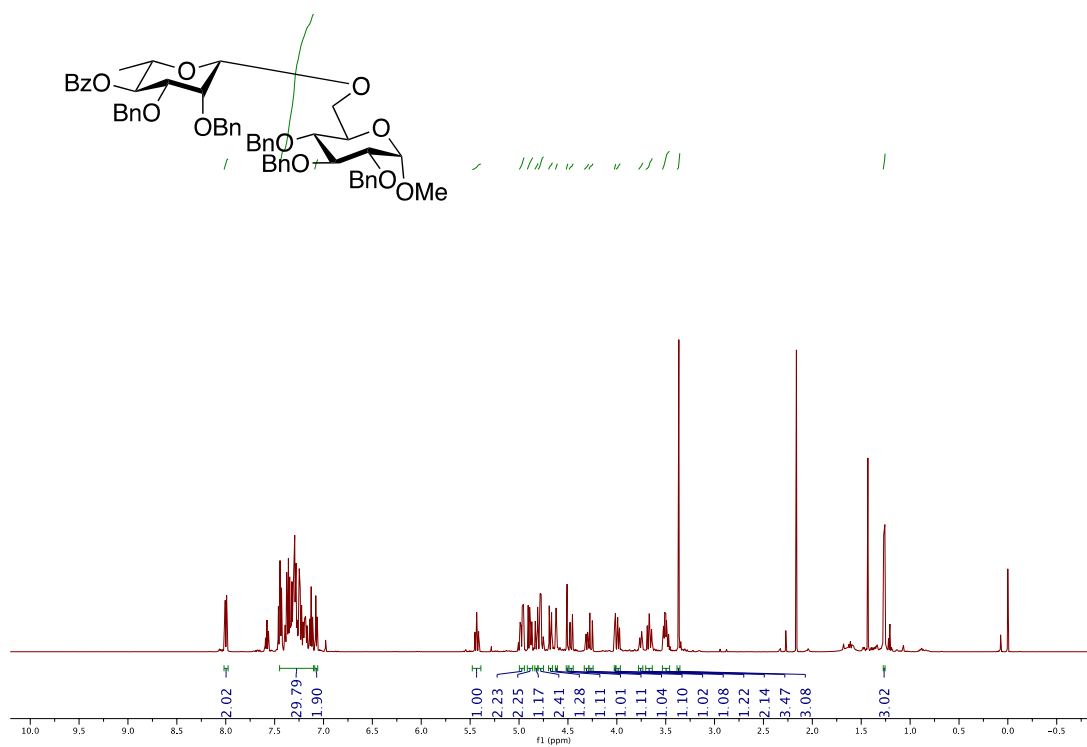


HMBC (600 x 151 MHz, Chloroform-*d*) 2k

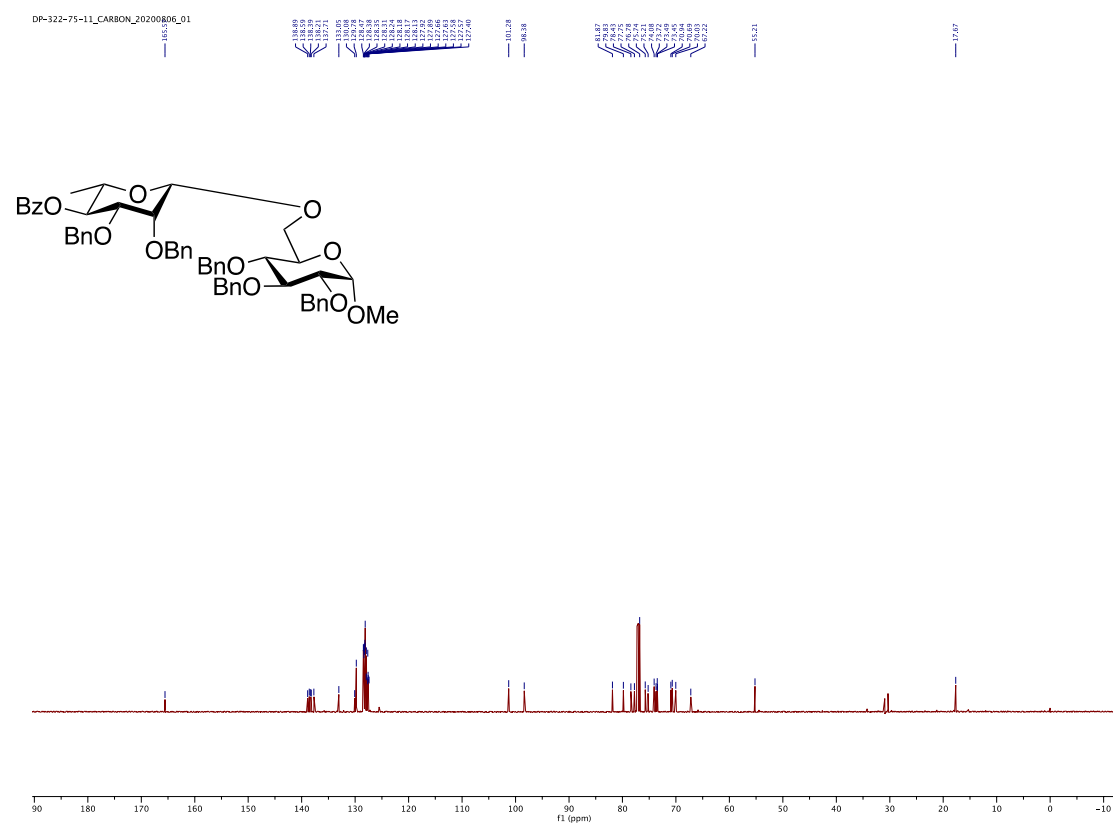


¹H NMR (500 MHz, Chloroform-*d*) 2l

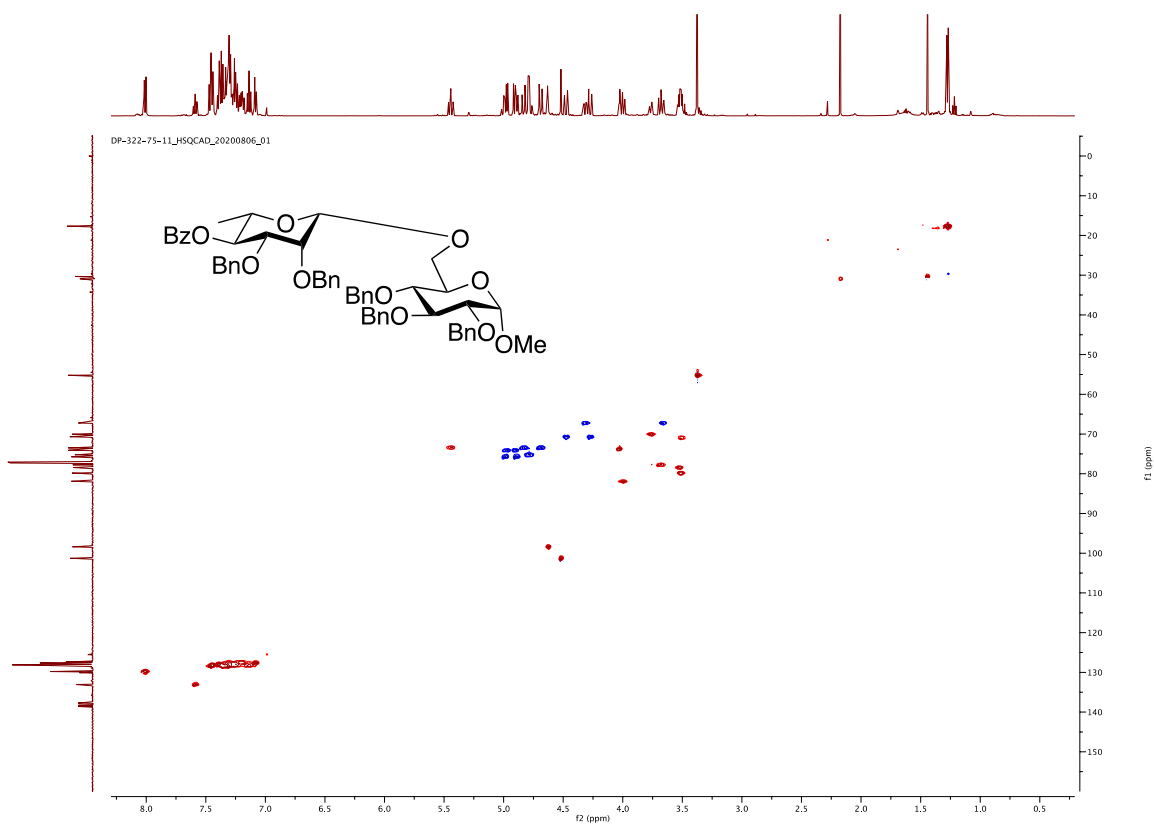
DP-322-75-11_PROTON_20200806_01



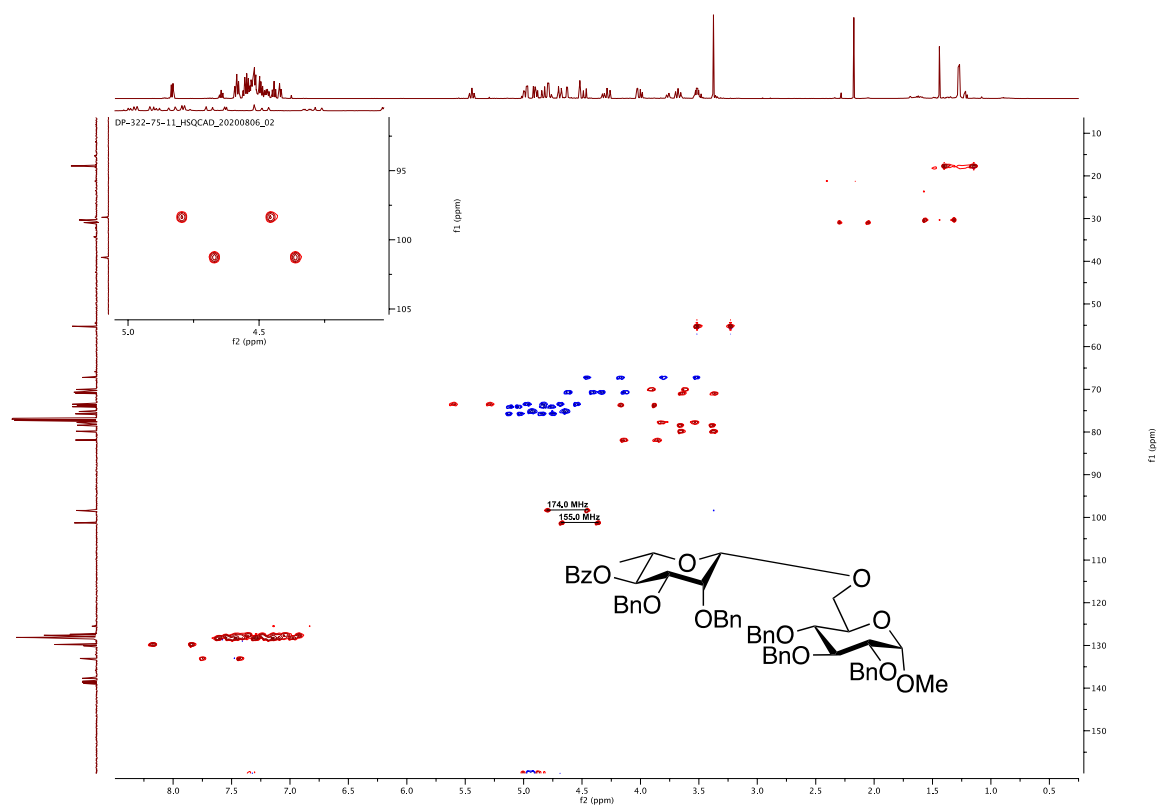
¹³C NMR (126 MHz, Chloroform-*d*) 2l



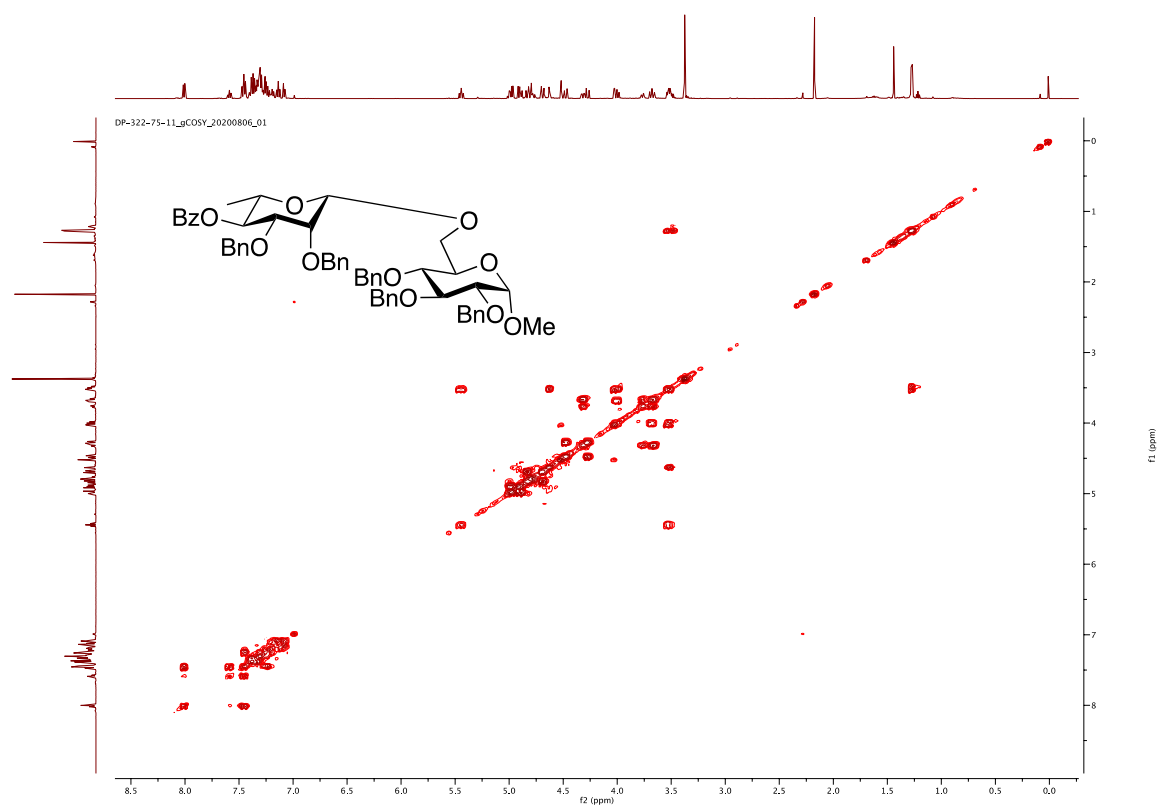
¹³C - ¹H decoupled HSQC (500 x 126 MHz, Chloroform-*d*) 2l



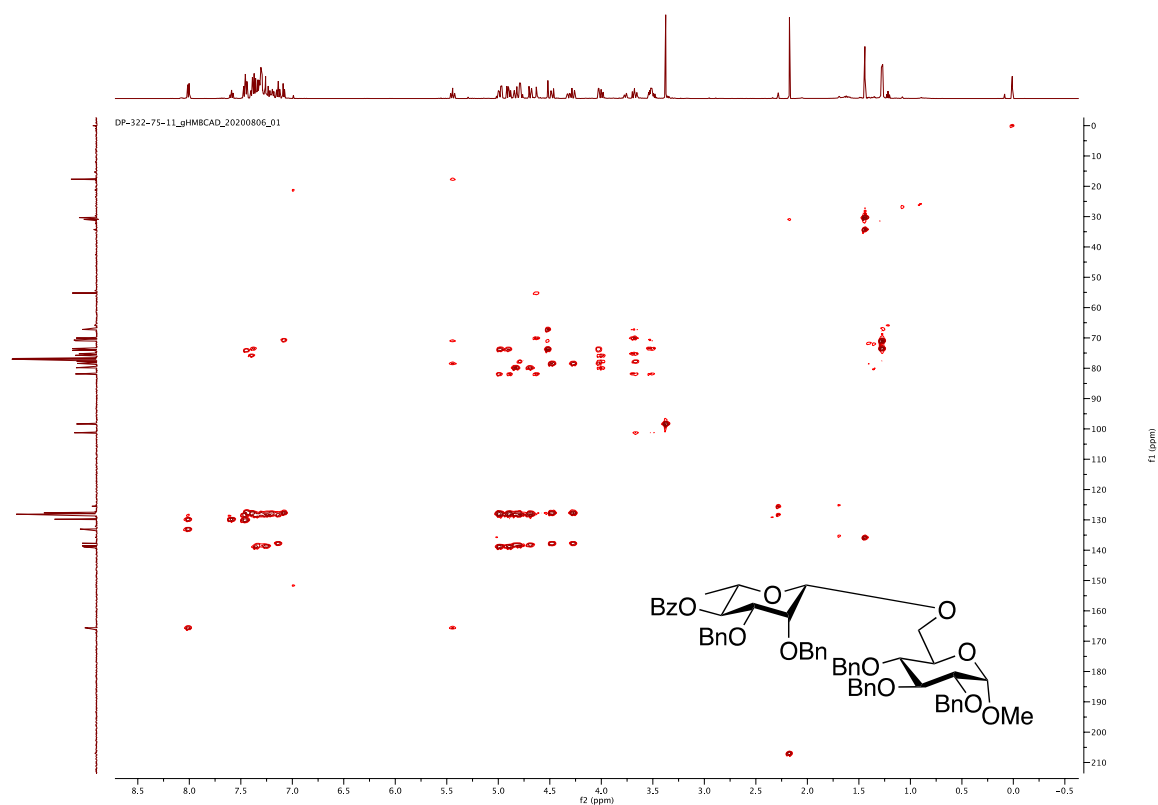
^{13}C - ^1H coupled HSQC (500 x 126 MHz, Chloroform-*d*) 2l



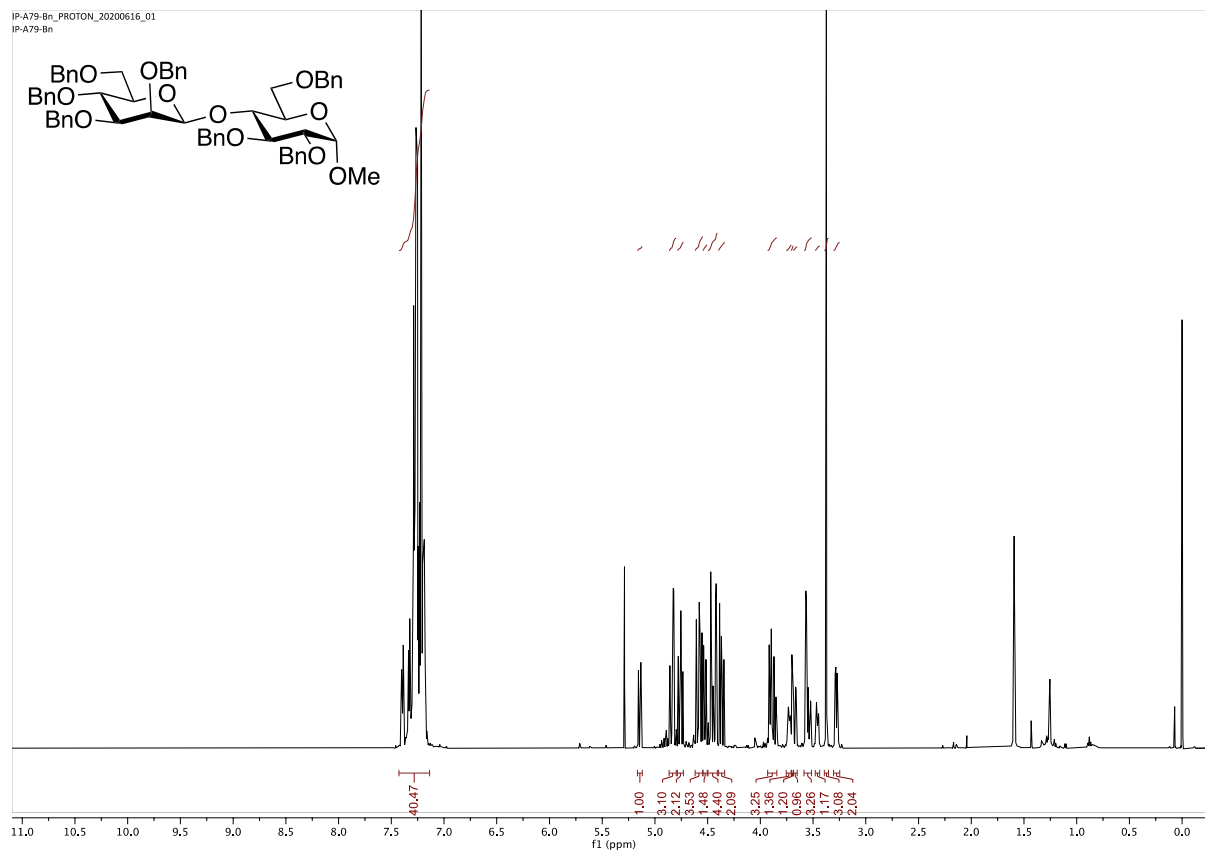
COSY (500 x 500 MHz, Chloroform-*d*) 2l



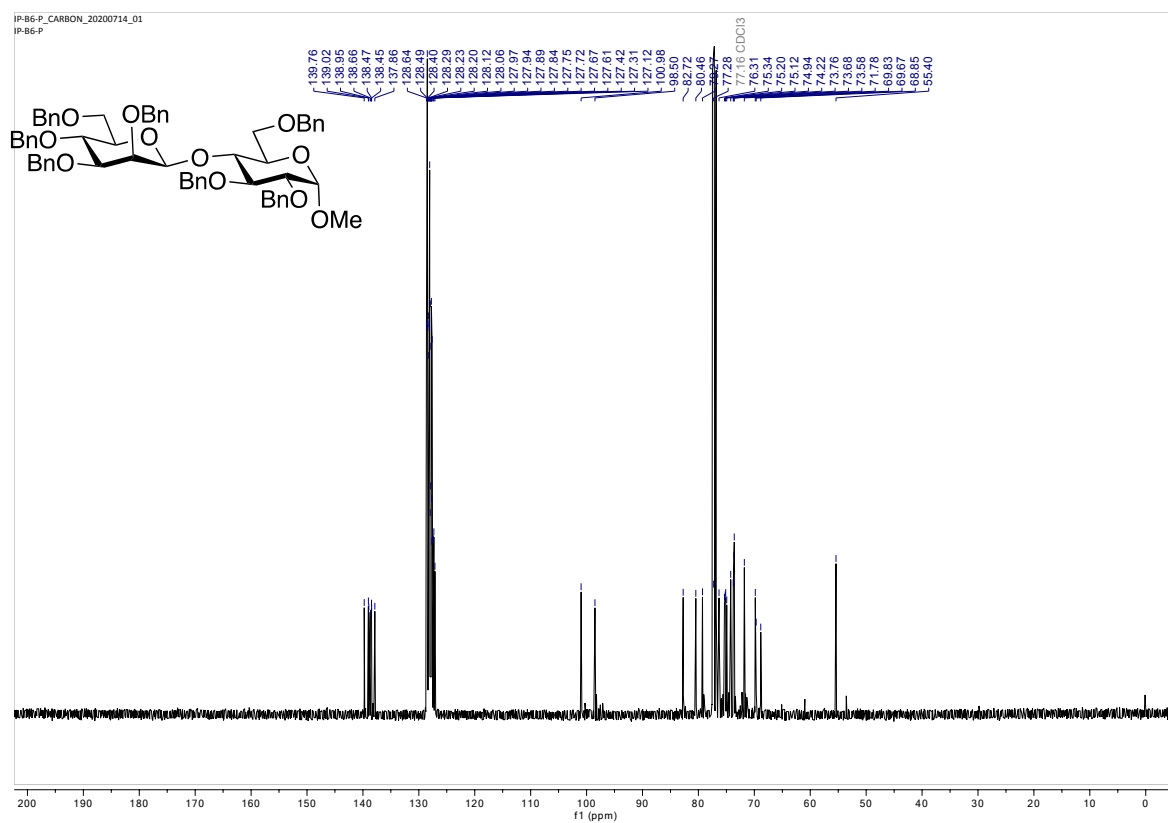
HMBC (500 x 126 MHz, Chloroform-*d*) 2l



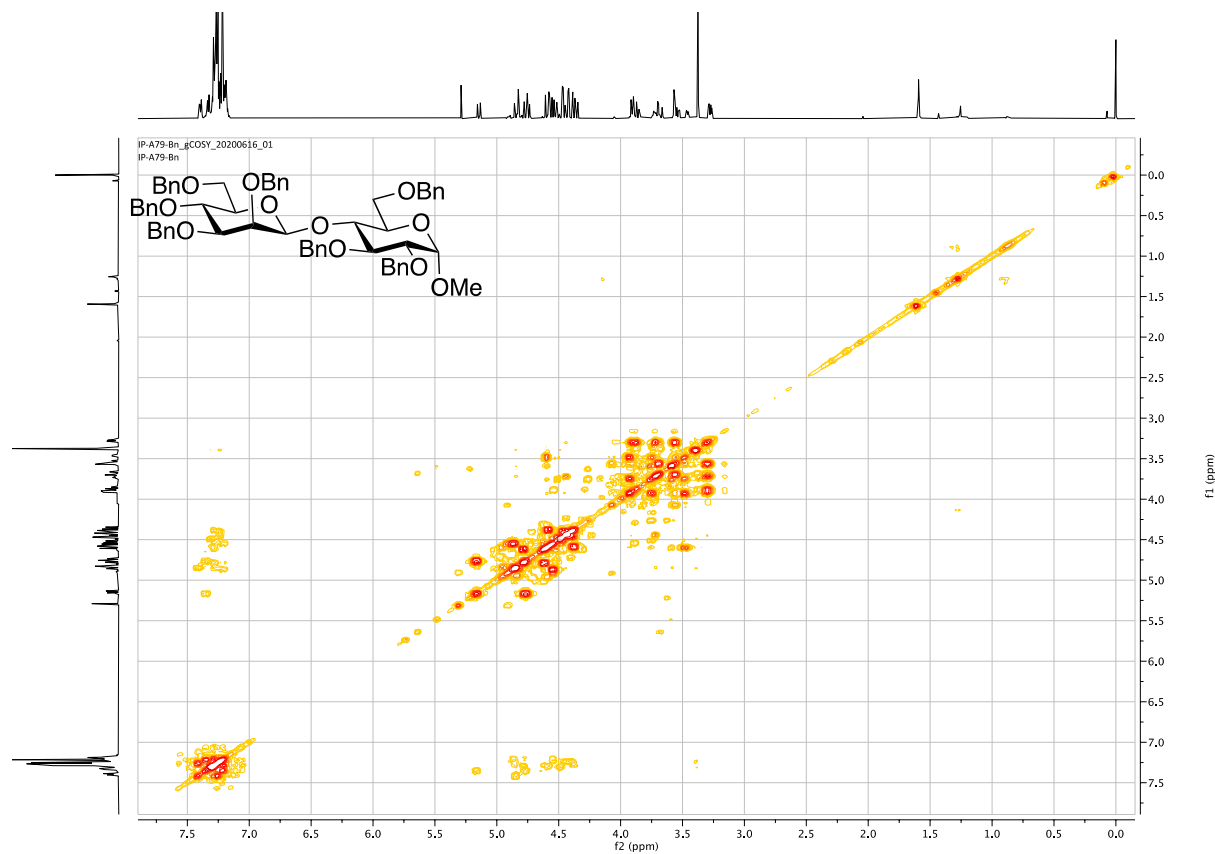
¹H NMR (500 MHz, Chloroform-*d*) 4b



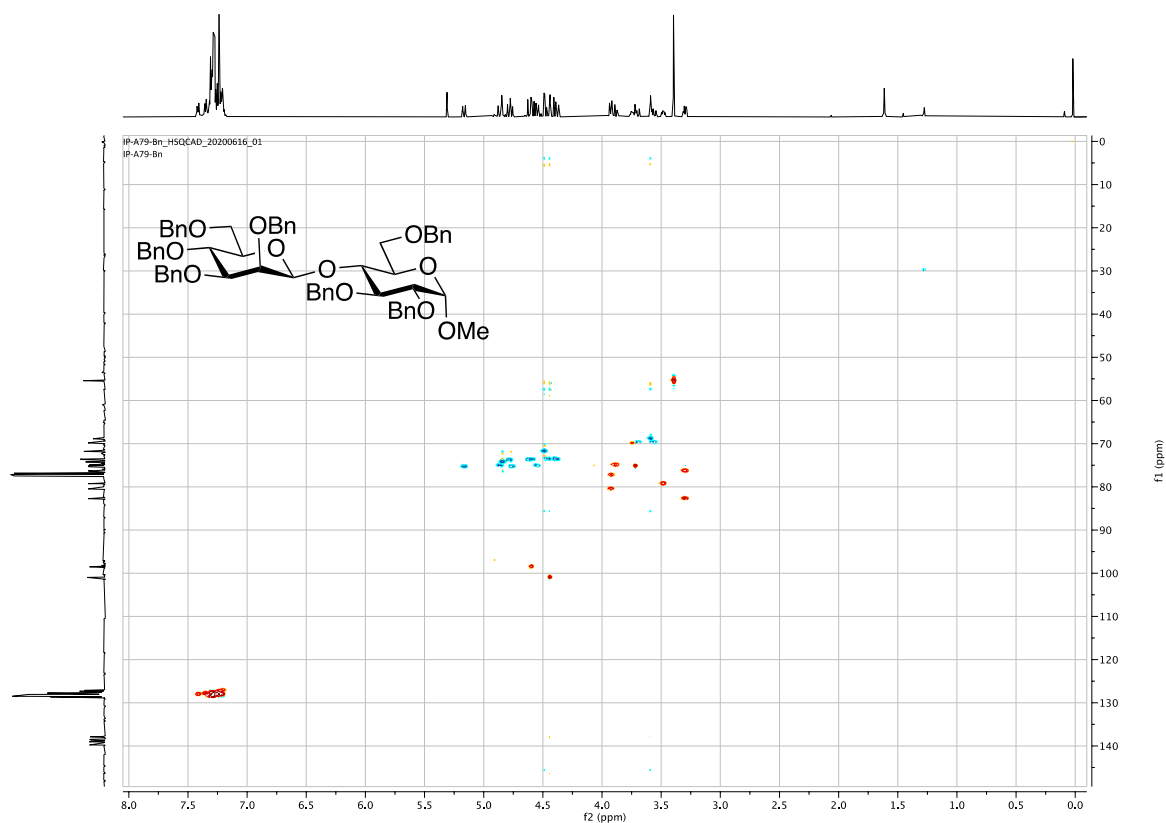
^{13}C NMR (126 MHz, Chloroform-*d*) 4b



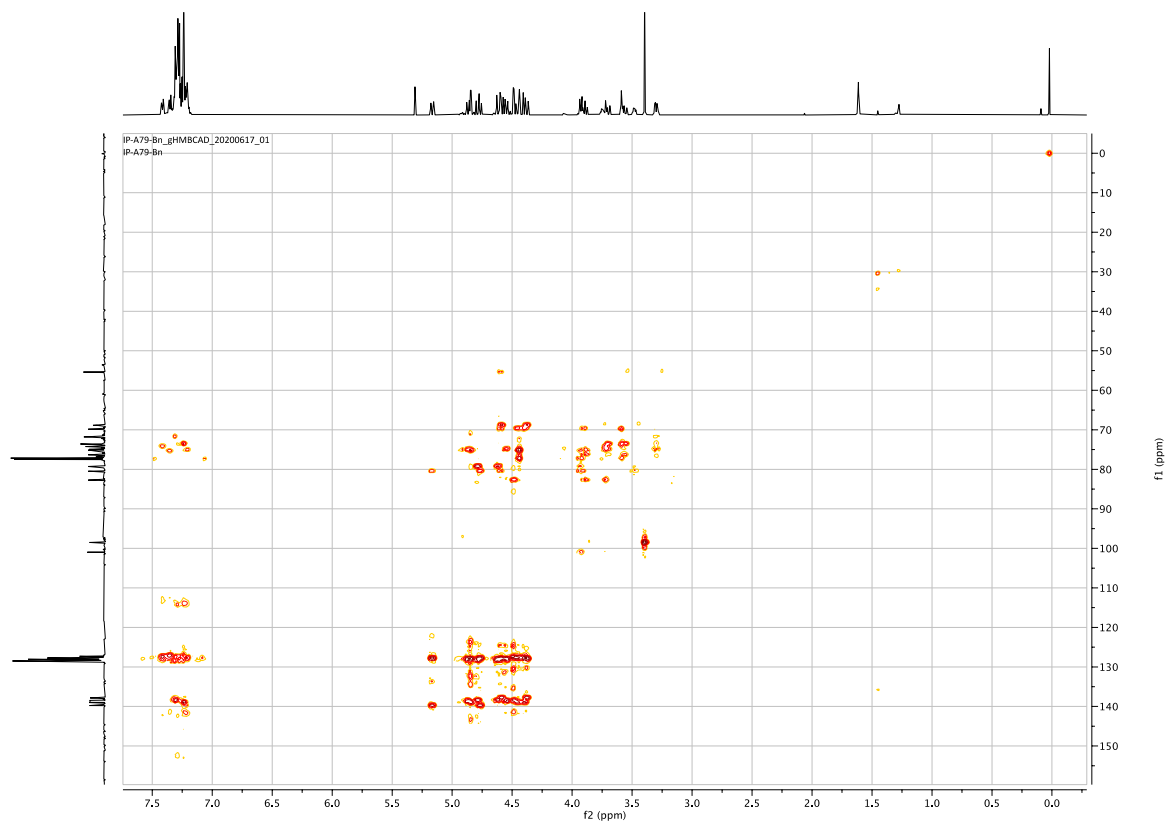
COSY NMR (500 MHz, Chloroform-*d*) 4b



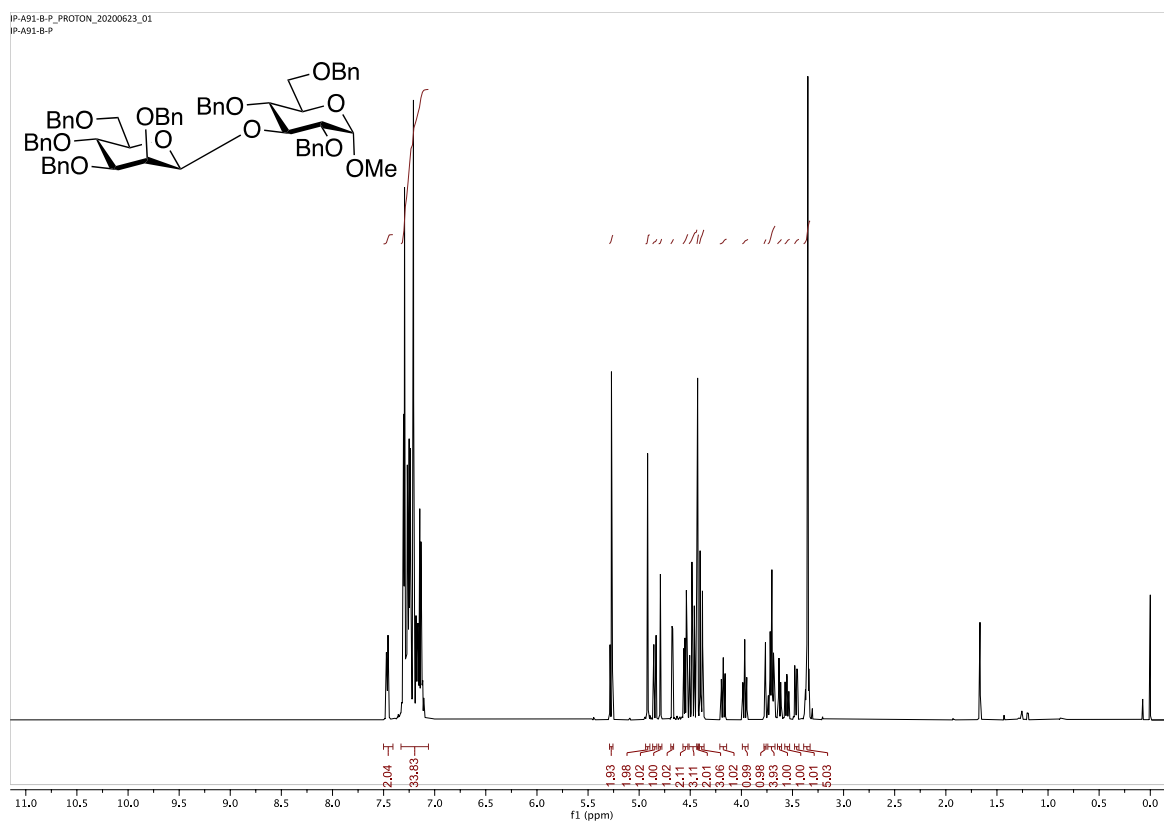
HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) 4b



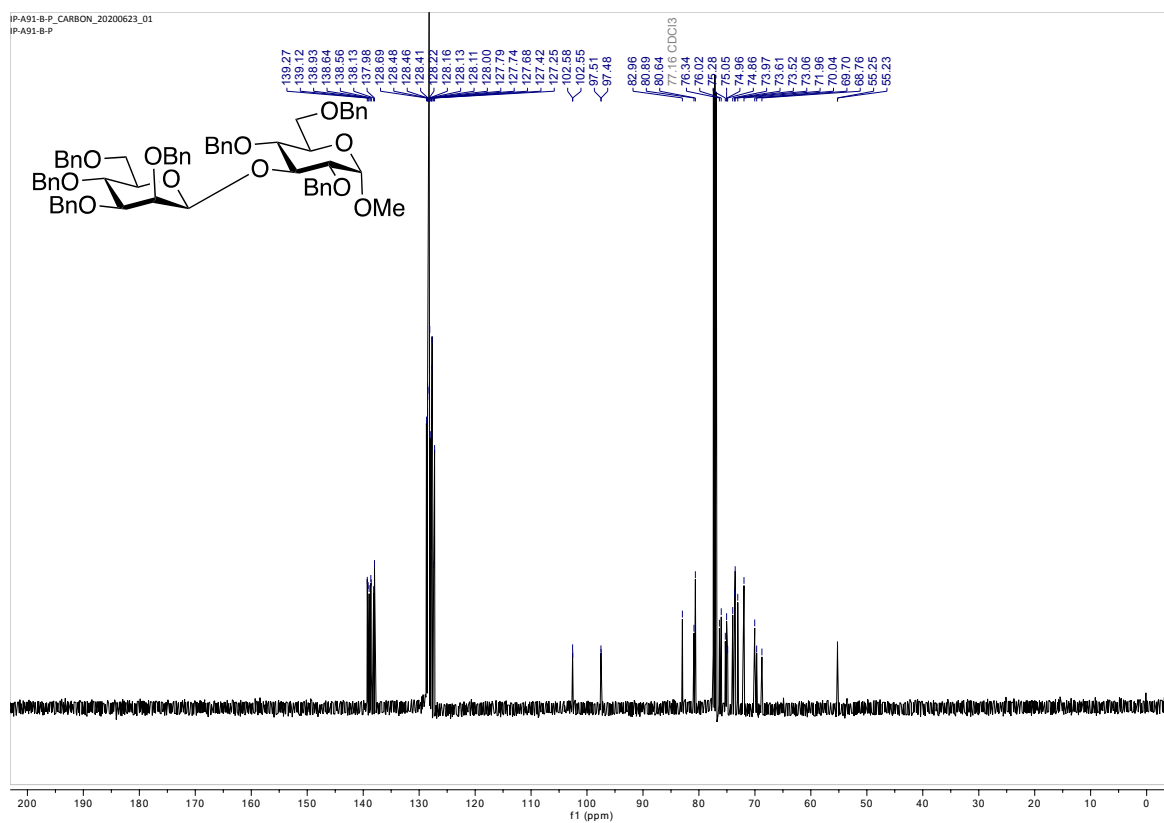
HMBC NMR (500 MHz x 126 MHz, Chloroform-*d*) 4b



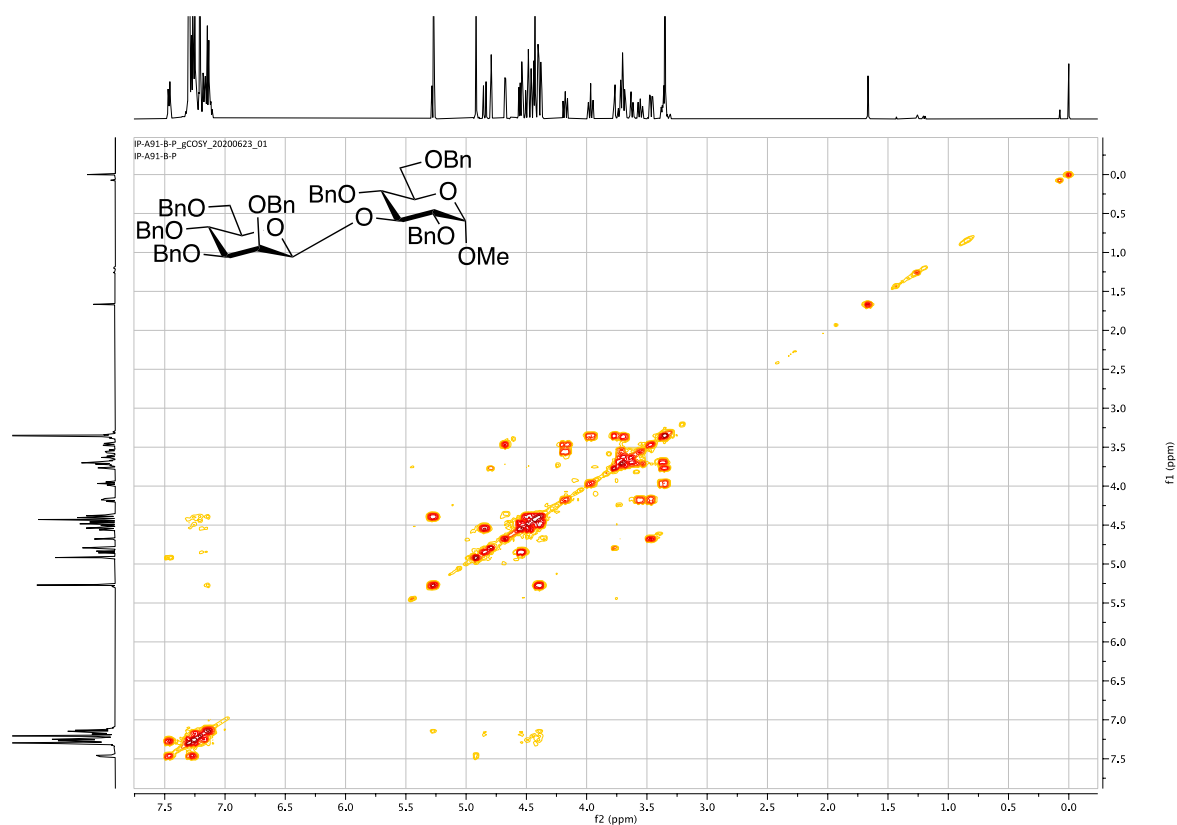
¹H NMR (500 MHz, Chloroform-*d*) 4c



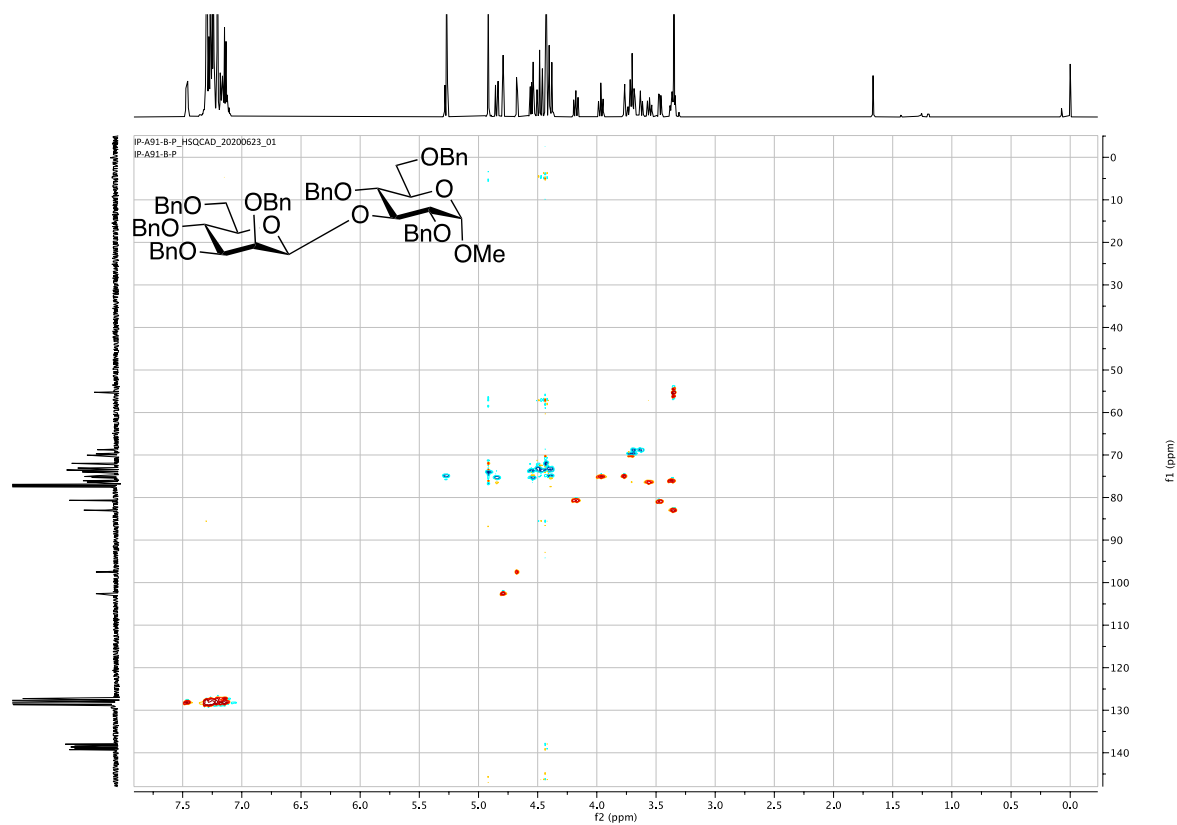
¹³C NMR (126 MHz, Chloroform-*d*) 4c



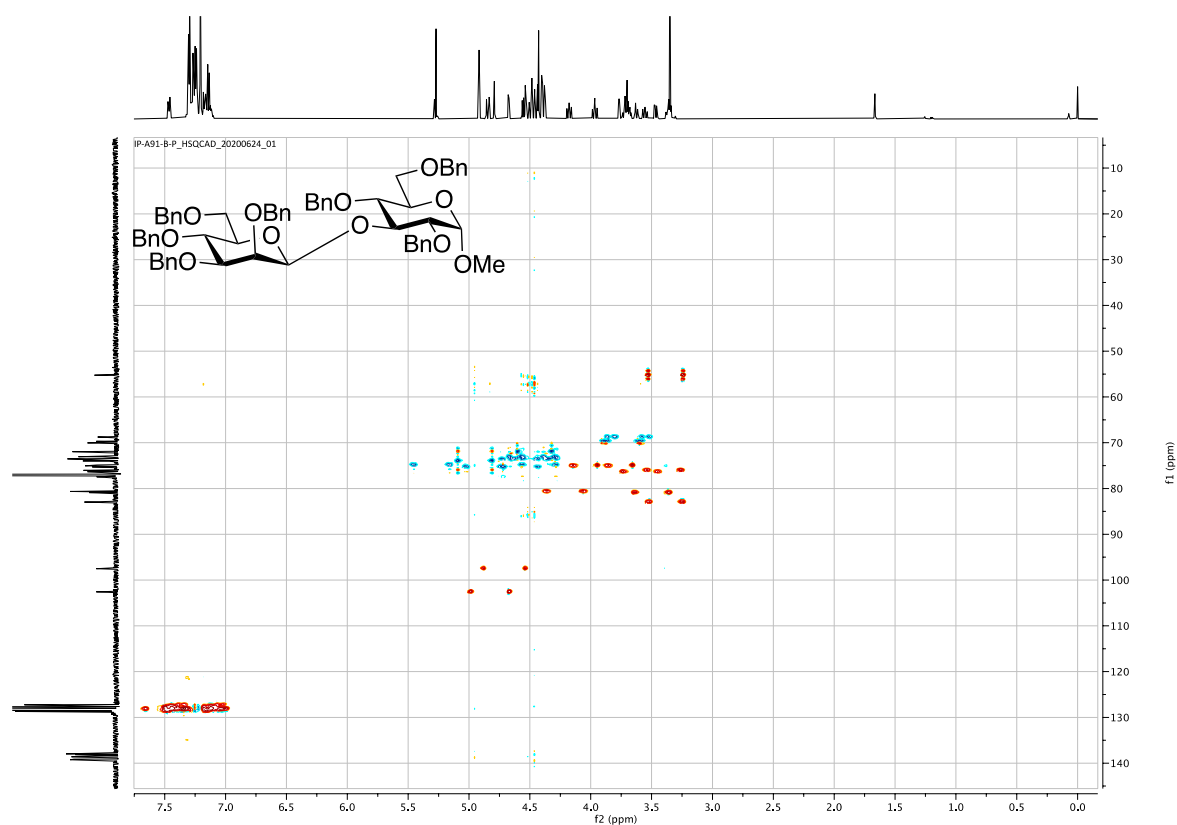
COSY NMR (500 MHz, Chloroform-*d*) 4c



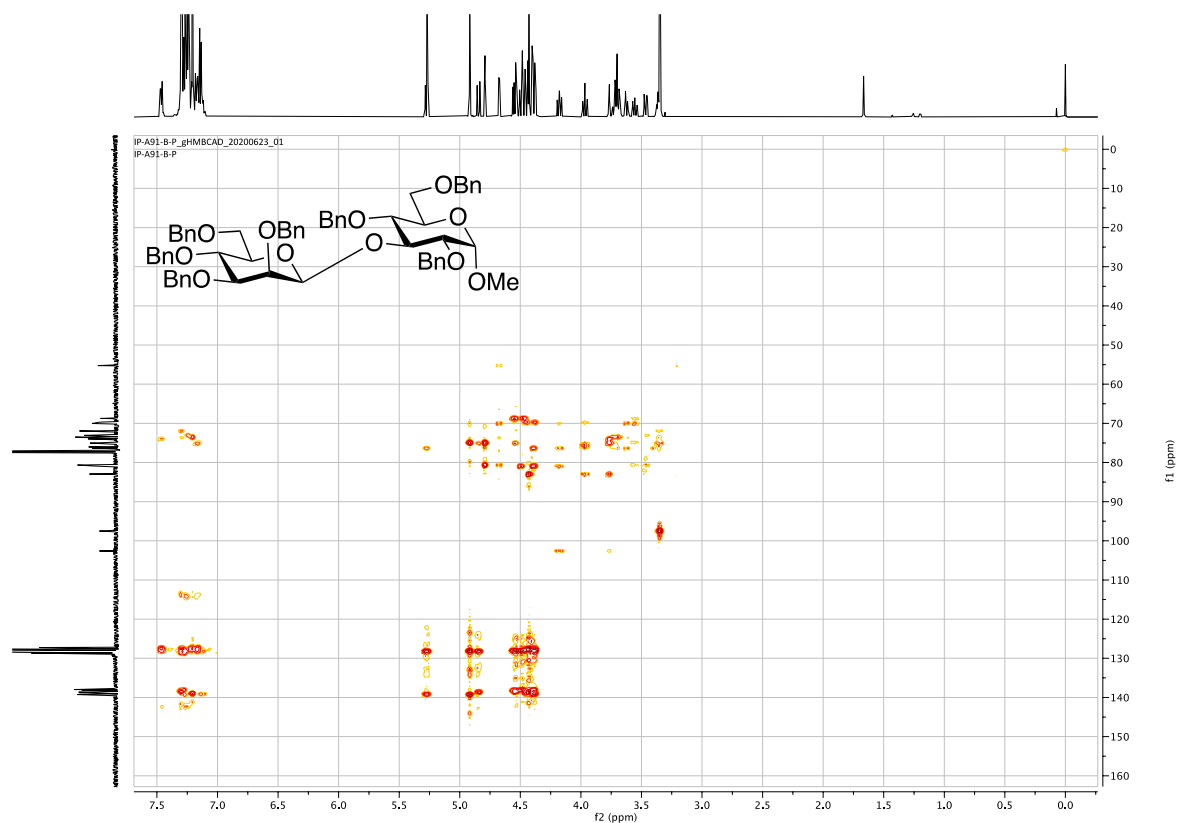
HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) 4c



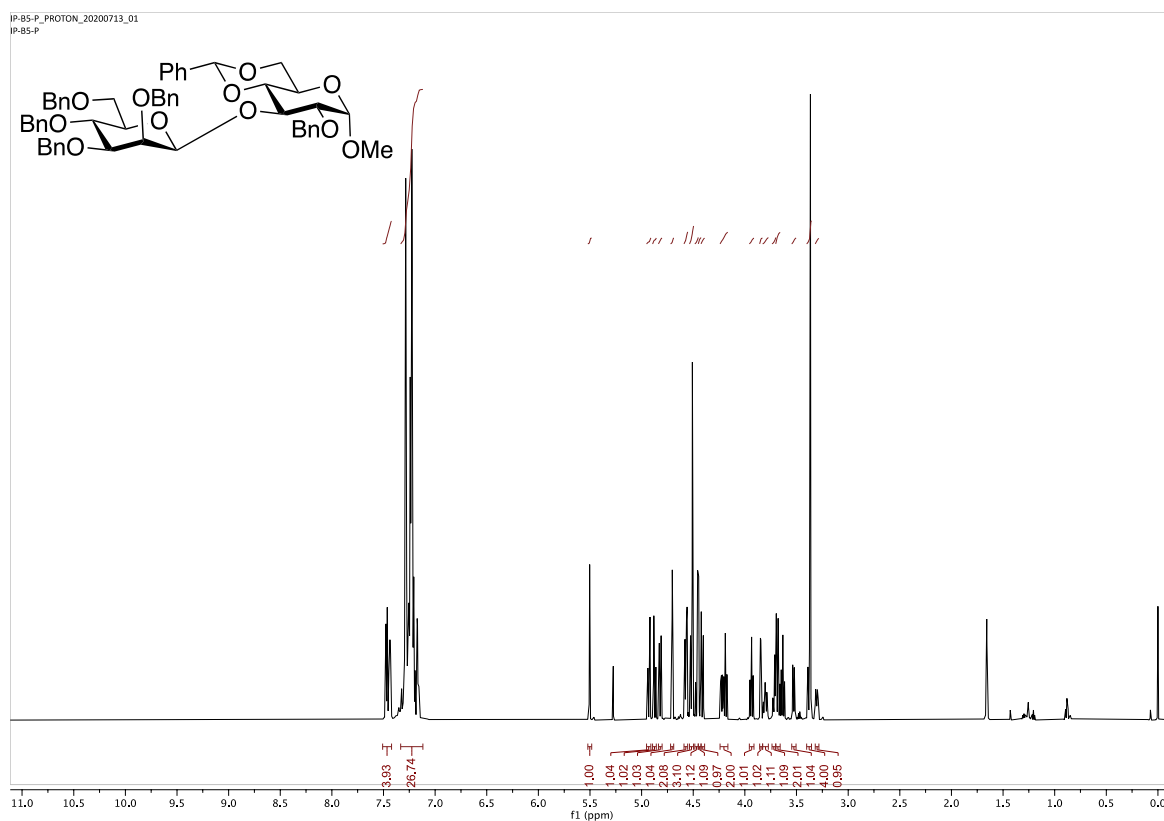
^{13}C - ^1H coupled HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) 4c



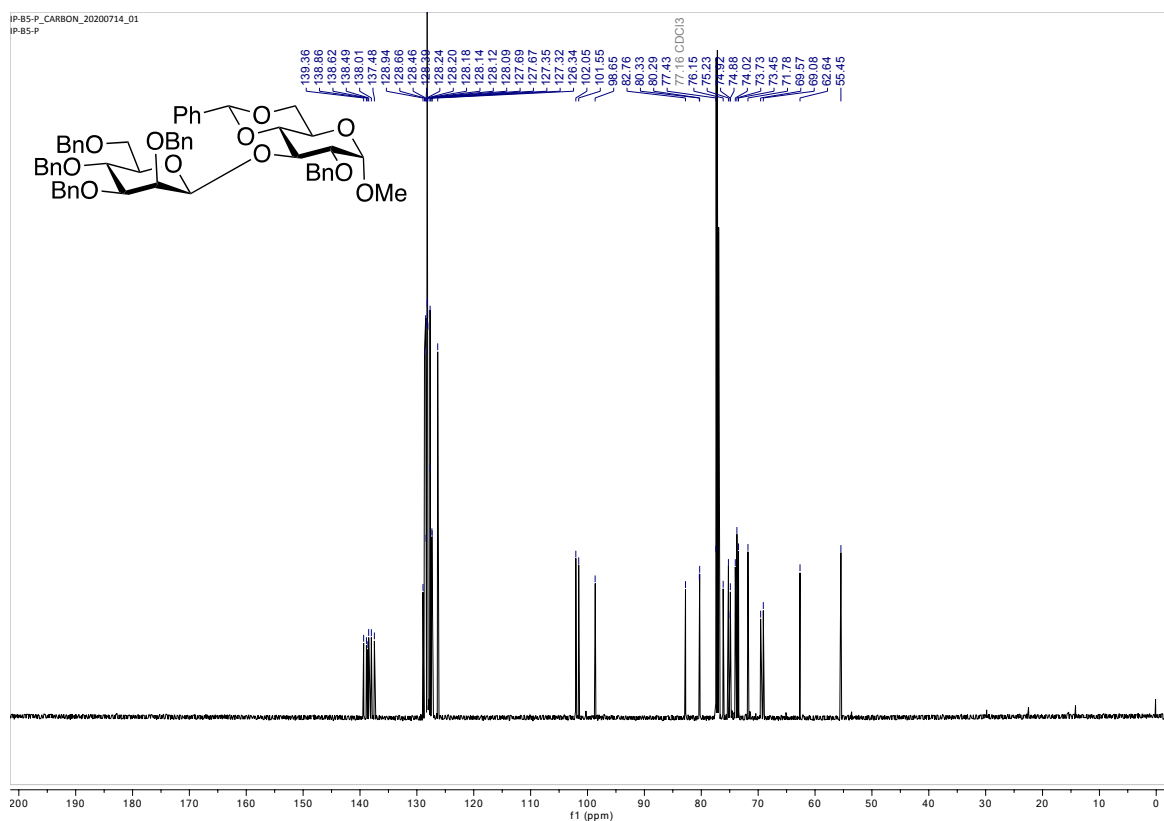
HMBC NMR (500 MHz x 126 MHz, Chloroform-*d*) 4c



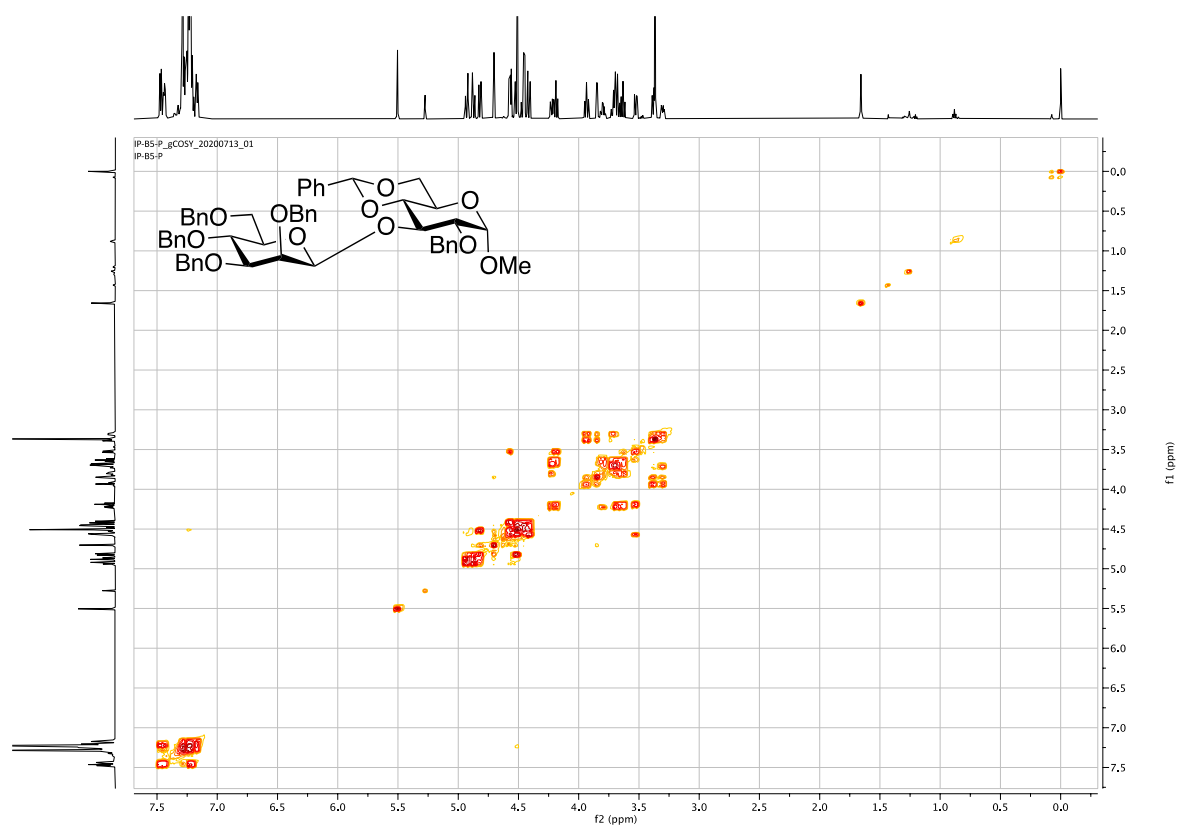
¹H NMR (600 MHz, Chloroform-*d*) 4d



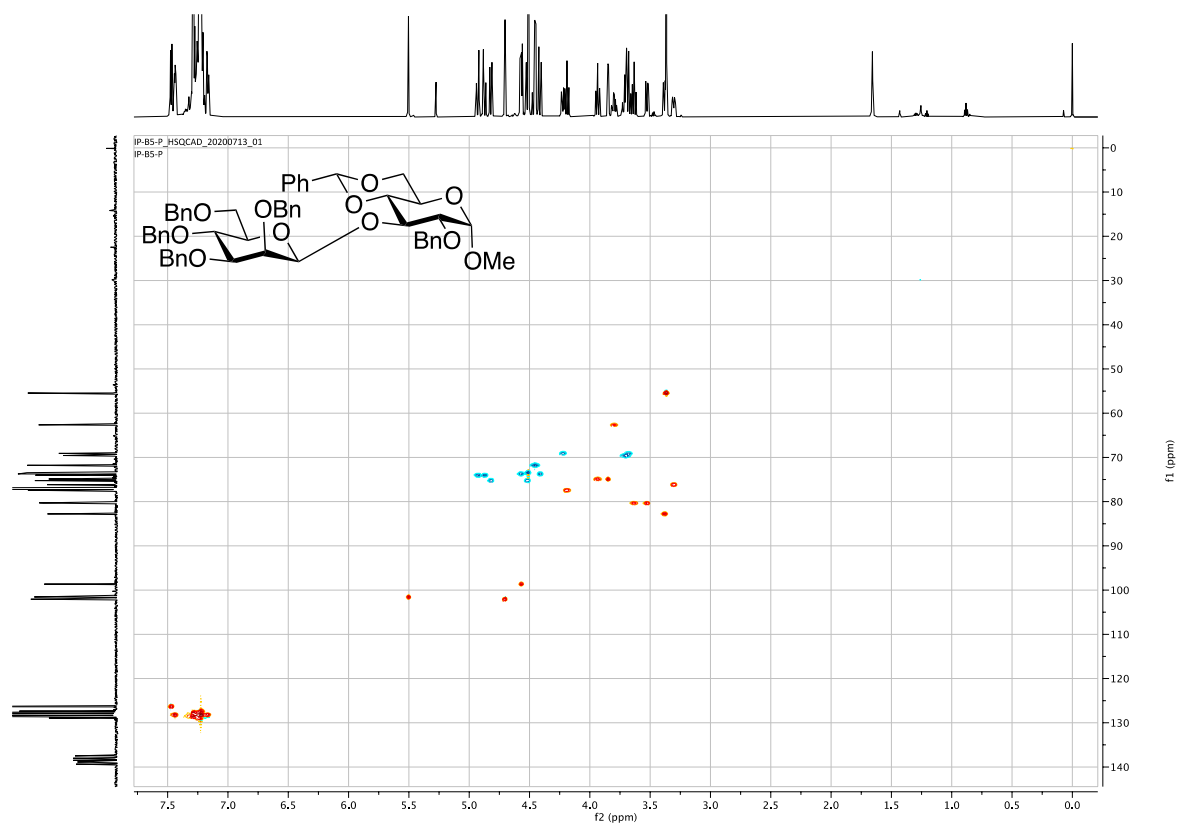
¹³C NMR (151 MHz, Chloroform-*d*) 4d



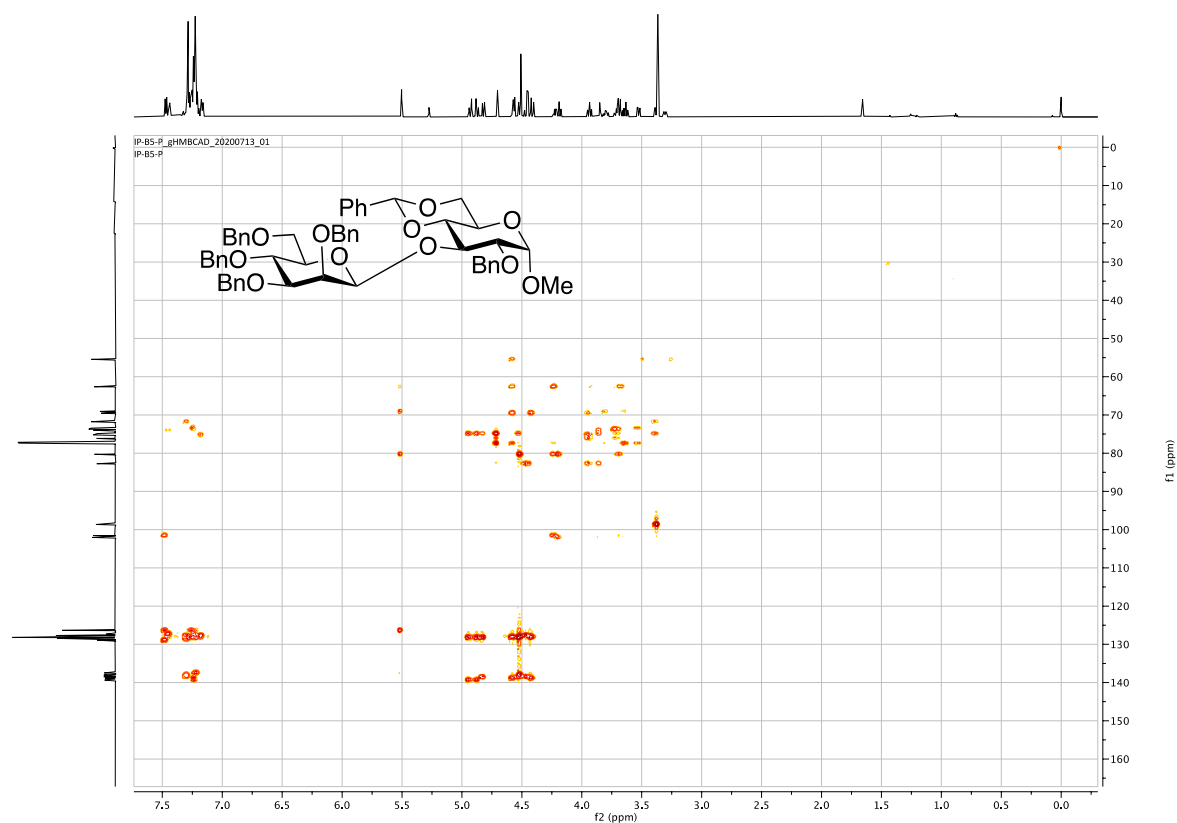
COSY NMR (600 MHz, Chloroform-*d*) 4d



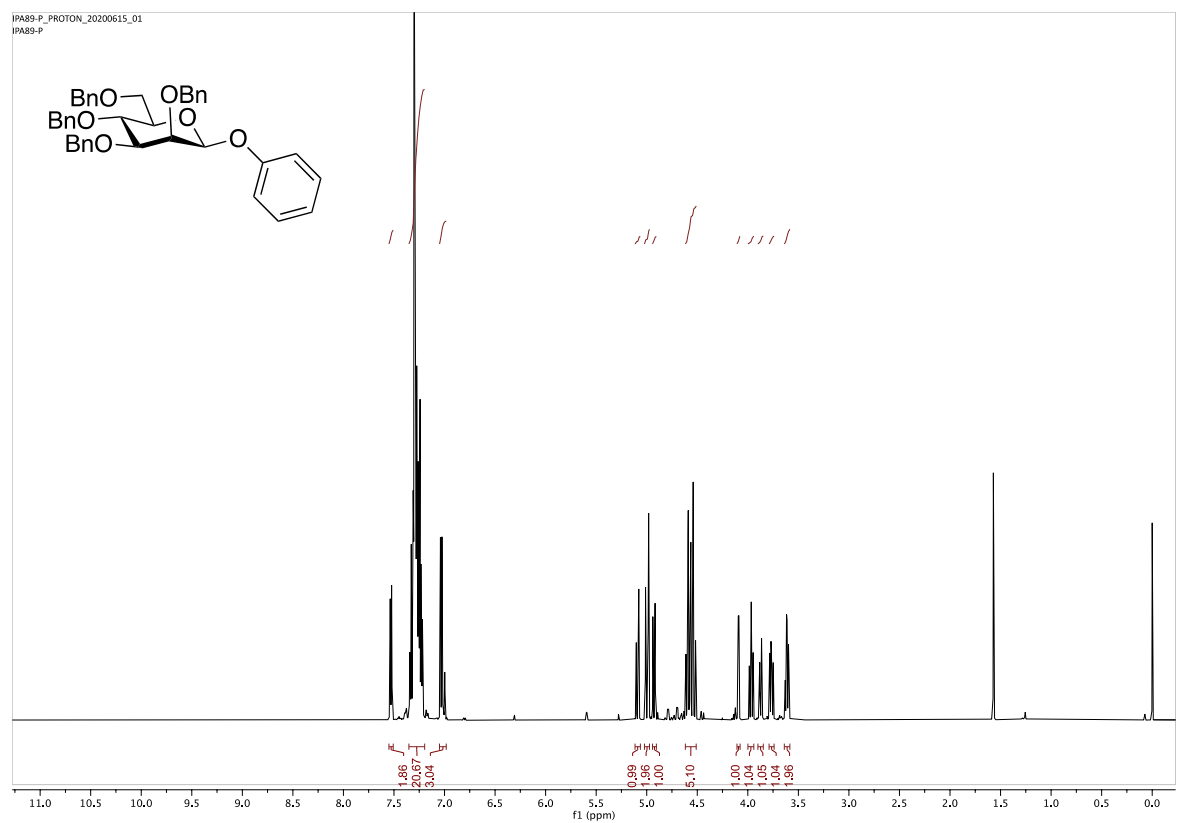
HSQC NMR (600 MHz x 151 MHz, Chloroform-*d*) 4d



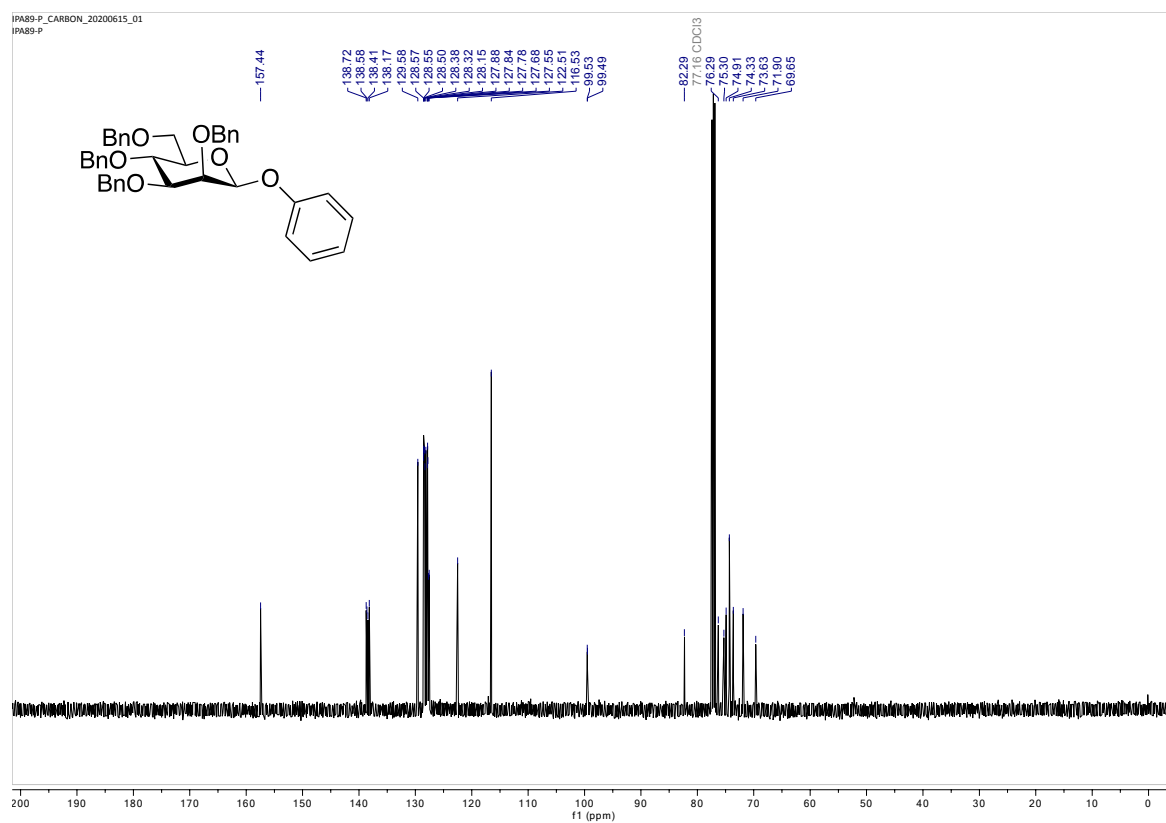
HMBC NMR (600 MHz x 151 MHz, Chloroform-*d*) 4d



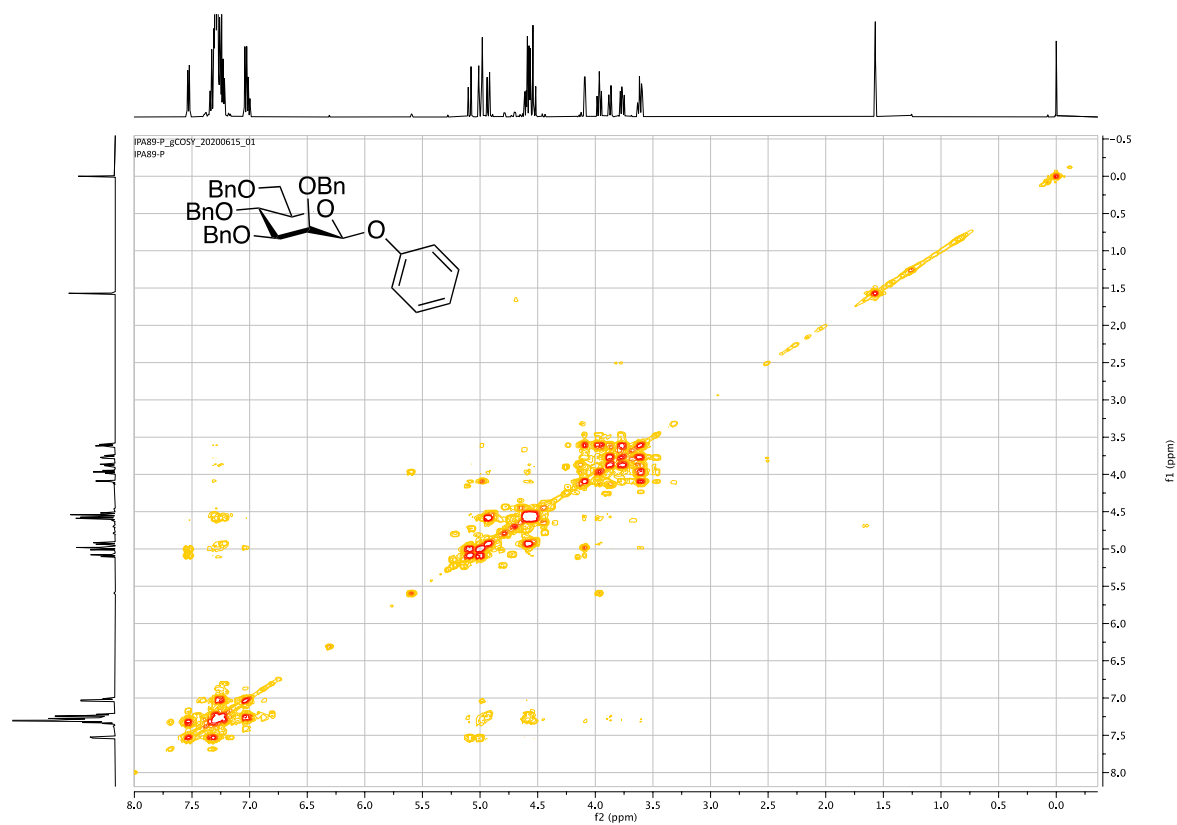
¹H NMR (500 MHz, Chloroform-*d*) 4e



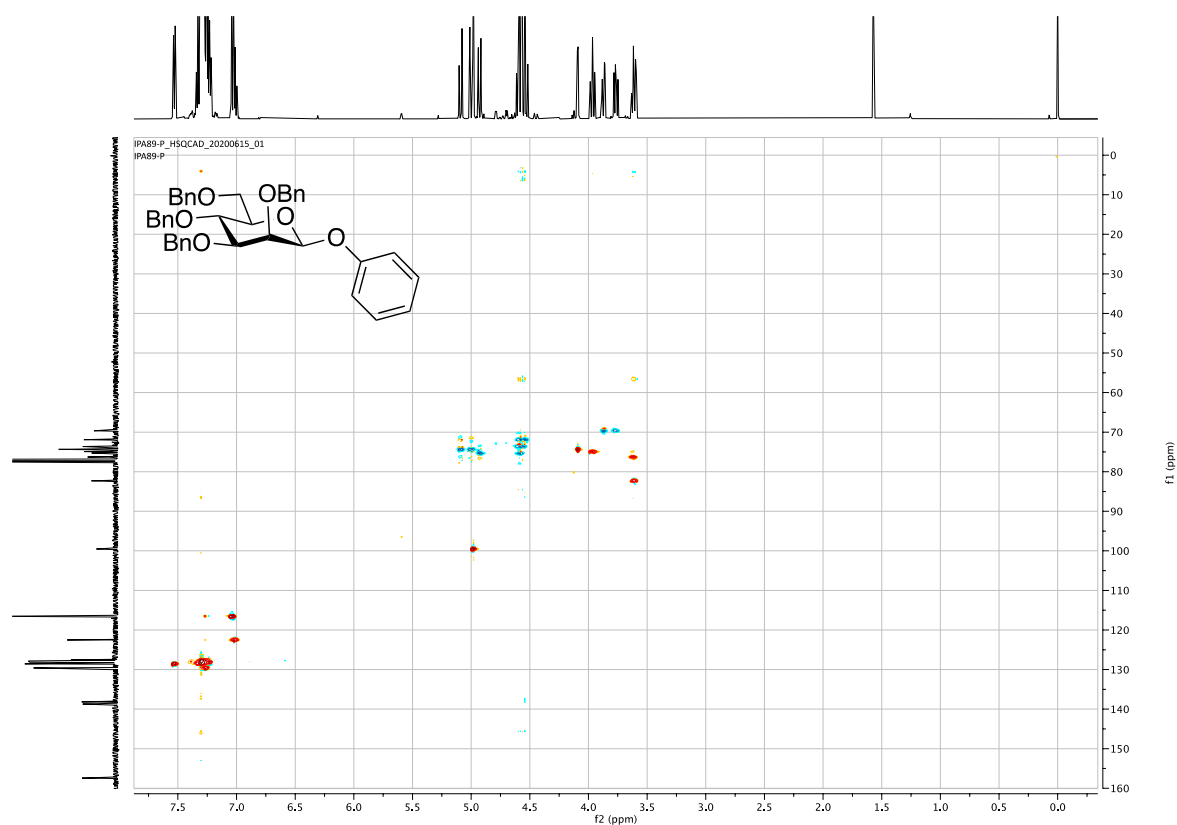
^{13}C NMR (126 MHz, Chloroform-*d*) 4e



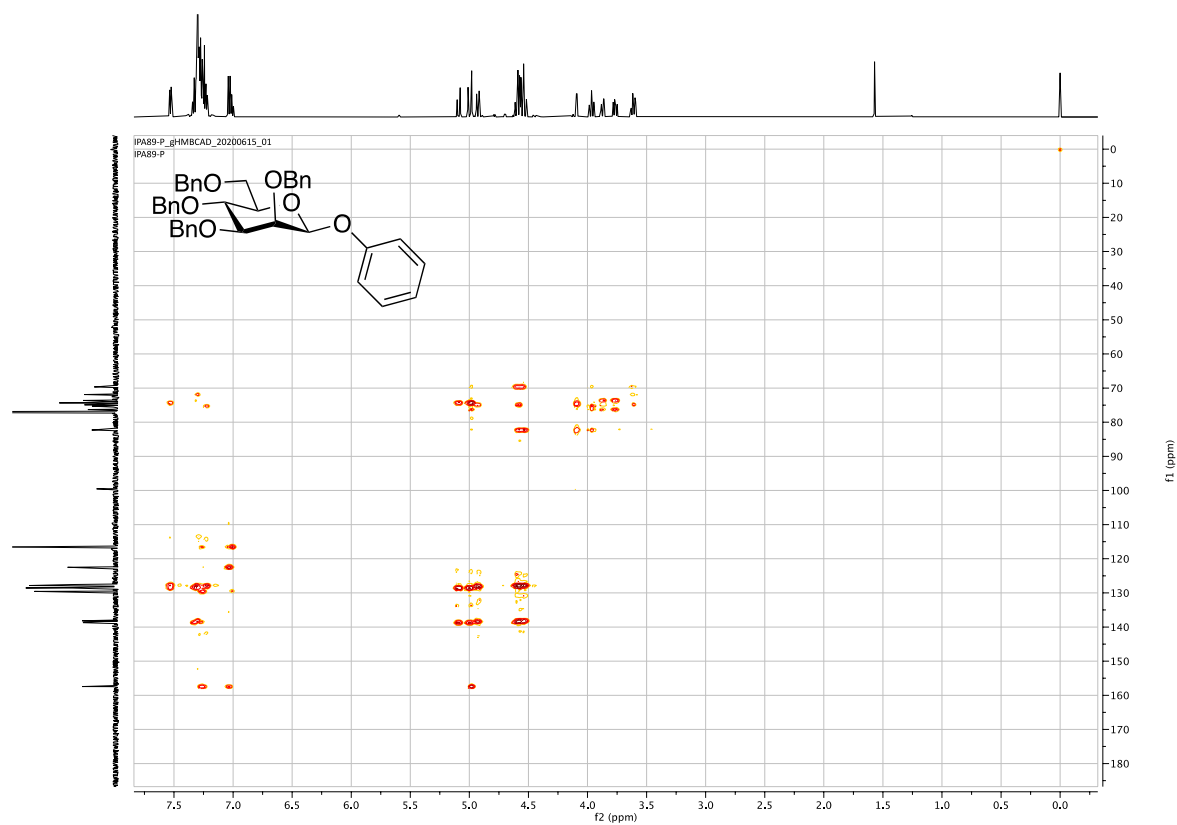
COSY NMR (500 MHz, Chloroform-*d*) 4e



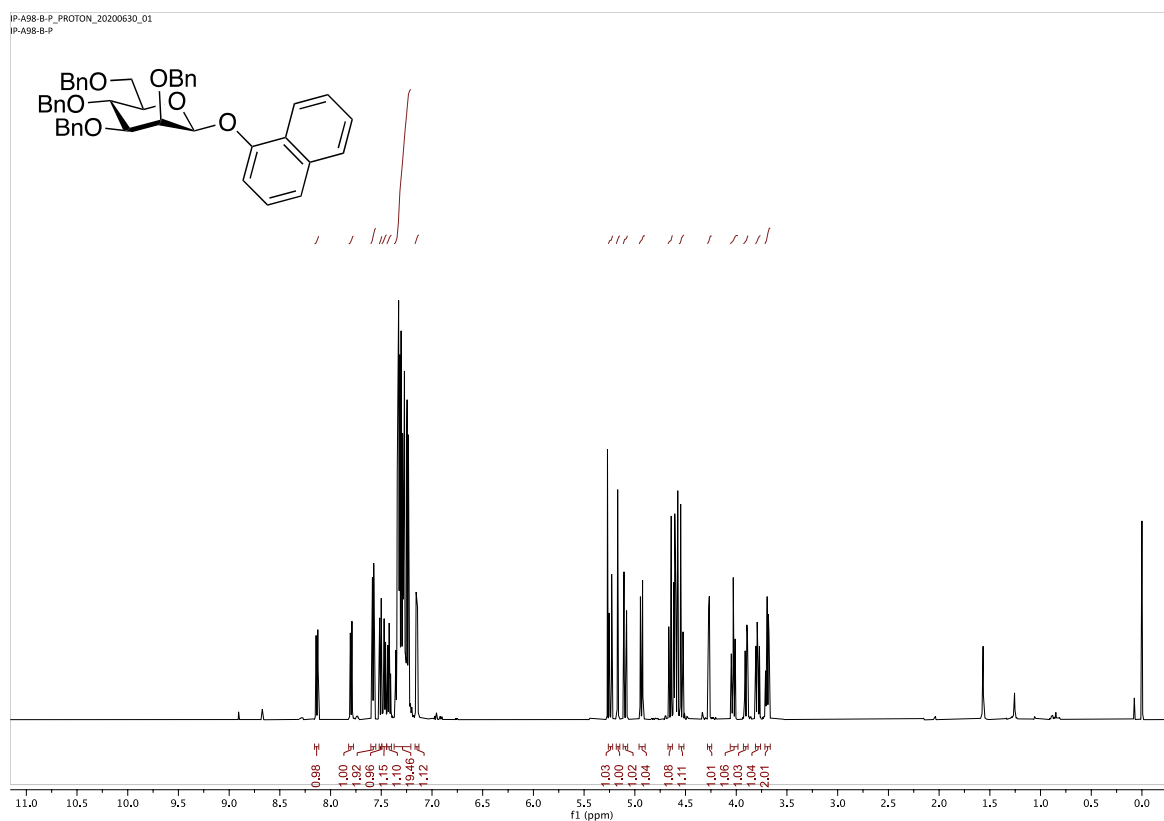
HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) 4e



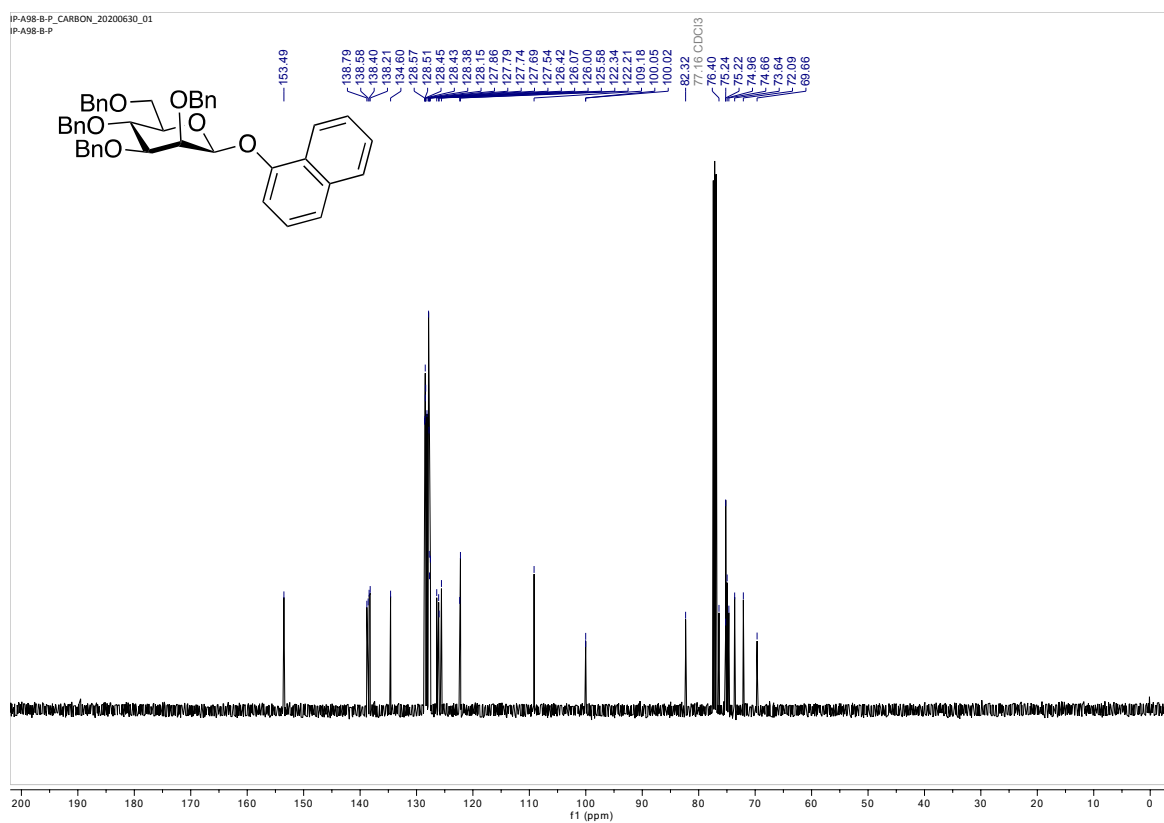
HMBC NMR (500 MHz x 126 MHz, Chloroform-*d*) 4e



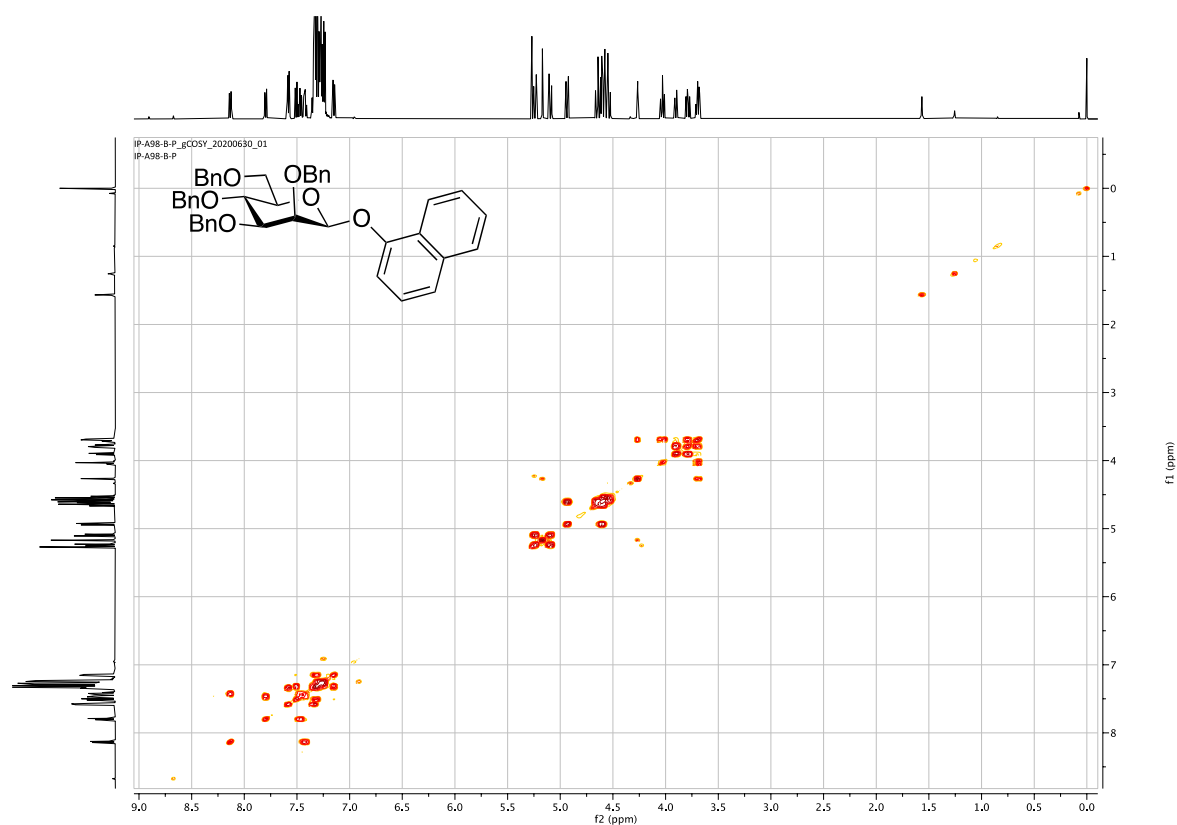
¹H NMR (500 MHz, Chloroform-*d*) 4f



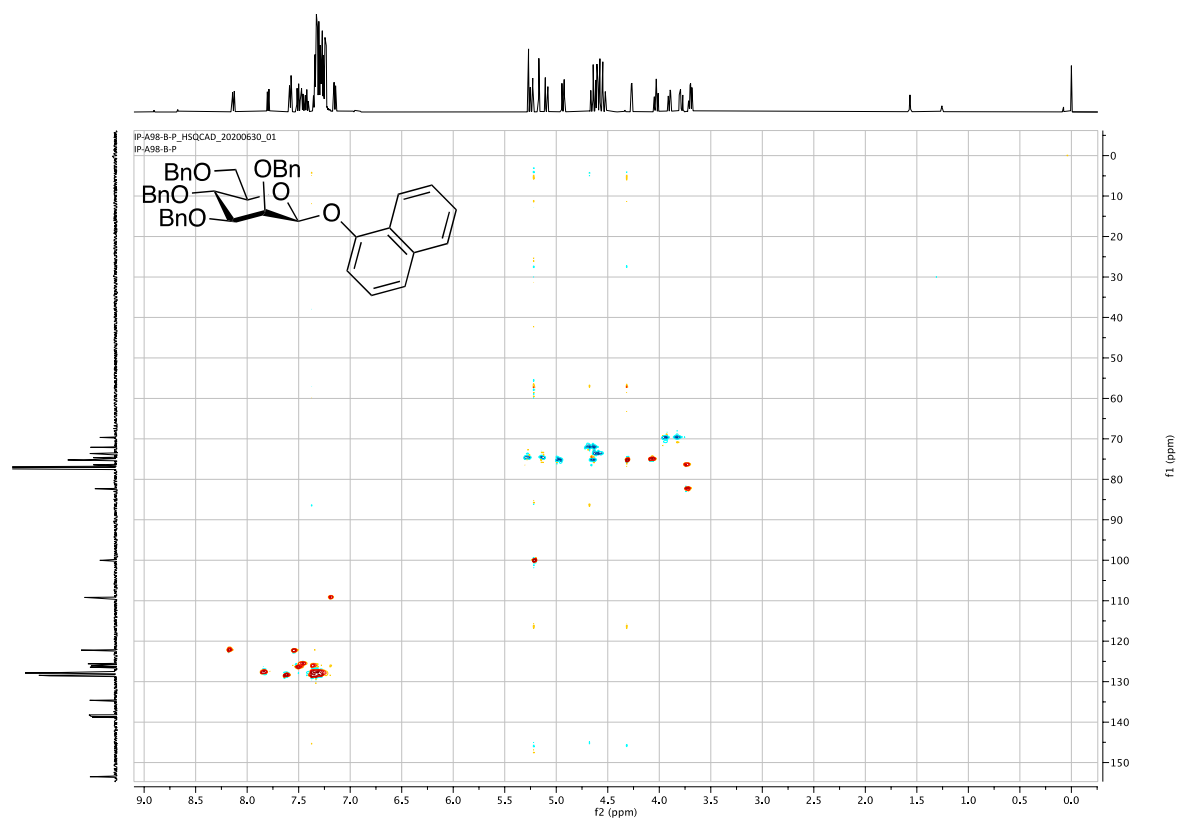
¹³C NMR (126 MHz, Chloroform-*d*) 4f



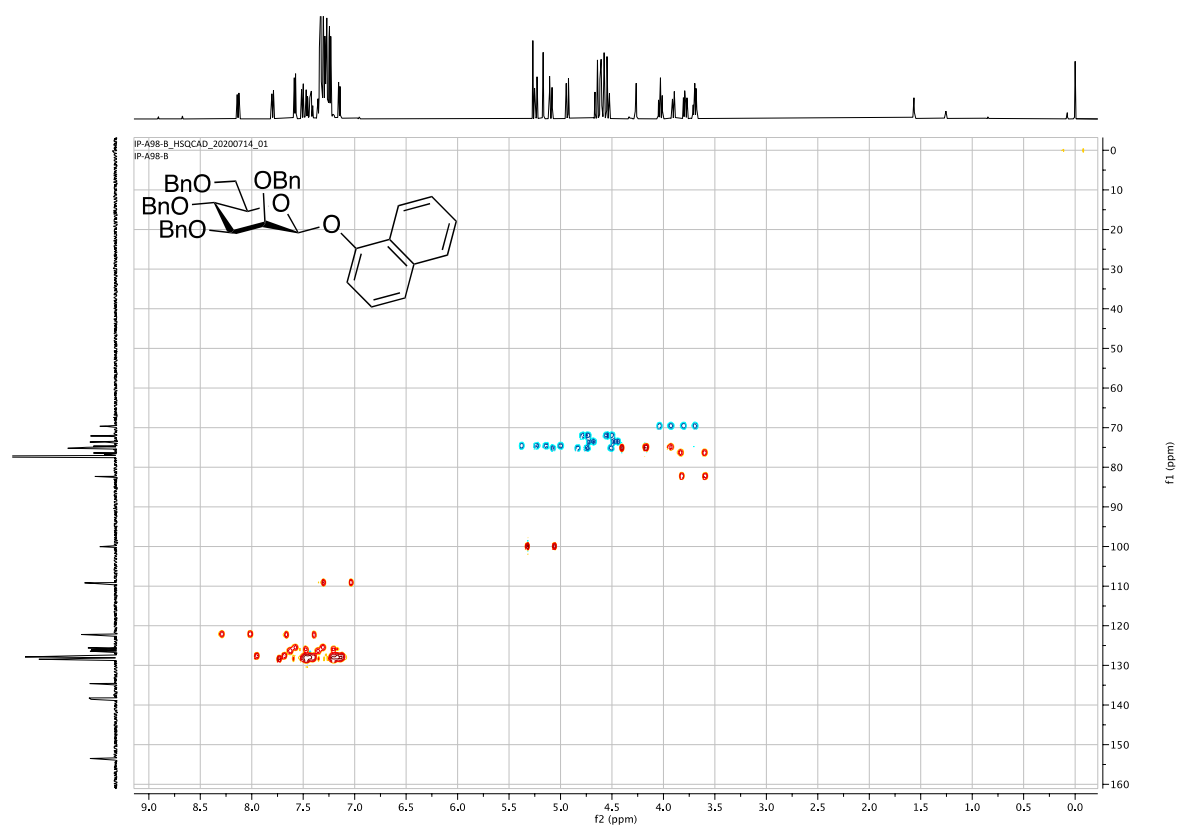
COSY NMR (500 MHz, Chloroform-*d*) 4f



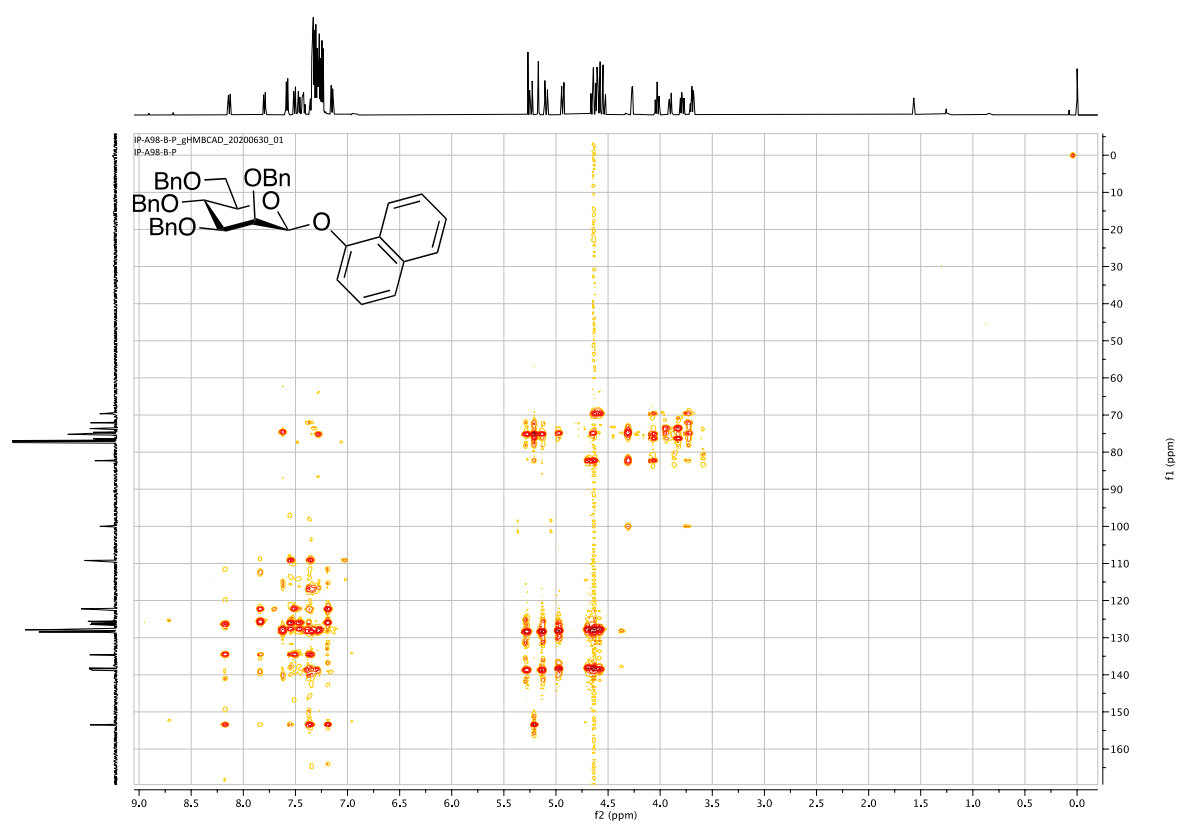
HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) 4f



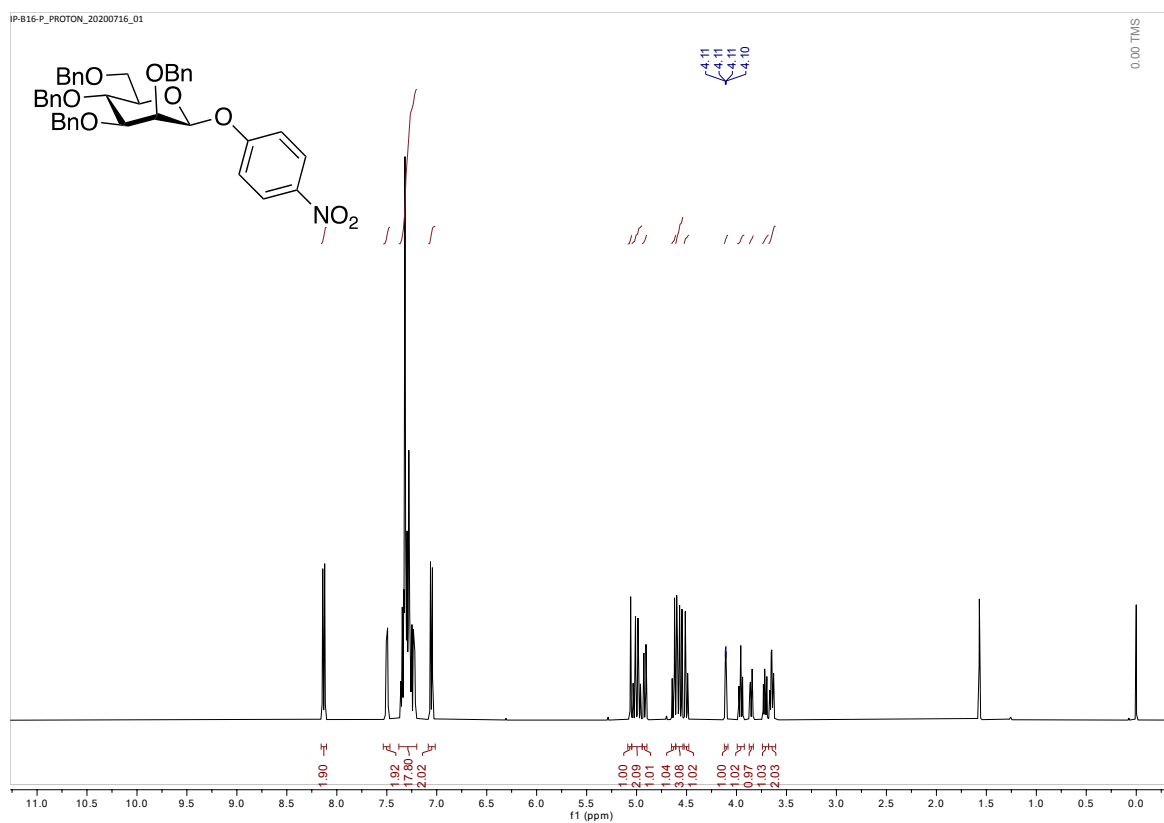
^{13}C - ^1H coupled HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) 4f



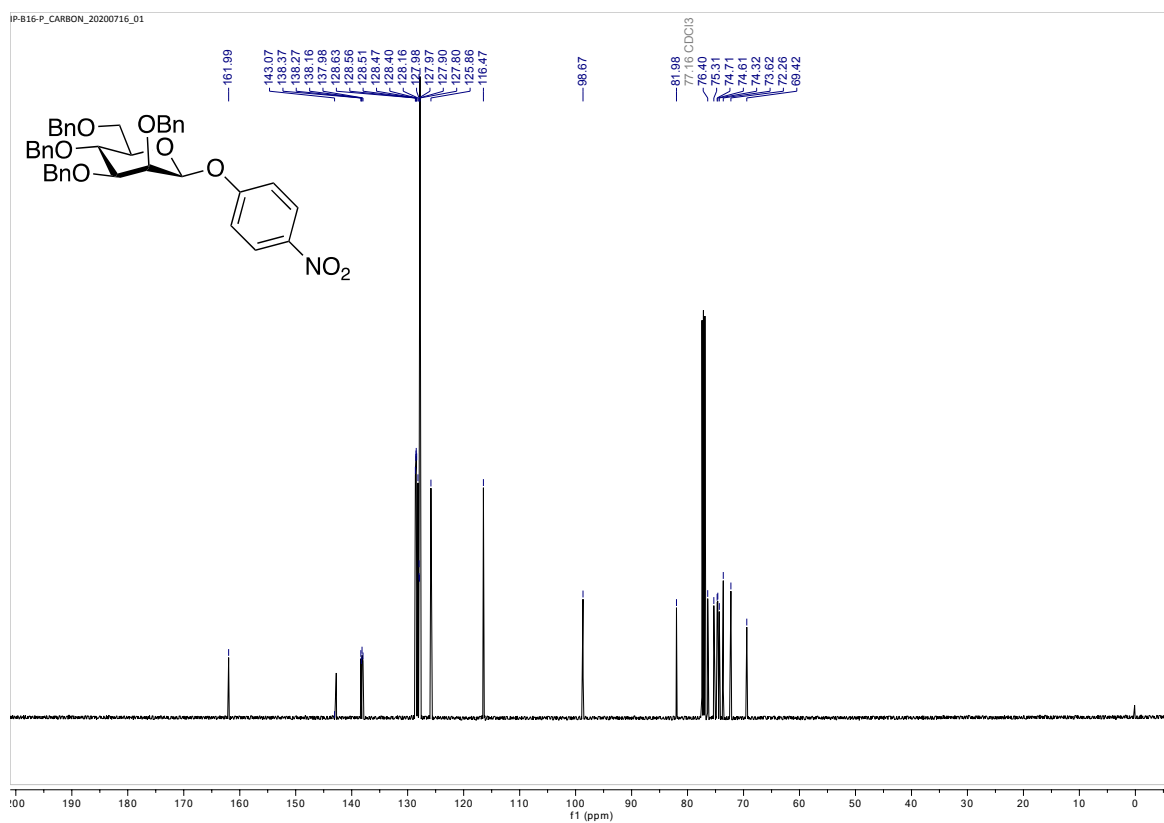
HMBC NMR (500 MHz x 126 MHz, Chloroform-*d*) 4f



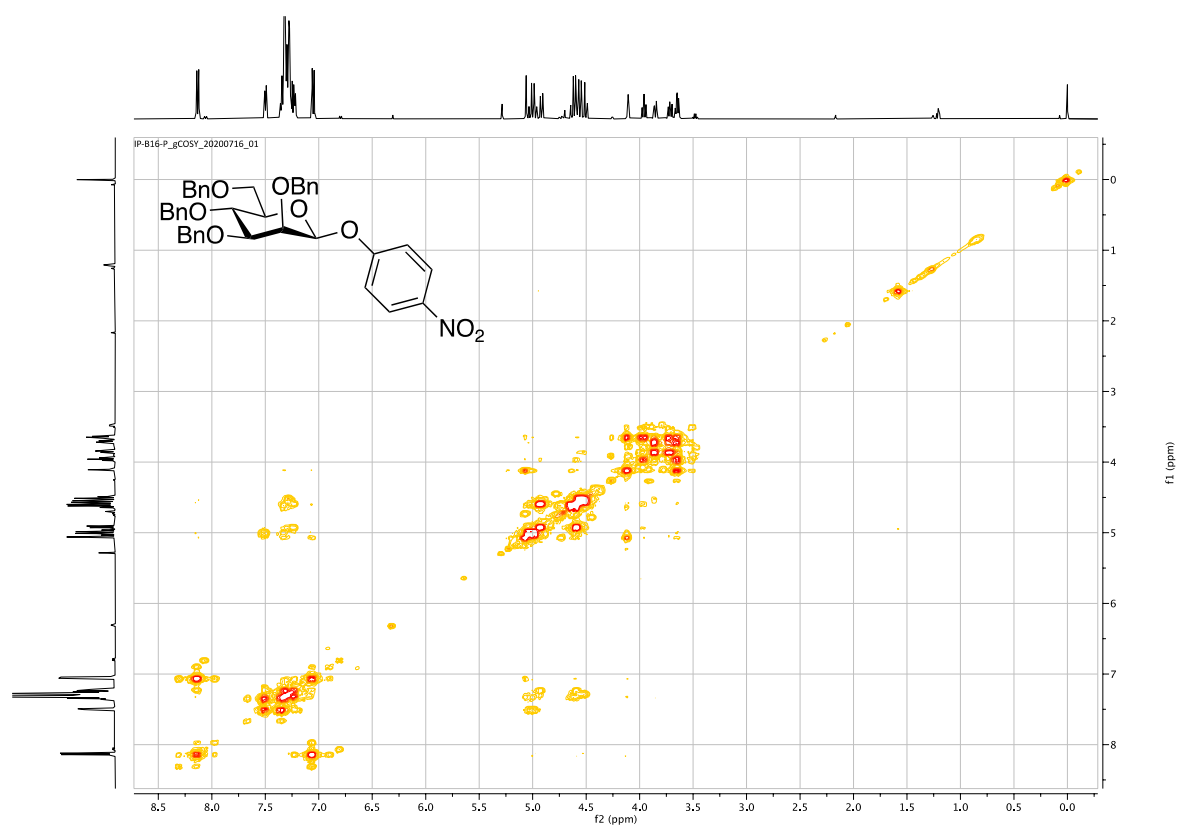
¹H NMR (500 MHz, Chloroform-*d*) 4g



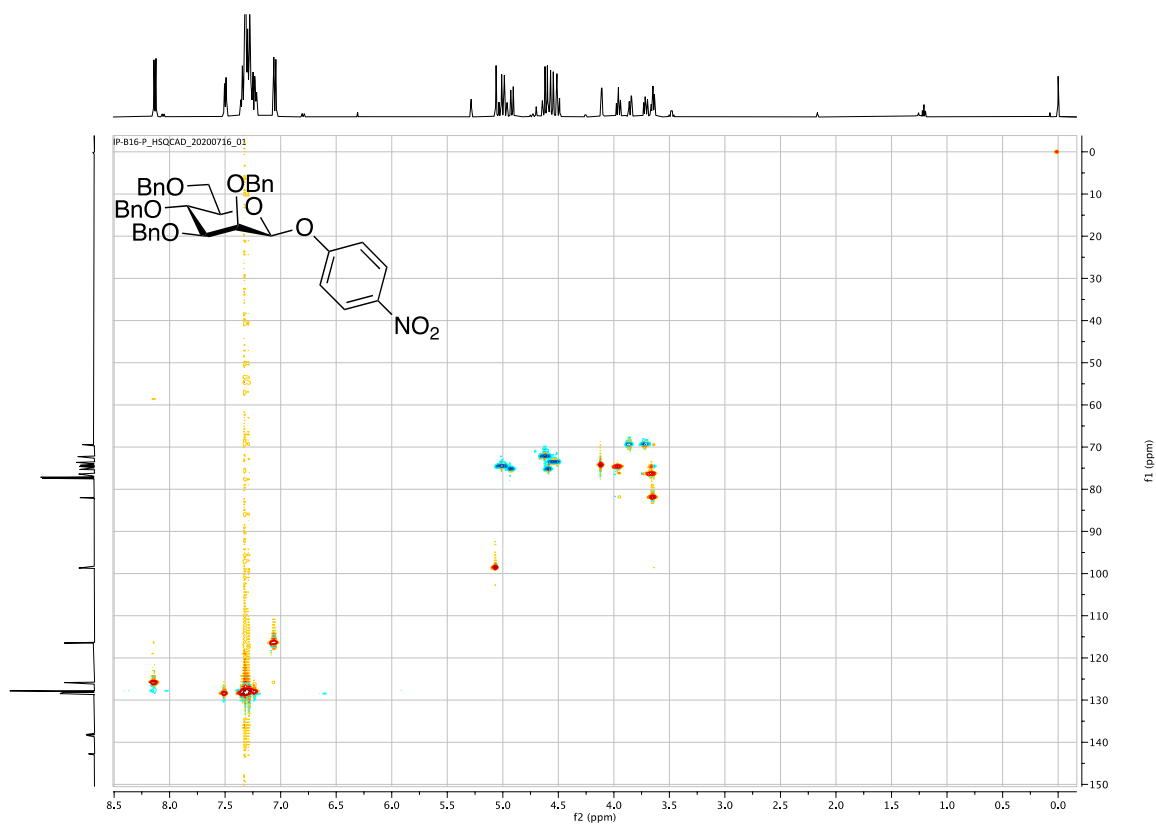
¹³C NMR (126 MHz, Chloroform-*d*) 4g



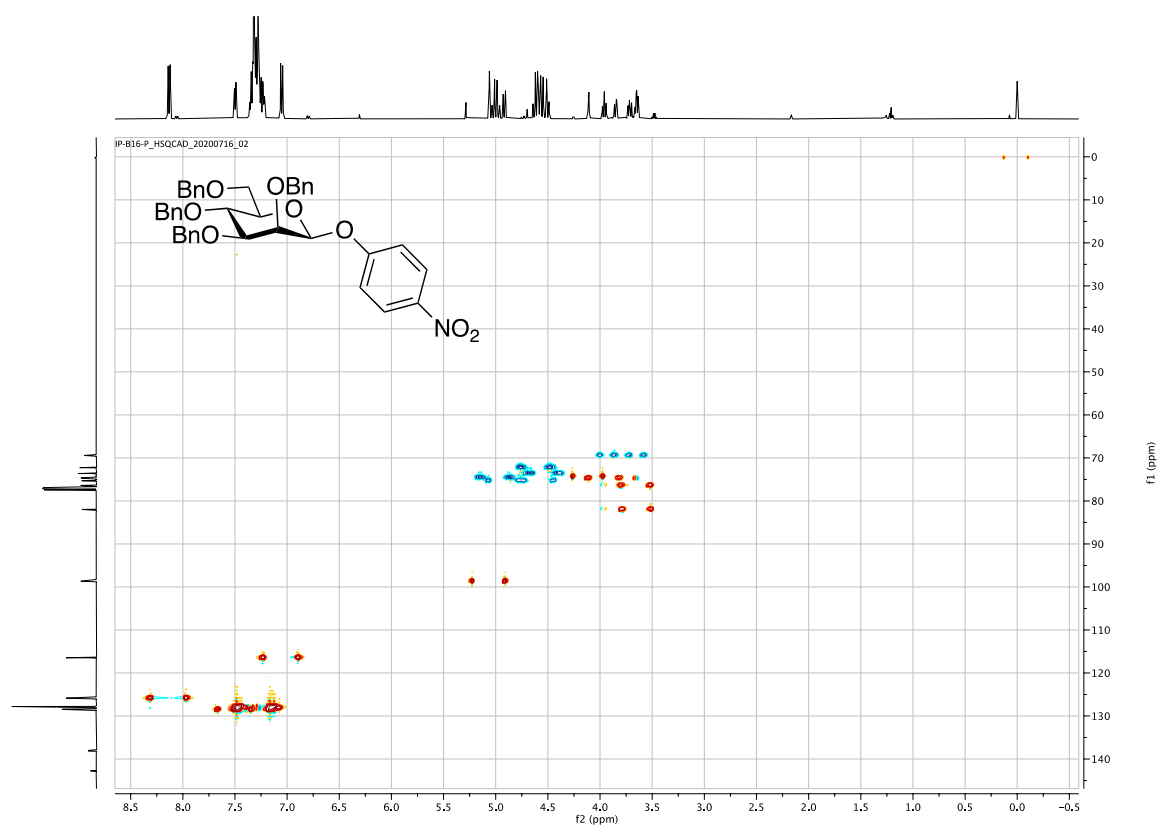
COSY NMR (500 MHz, Chloroform-*d*) 4g



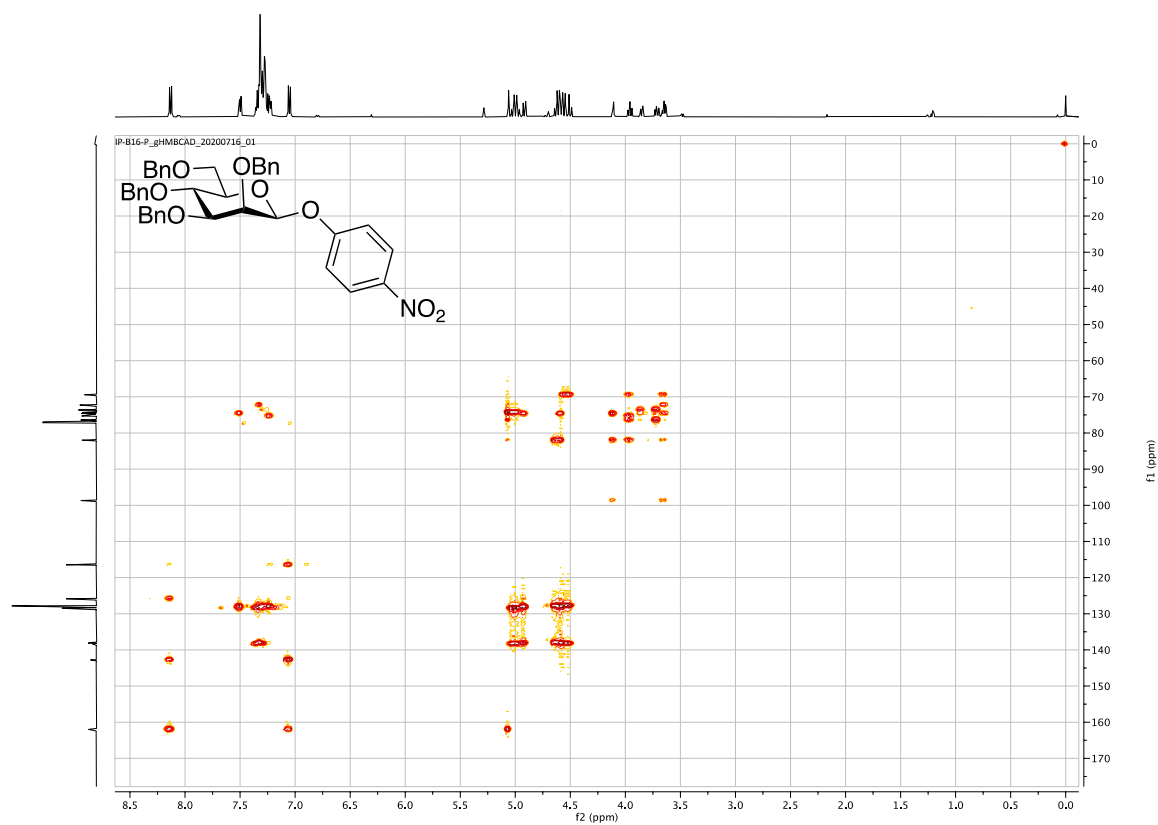
HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) 4g



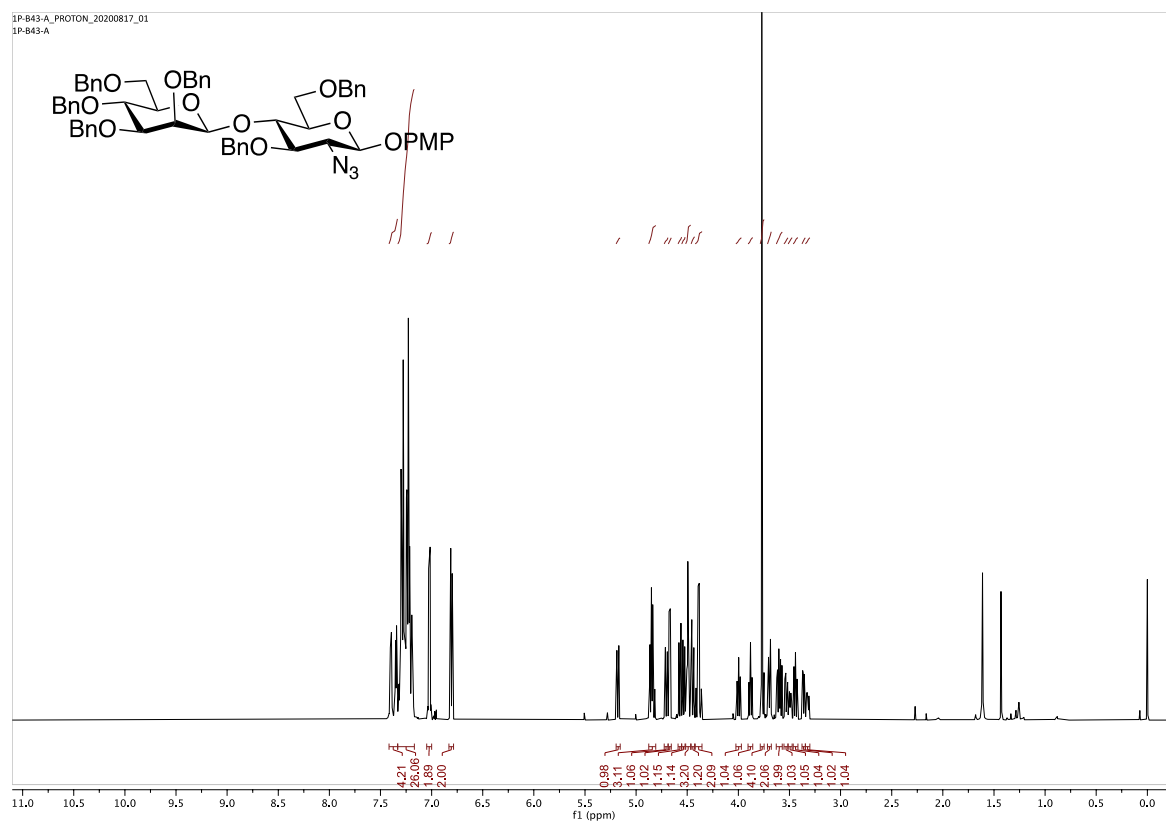
^{13}C - ^1H coupled HSQC NMR (500 MHz x 126 MHz, Chloroform-*d*) 4g



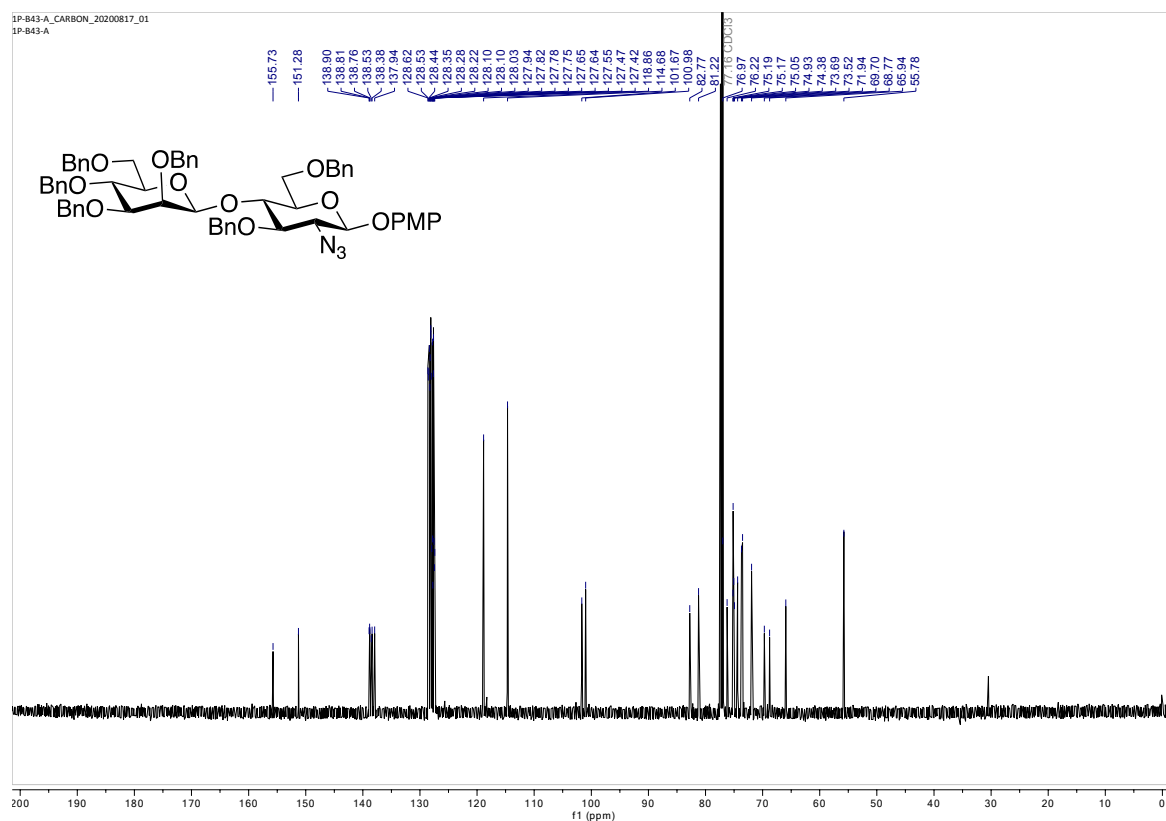
HMBC NMR (500 MHz x 126 MHz, Chloroform-*d*) 4g



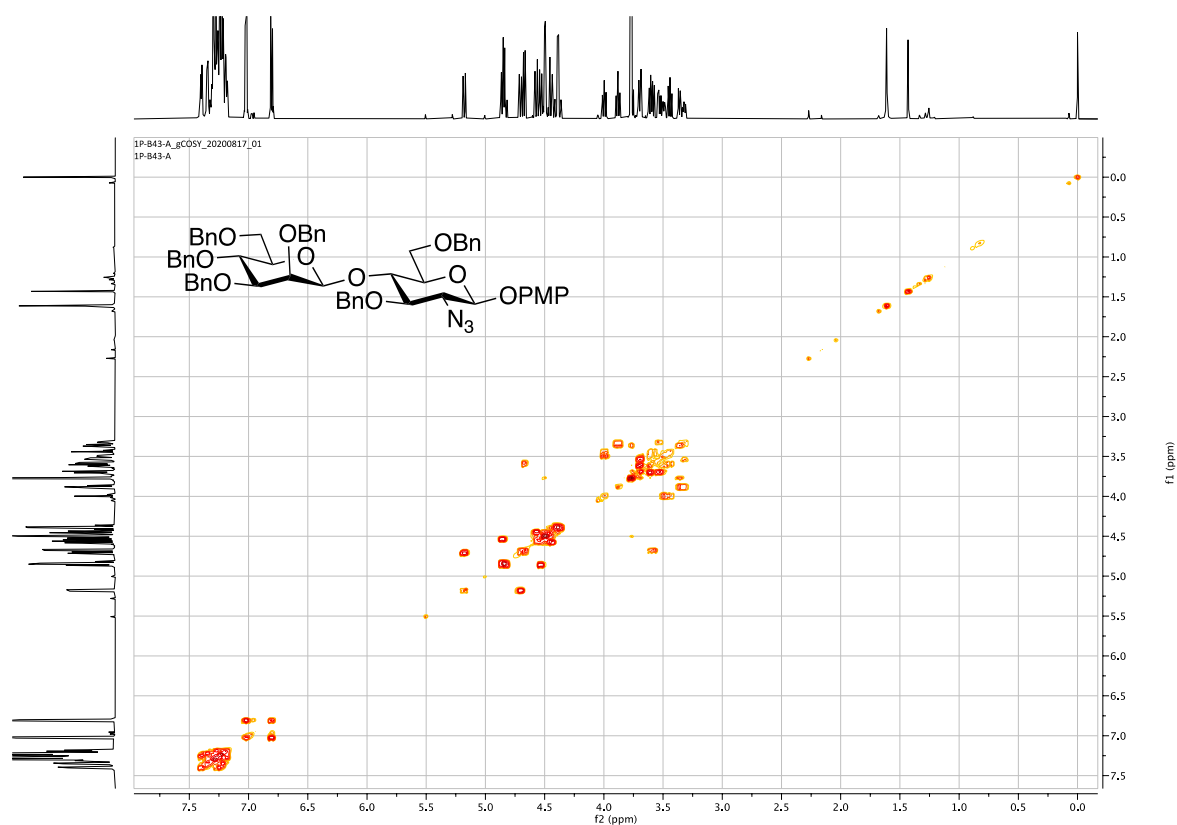
¹H NMR (600 MHz, Chloroform-*d*) 4h



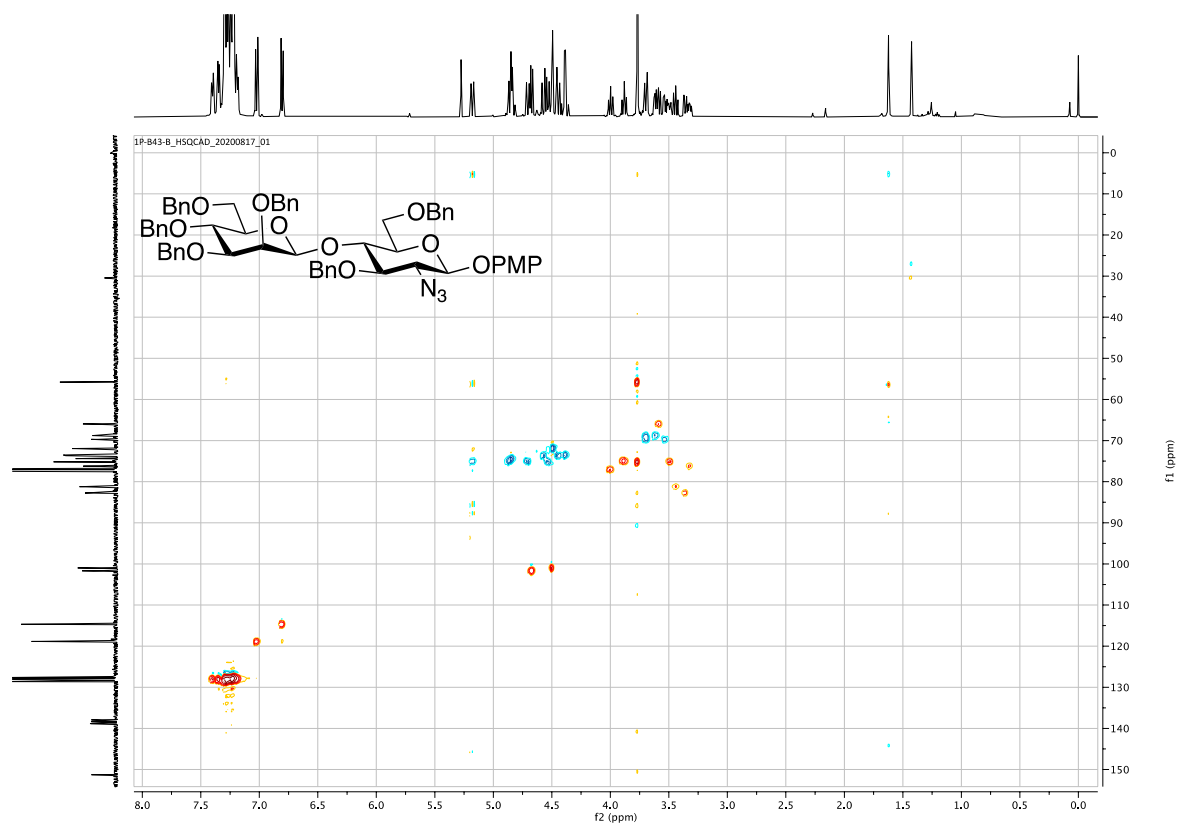
¹³C NMR (151 MHz, Chloroform-*d*) 4h



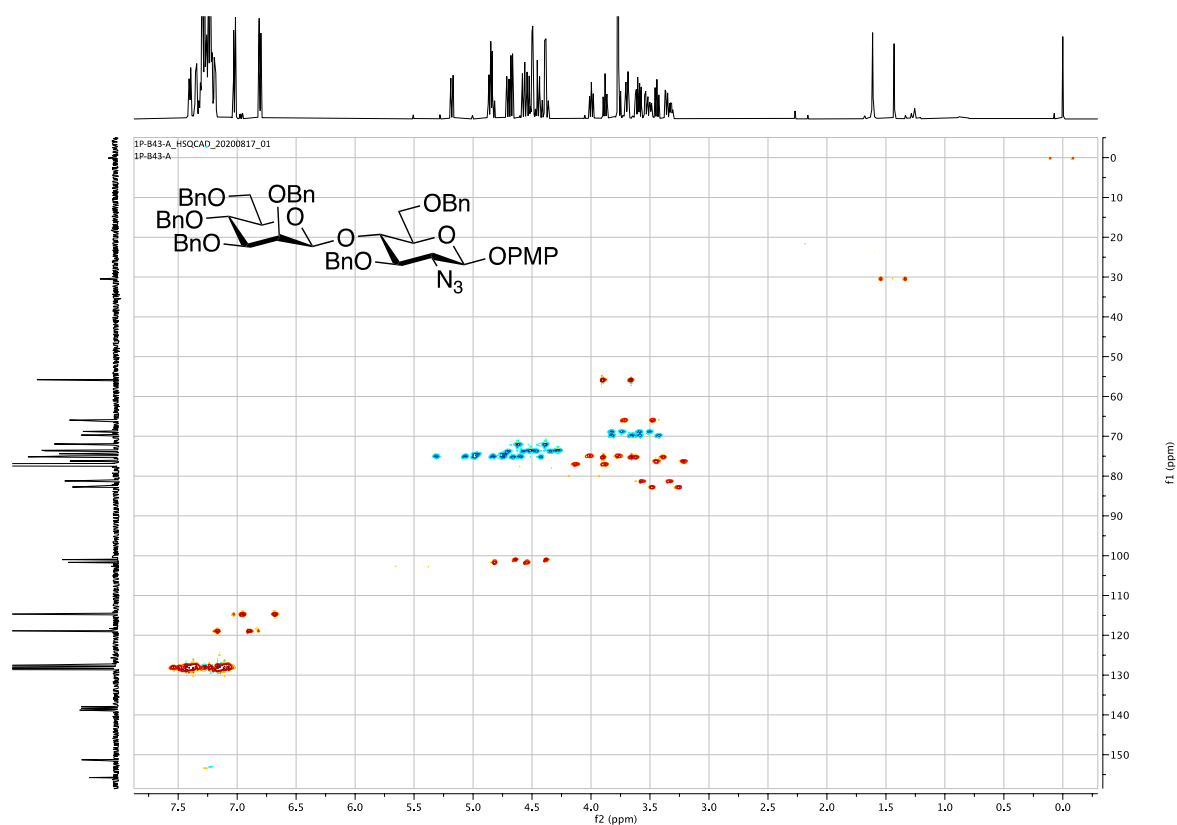
COSY NMR (600 MHz, Chloroform-*d*) 4h



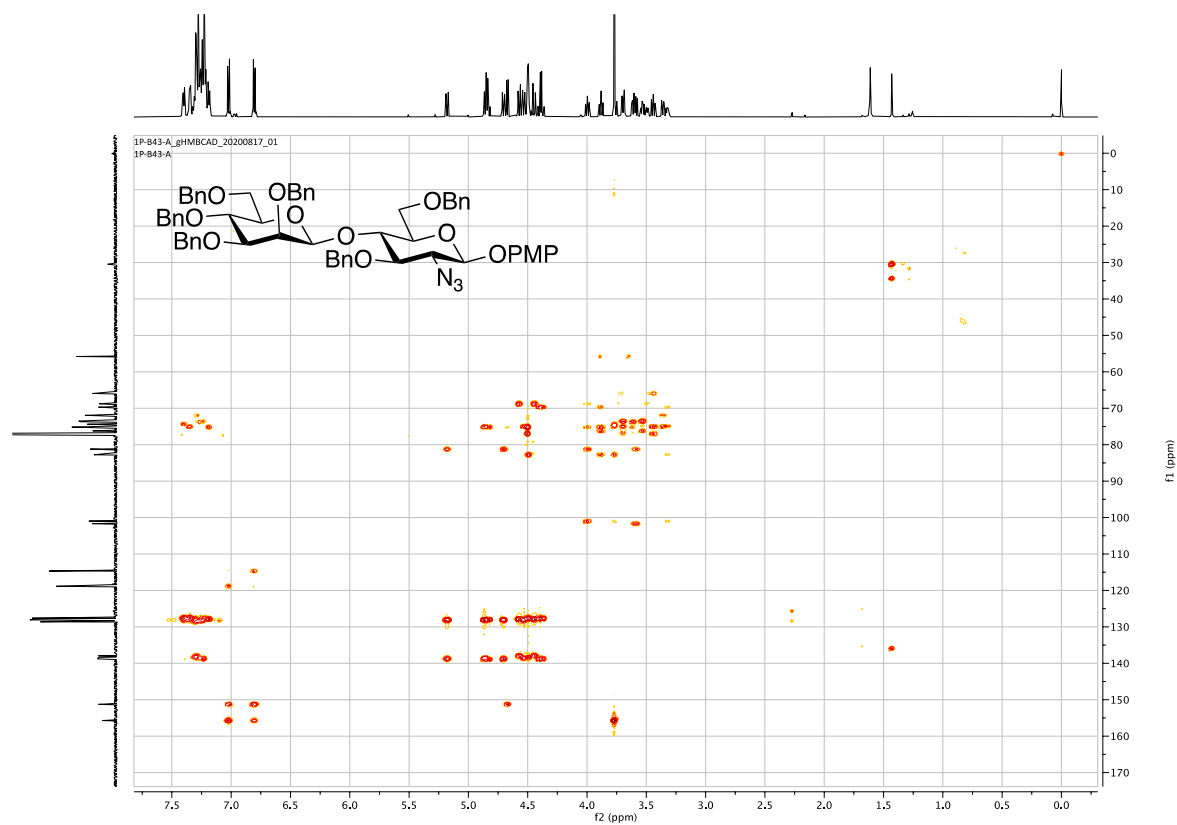
HSQC NMR (600 MHz x 151 MHz, Chloroform-*d*) 4h



^{13}C - ^1H coupled HSQC NMR (600 MHz x 151 MHz, Chloroform-*d*) 4h

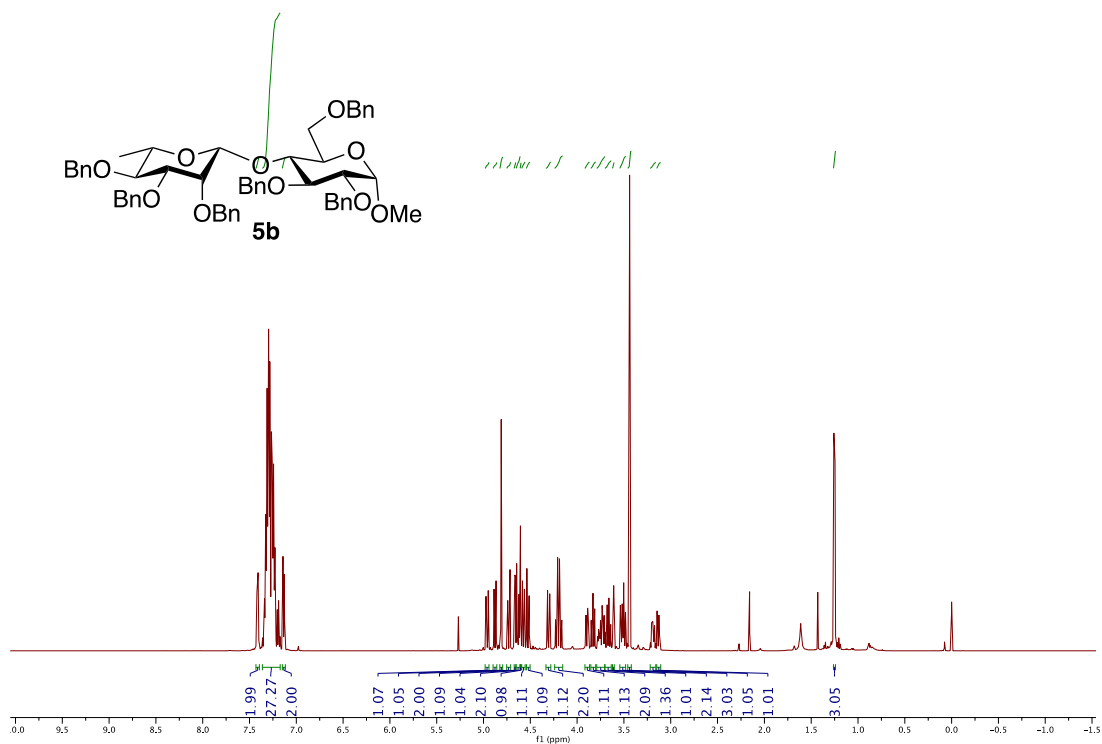


HMBC NMR (600 MHz x 151 MHz, Chloroform-*d*) 4h



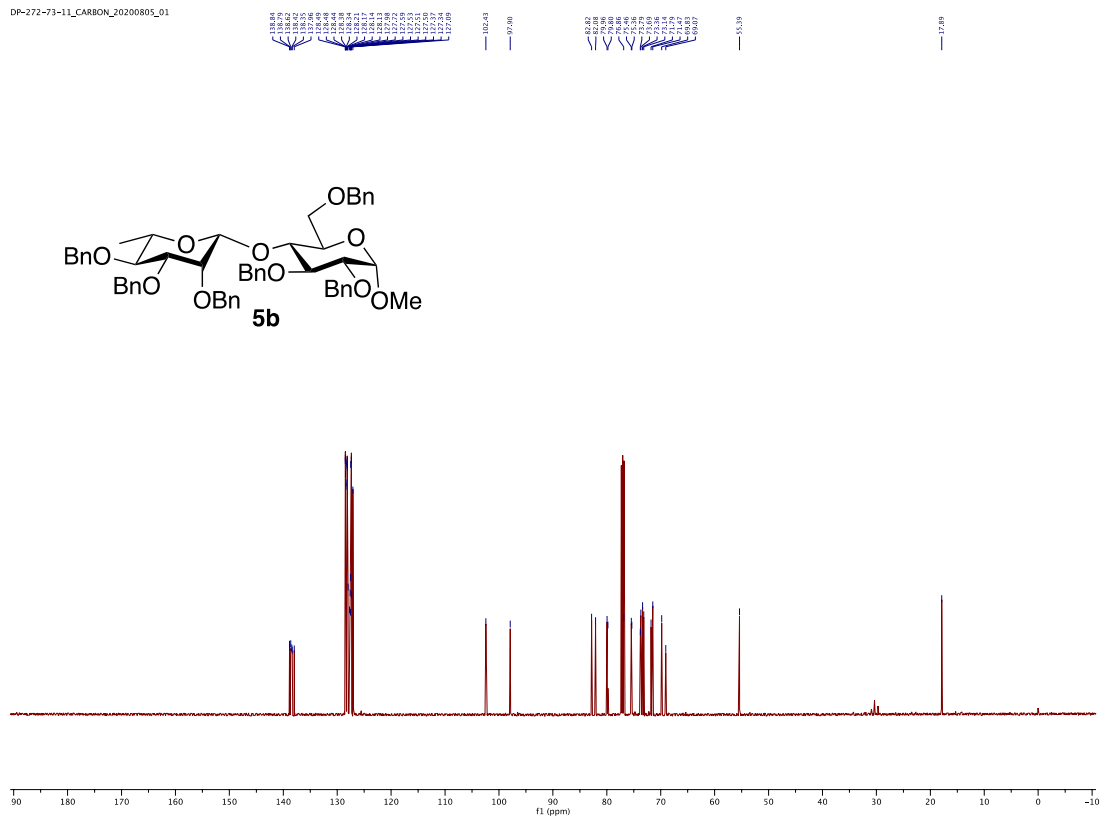
¹H NMR (500 MHz, Chloroform-*d*) 5b

DP-272-73-11_PROTON_20200805_01

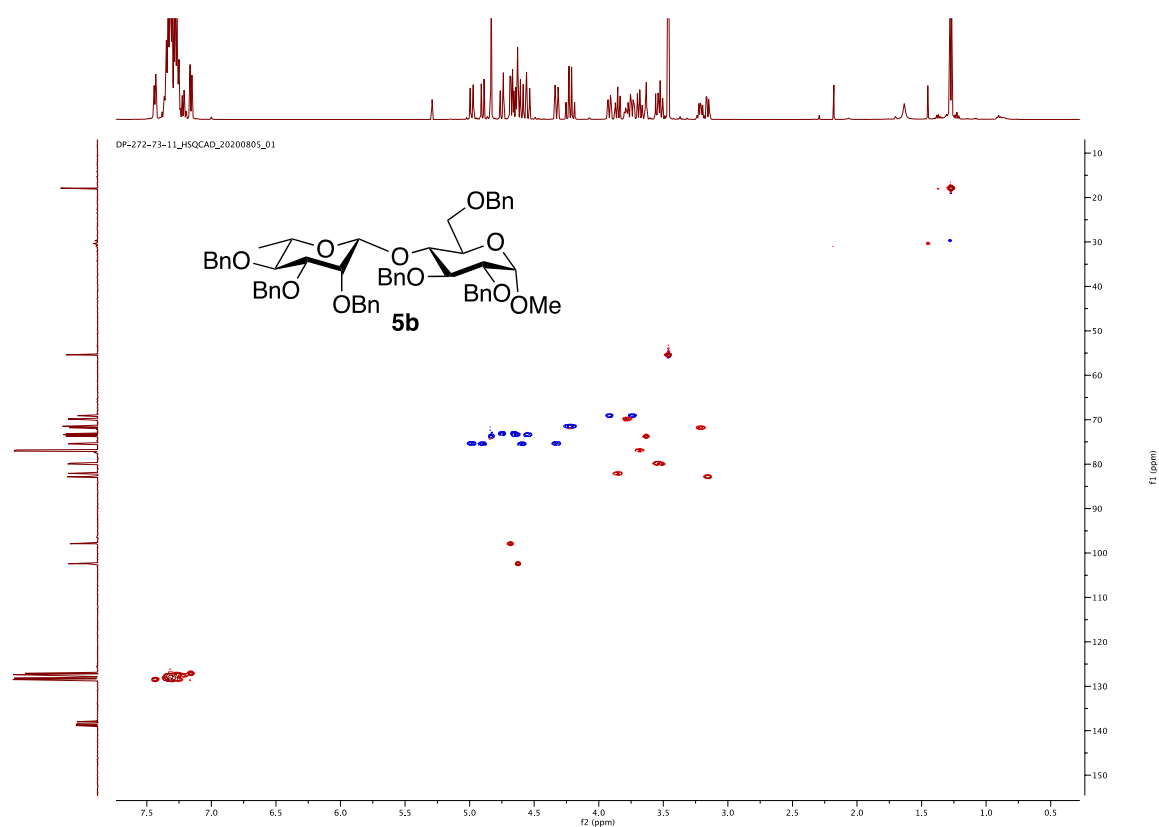


¹³C NMR (126 MHz, Chloroform-*d*) 5b

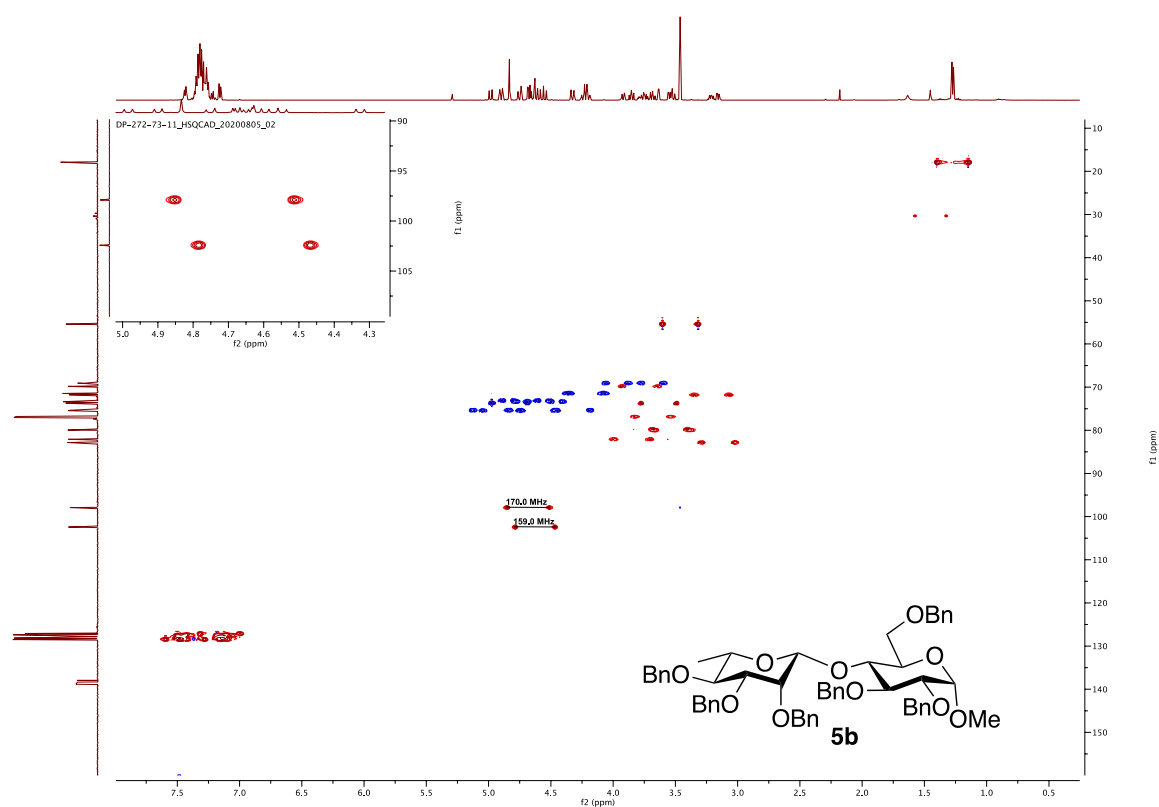
DP-272-73-11_CARBON_20200805_01



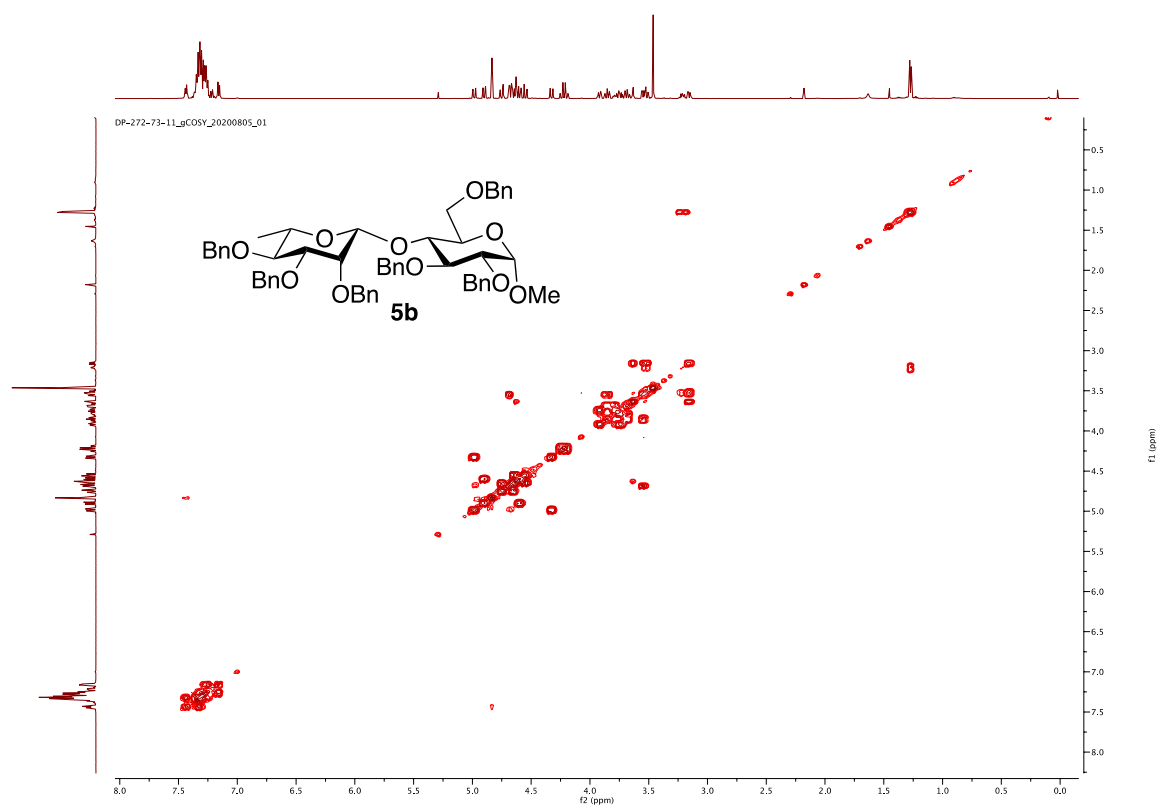
^{13}C - ^1H decoupled HSQC (500 x 126 MHz, Chloroform-*d*) 5b



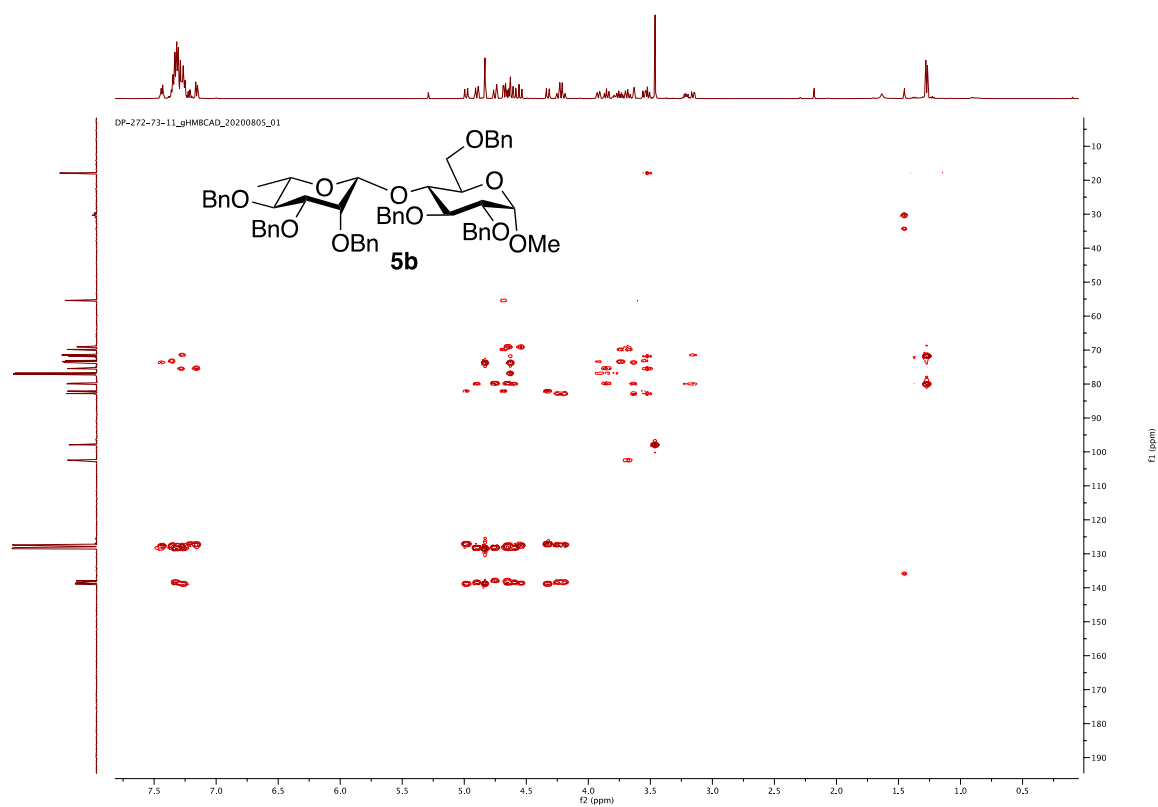
^{13}C - ^1H coupled HSQC (500 x 126 MHz, Chloroform-*d*) 5b



COSY (500 x 500 MHz, Chloroform-*d*) 5b

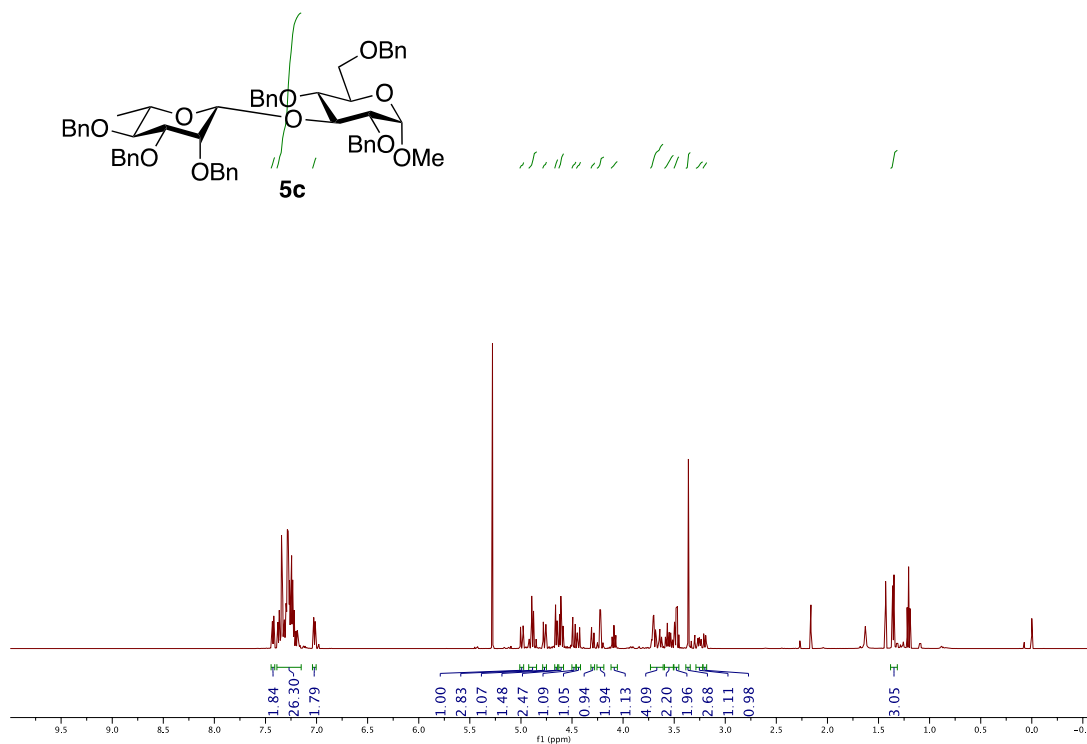


HMBC (500 x 126 MHz, Chloroform-*d*) 5b



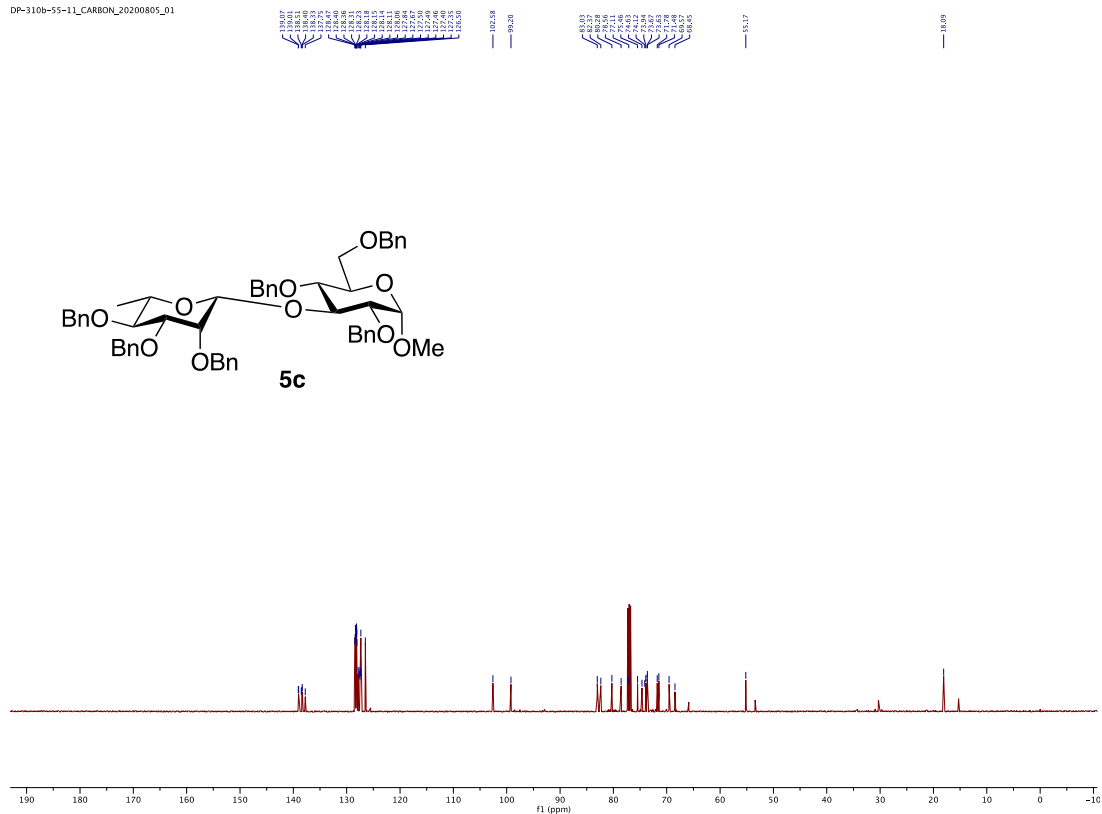
¹H NMR (500 MHz, Chloroform-*d*) 5c

DP-310b-55-11_PROTON_20200804_01

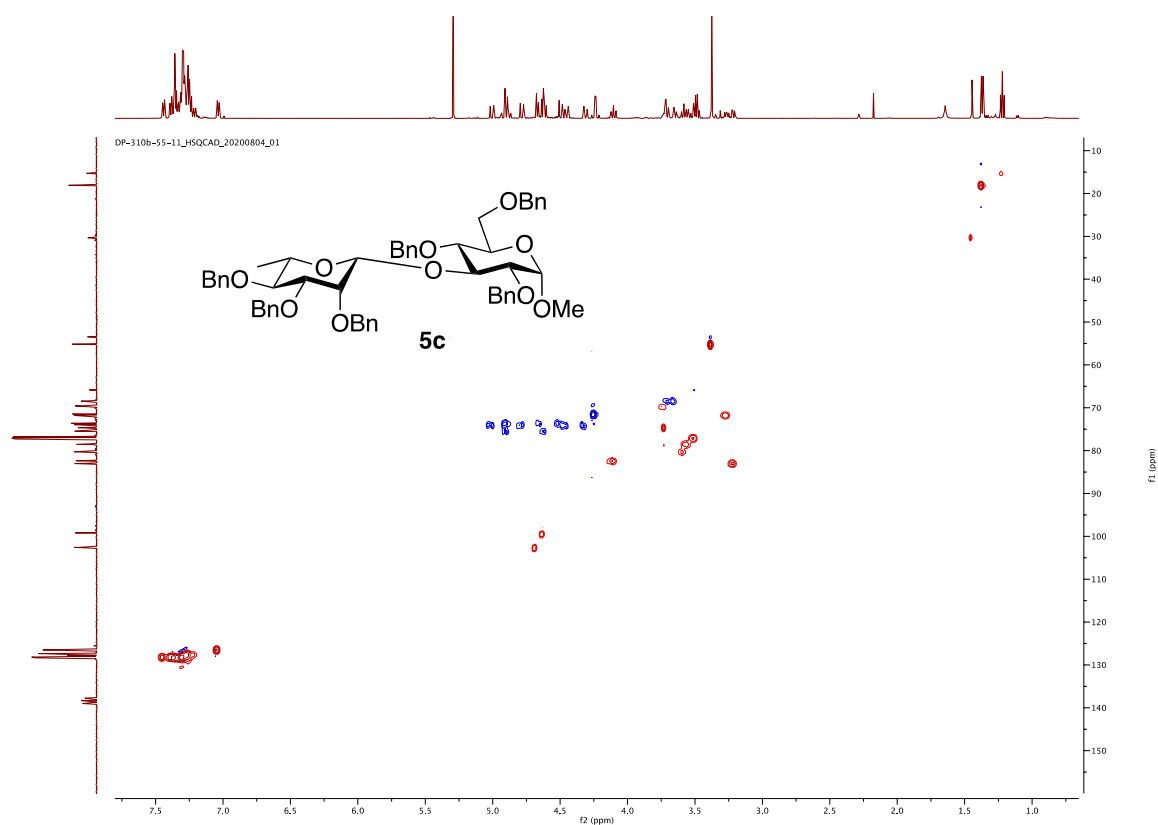


¹³C NMR (126 MHz, Chloroform-*d*) 5c

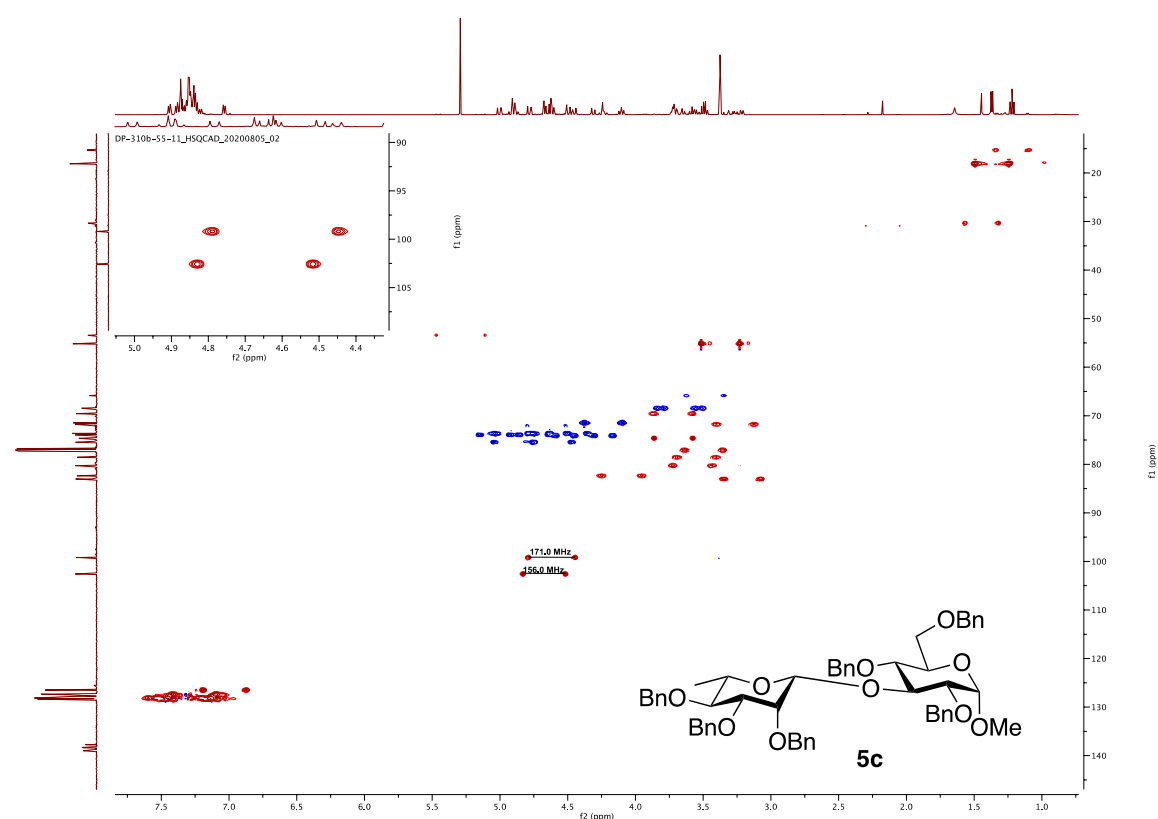
DP-310b-55-11_CARBON_20200805_01



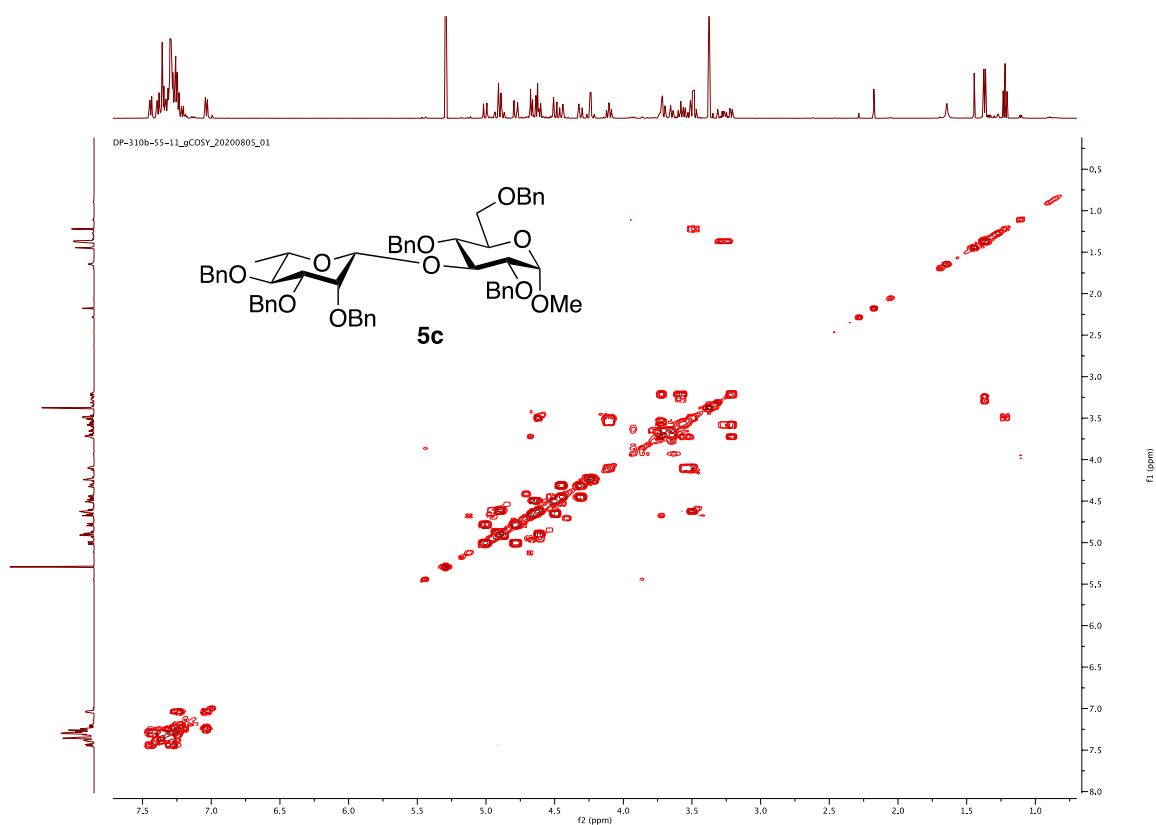
^{13}C - ^1H decoupled HSQC (500 x 126 MHz, Chloroform-*d*) 5c



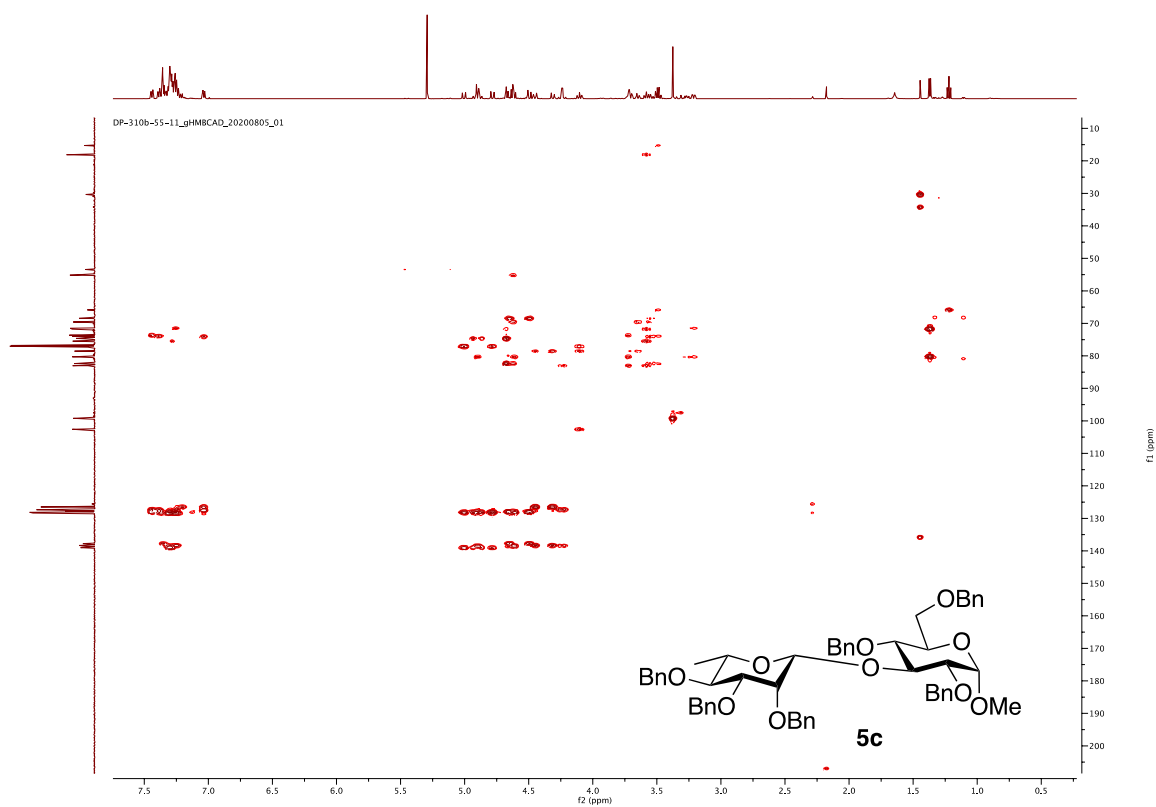
^{13}C - ^1H coupled HSQC (500 x 126 MHz, Chloroform-*d*) 5c



COSY (500 x 500 MHz, Chloroform-*d*) 5c



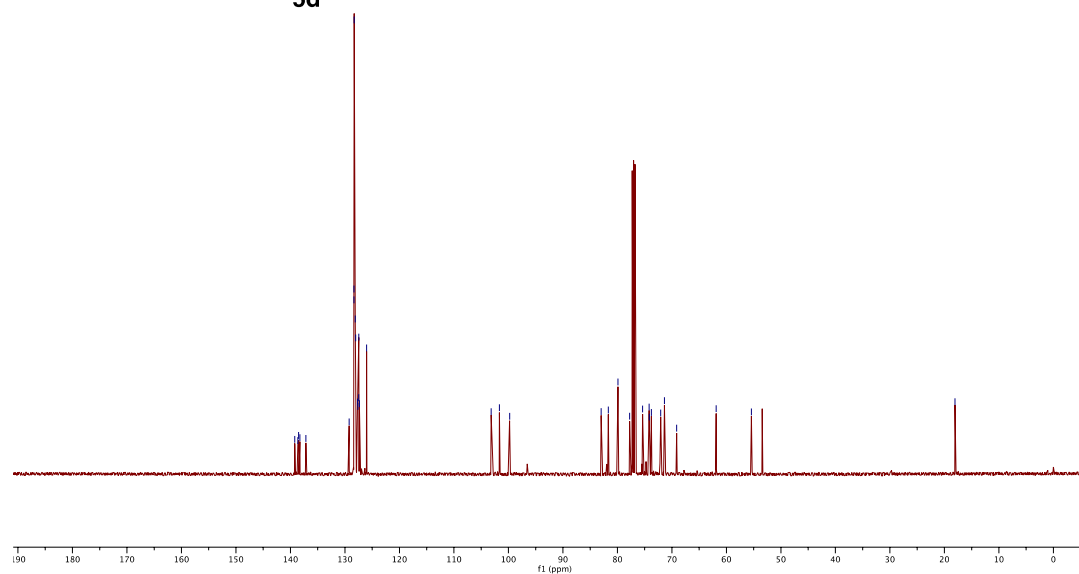
HMBC (500 x 126 MHz, Chloroform-*d*) 5c



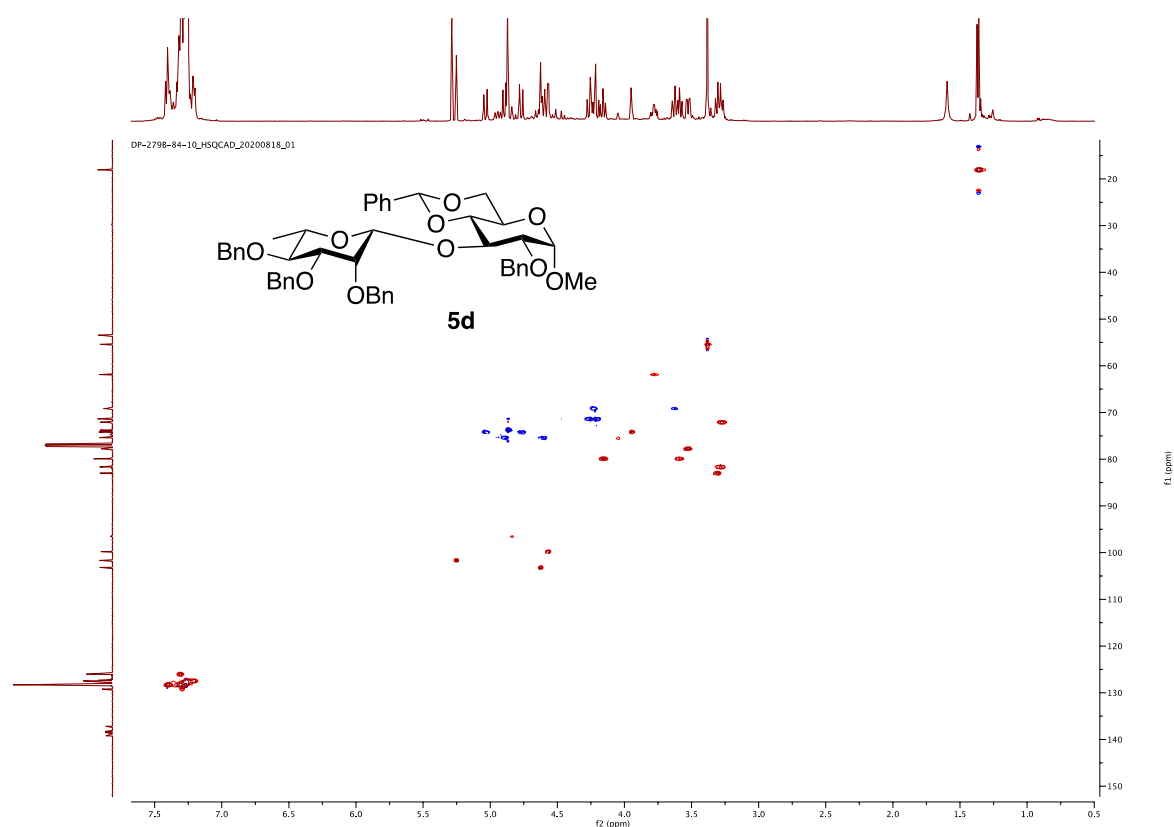
DP-279B-84-10 PROTON 20200818 01



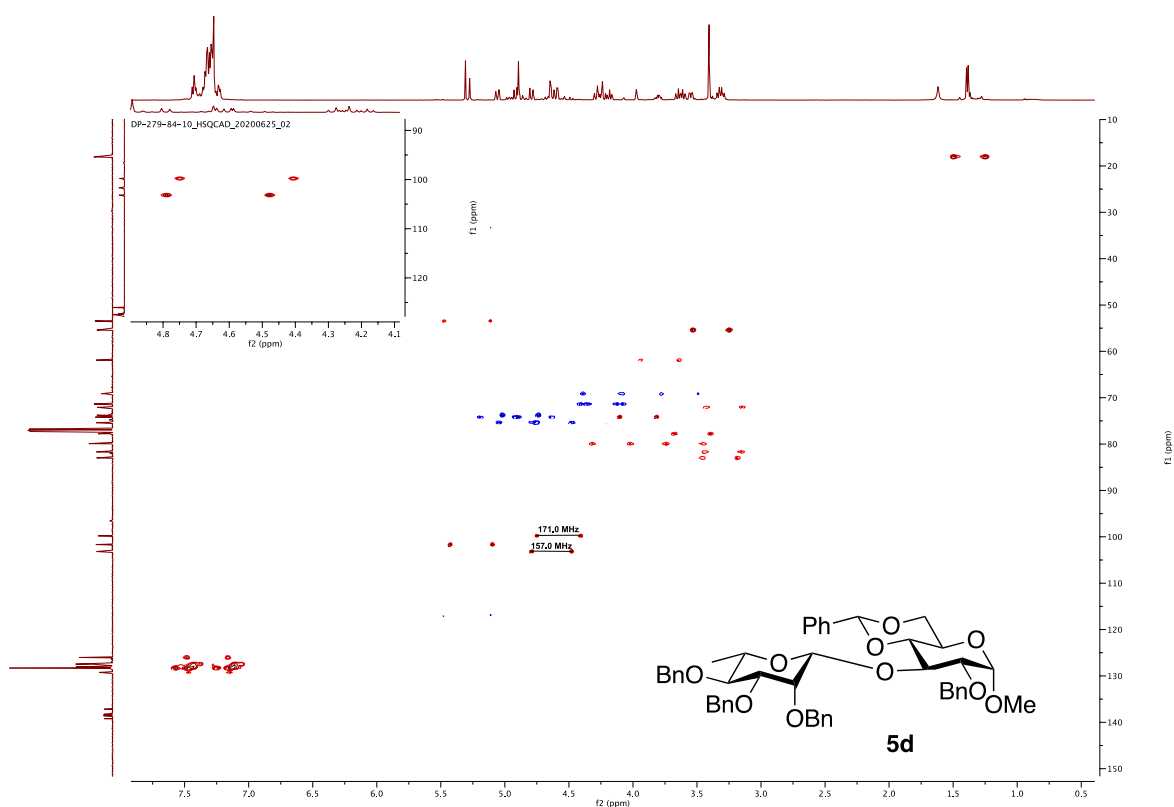
DP-279-84-10 CARBON 20200625 01



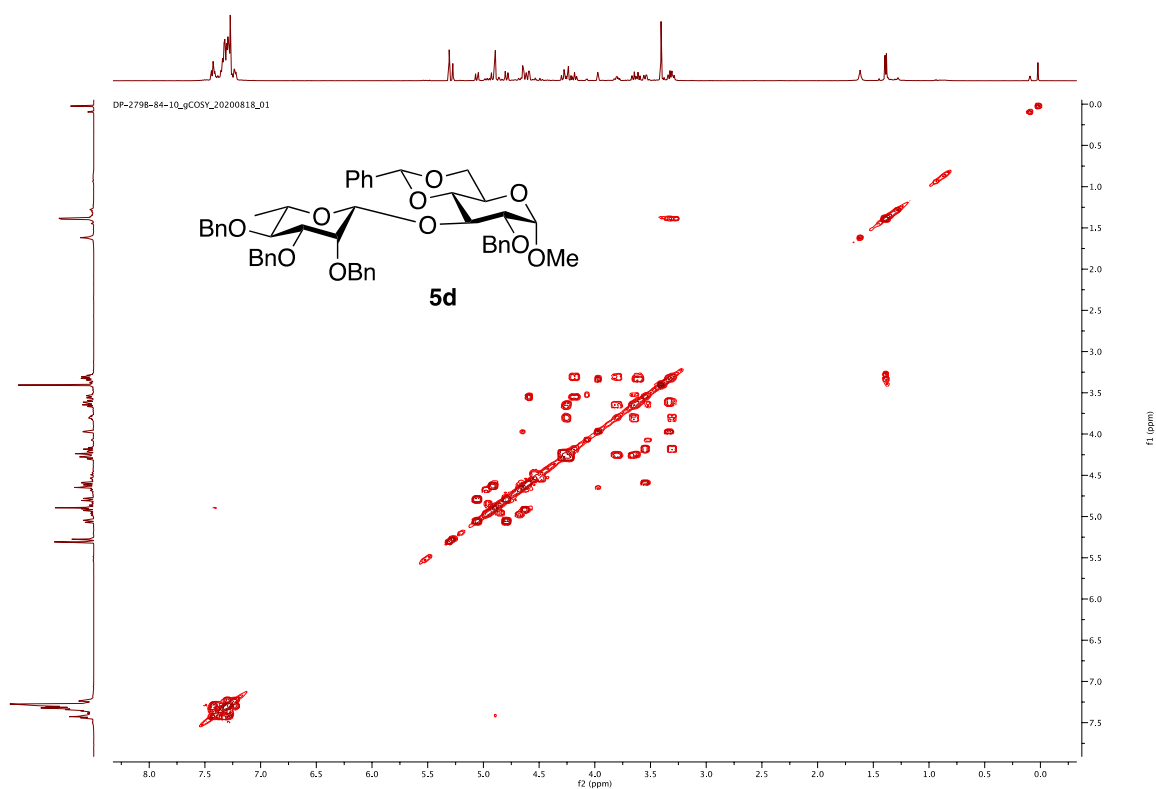
^{13}C - ^1H decoupled HSQC (500 x 126 MHz, Chloroform-*d*) 5d



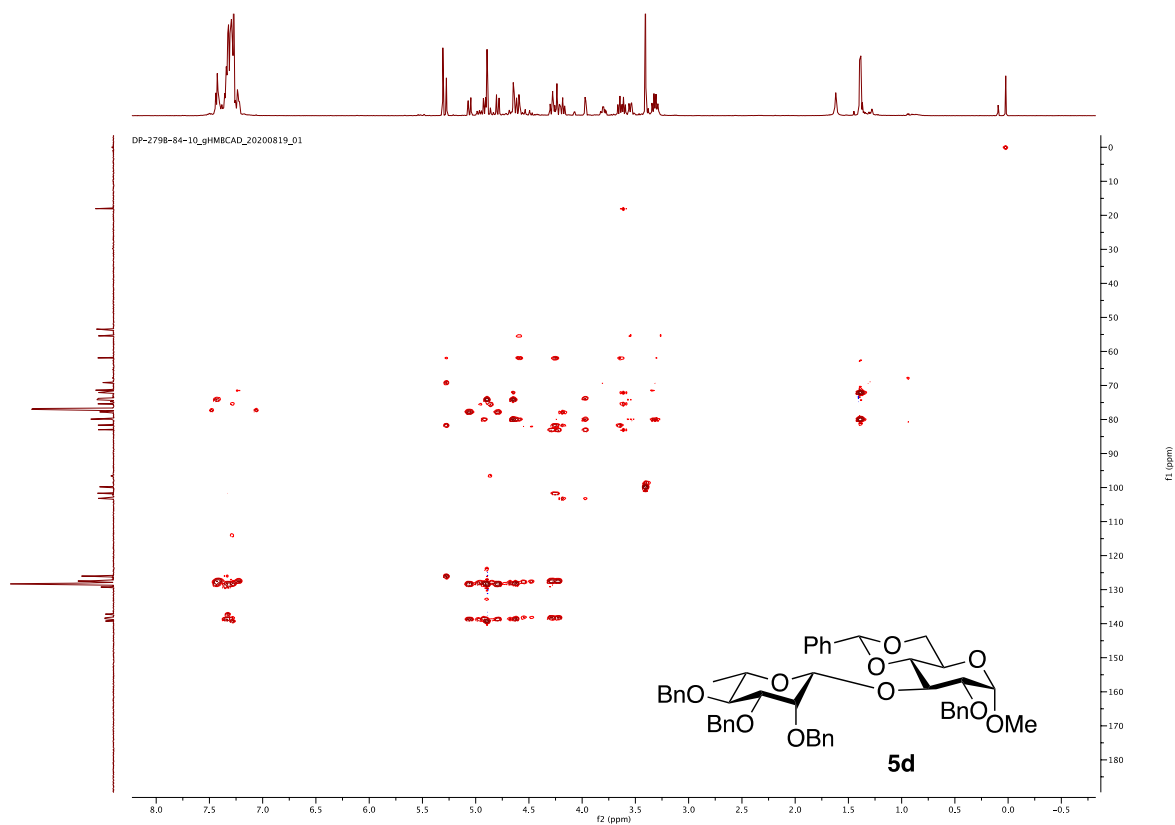
^{13}C - ^1H coupled HSQC (500 x 126 MHz, Chloroform-*d*) 5d



COSY (500 x 500 MHz, Chloroform-*d*) 5d

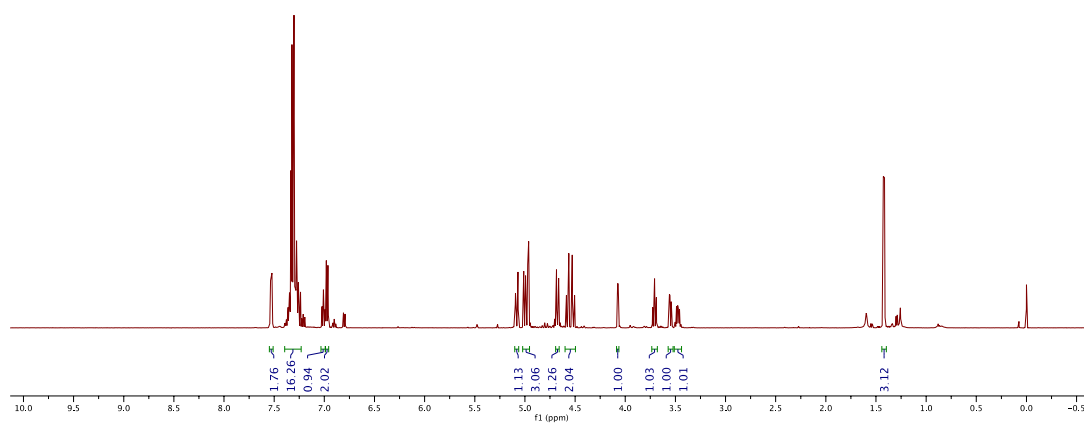
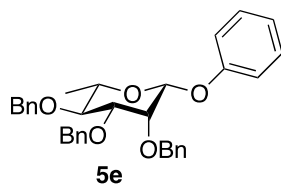


HMBC (500 x 126 MHz, Chloroform-*d*) 5d



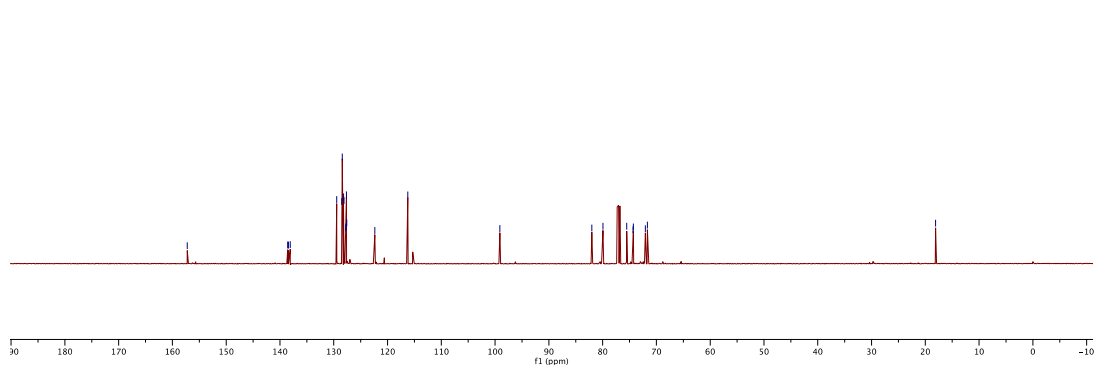
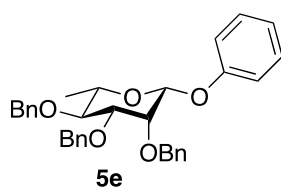
¹H NMR (500 MHz, Chloroform-*d*) 5e

DP-318-61-11_PROTON_20200626_01

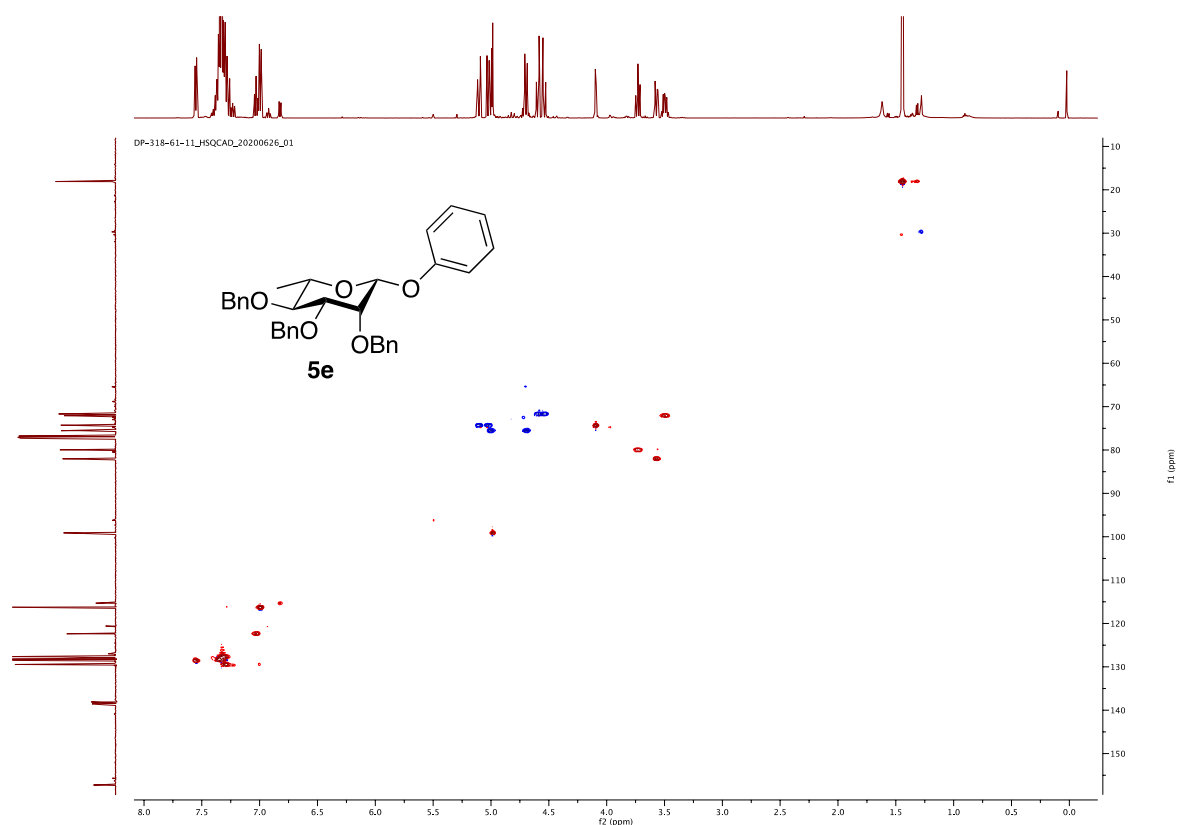


¹³C NMR (126 MHz, Chloroform-*d*) 5e

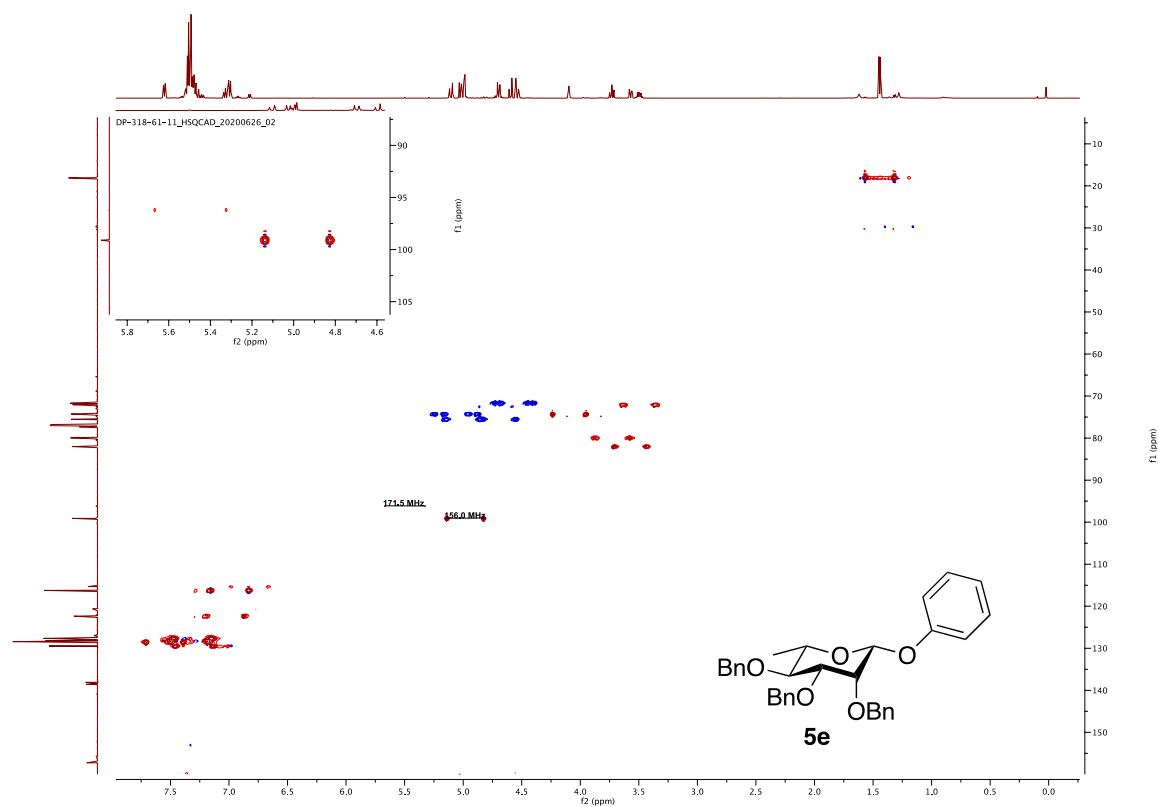
DP-318-61-11_CARBON_20200626_01



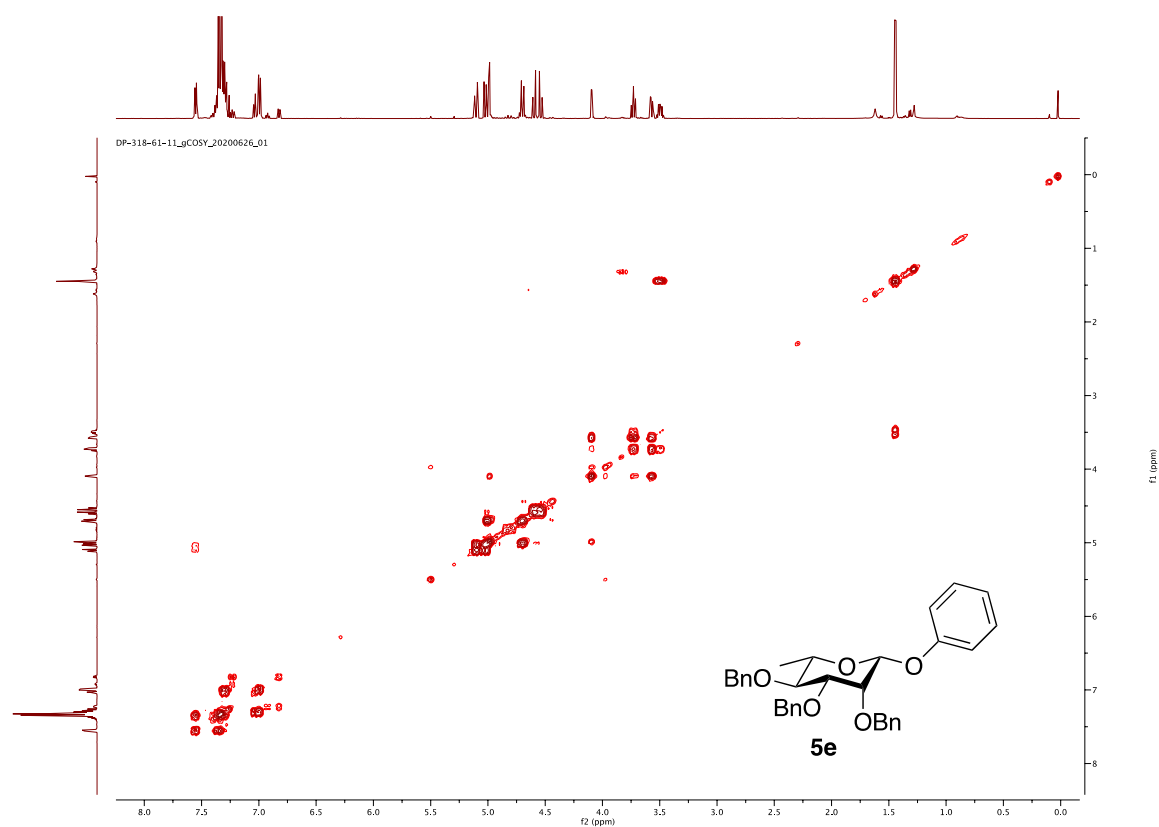
^{13}C - ^1H decoupled HSQC (500 x 126 MHz, Chloroform-*d*) 5e



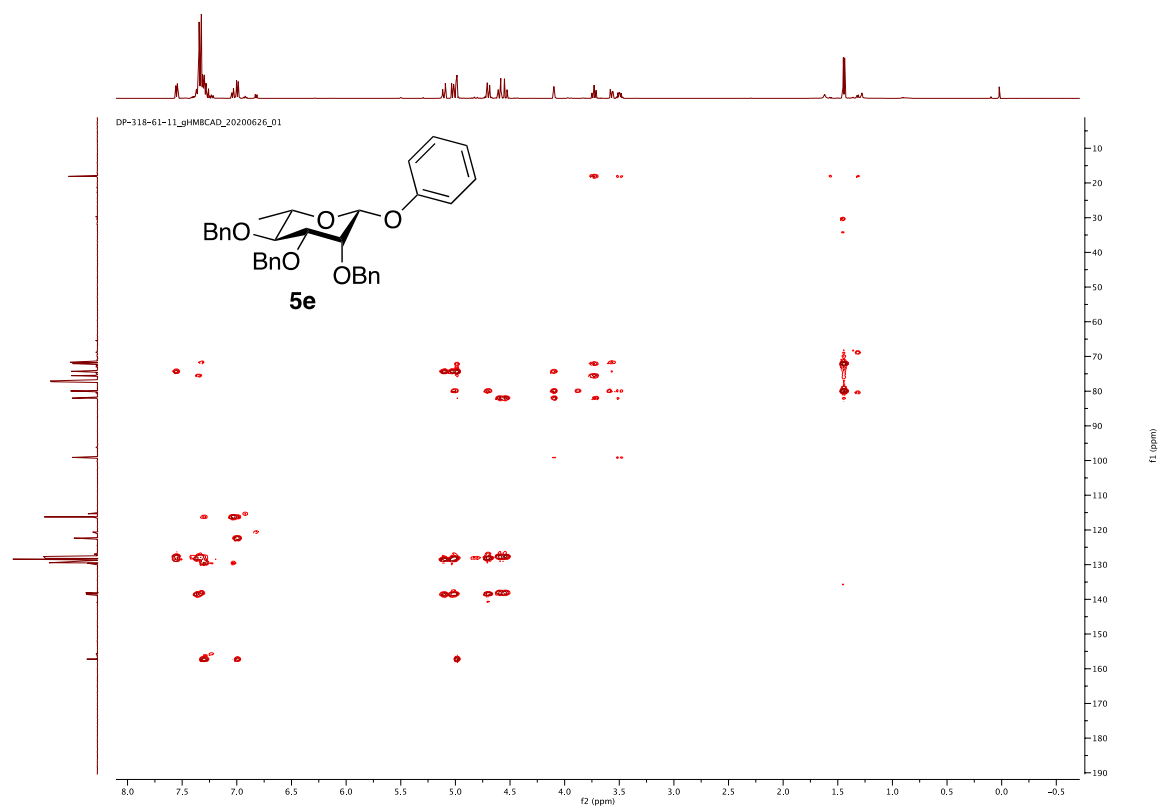
^{13}C - ^1H coupled HSQC (500 x 126 MHz, Chloroform-*d*) 5e



COSY (500 x 500 MHz, Chloroform-*d*) 5e

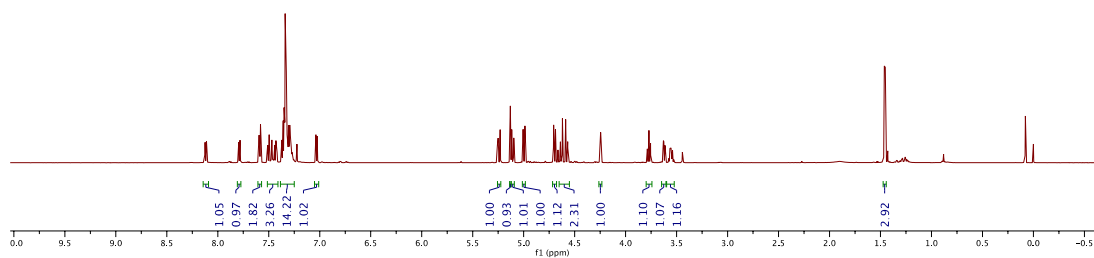
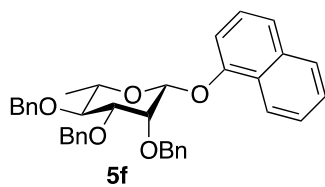


HMBC (500 x 126 MHz, Chloroform-*d*) 5e

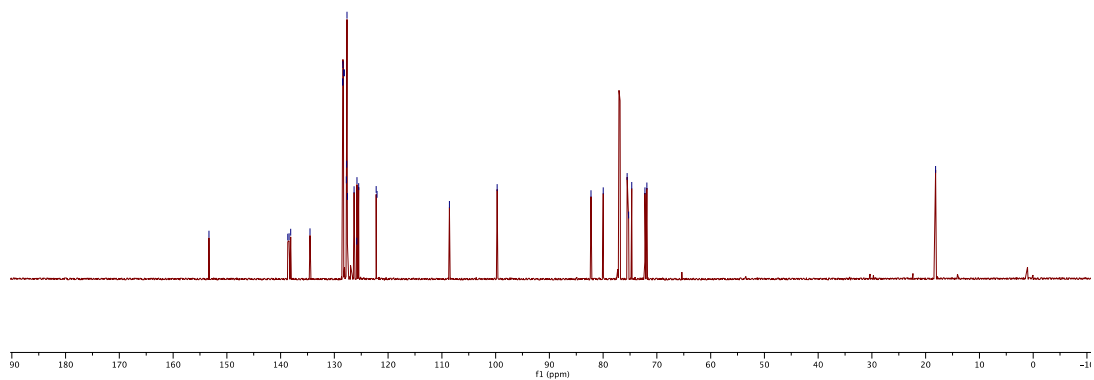
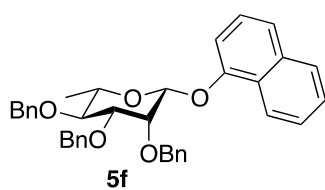


¹H NMR (600 MHz, Chloroform-*d*) 5f

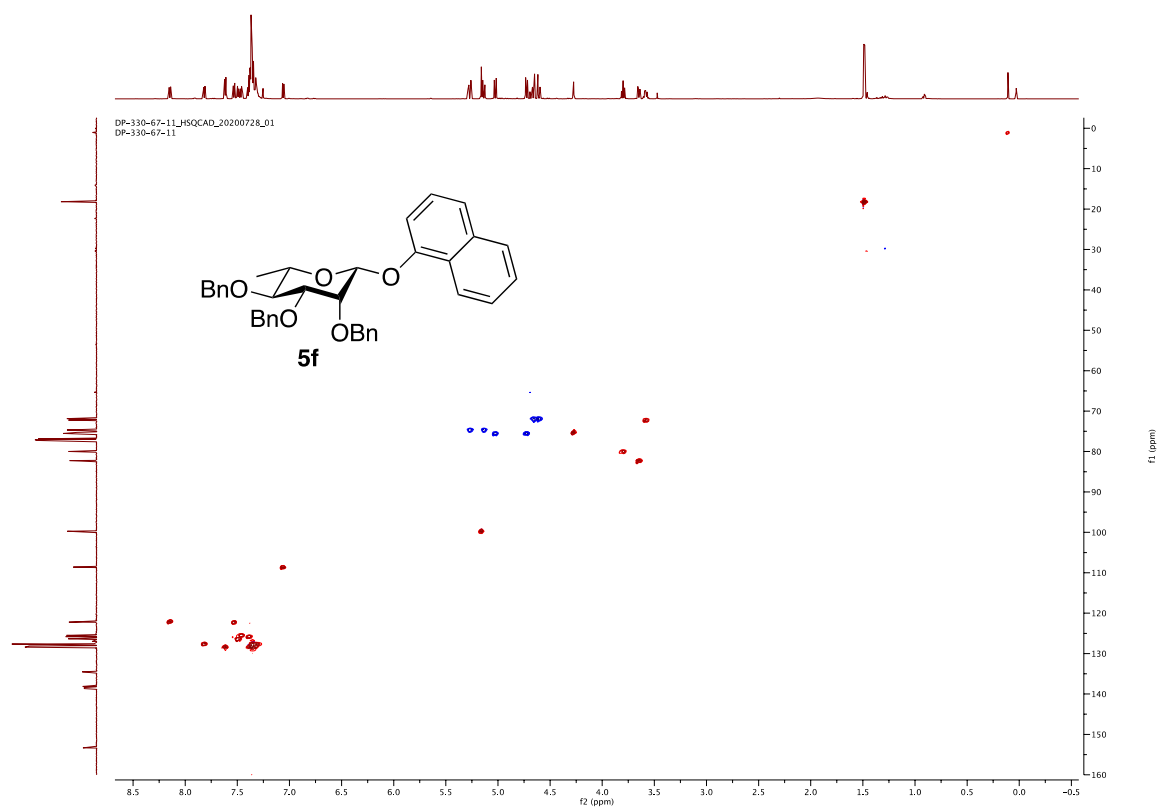
DP-330-67-11_PROTON_20200728_01
DP-330-67-11

³C NMR (151 MHz, Chloroform-*d*) 5f

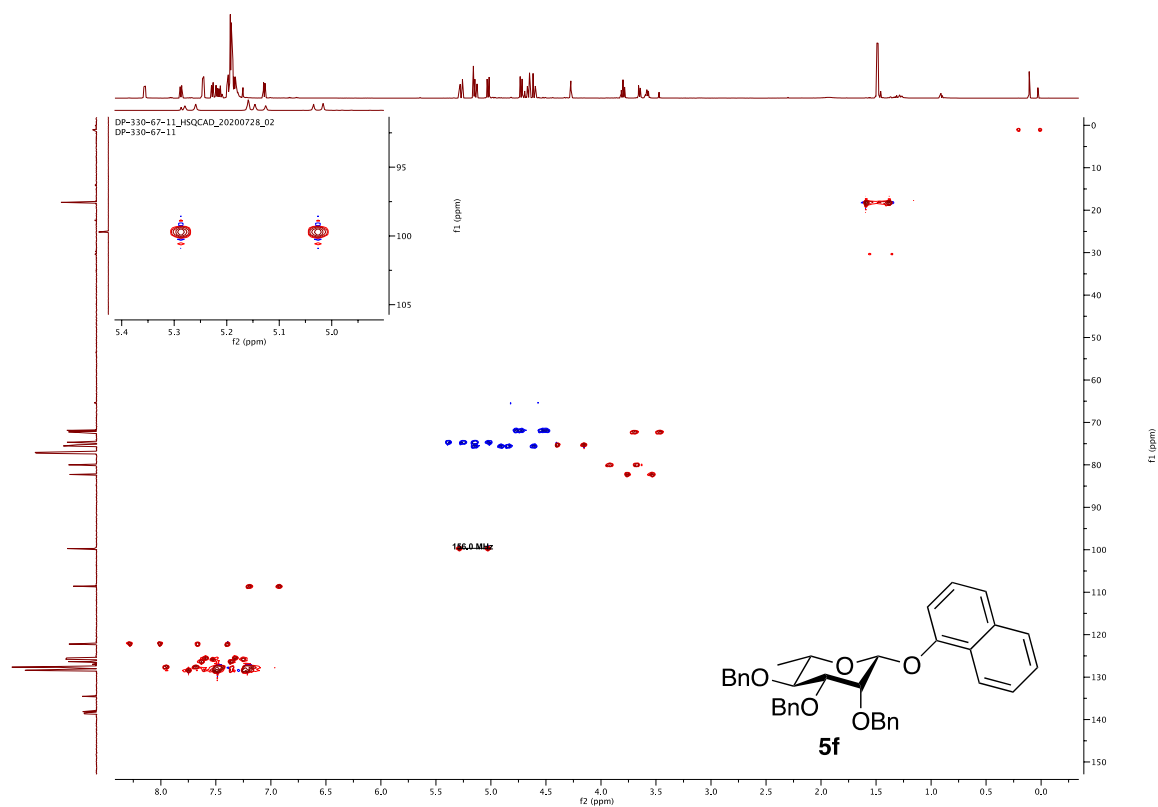
DP-330-67-11 CARBON_20200728_01
DP-330-67-11



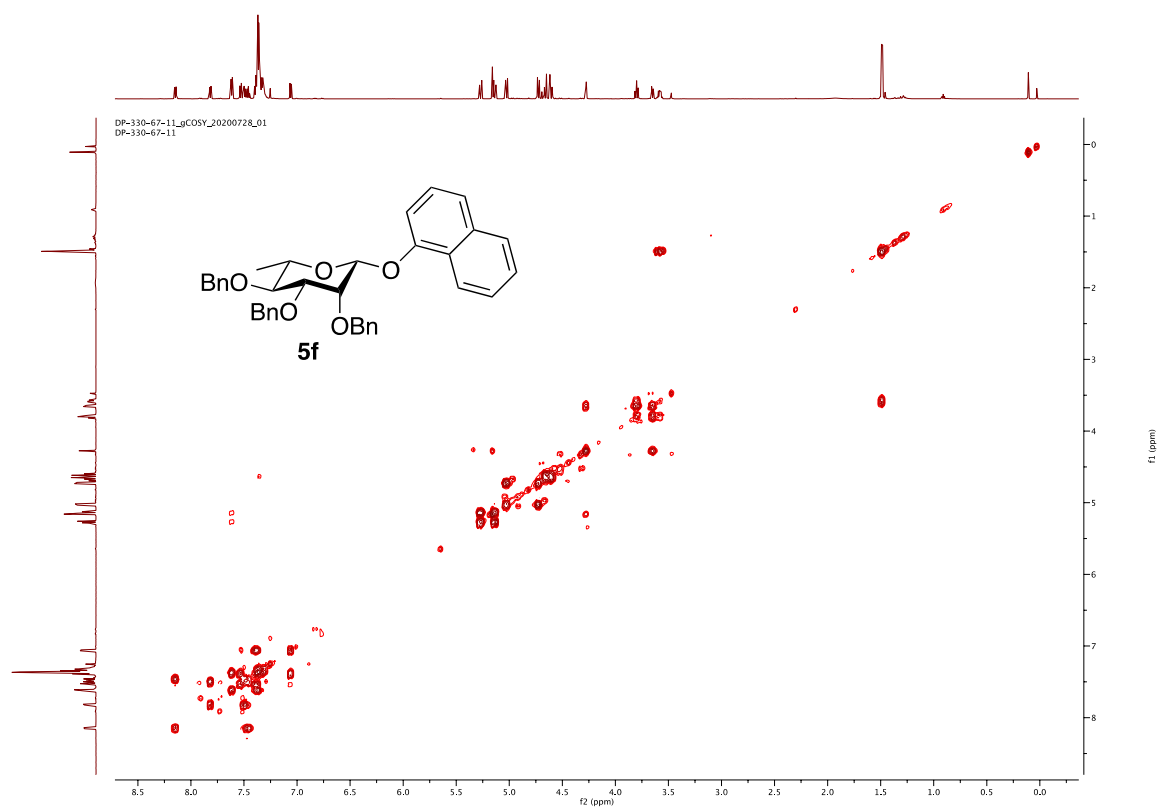
^{13}C - ^1H decoupled HSQC (600 x 151 MHz, Chloroform-*d*) 5f



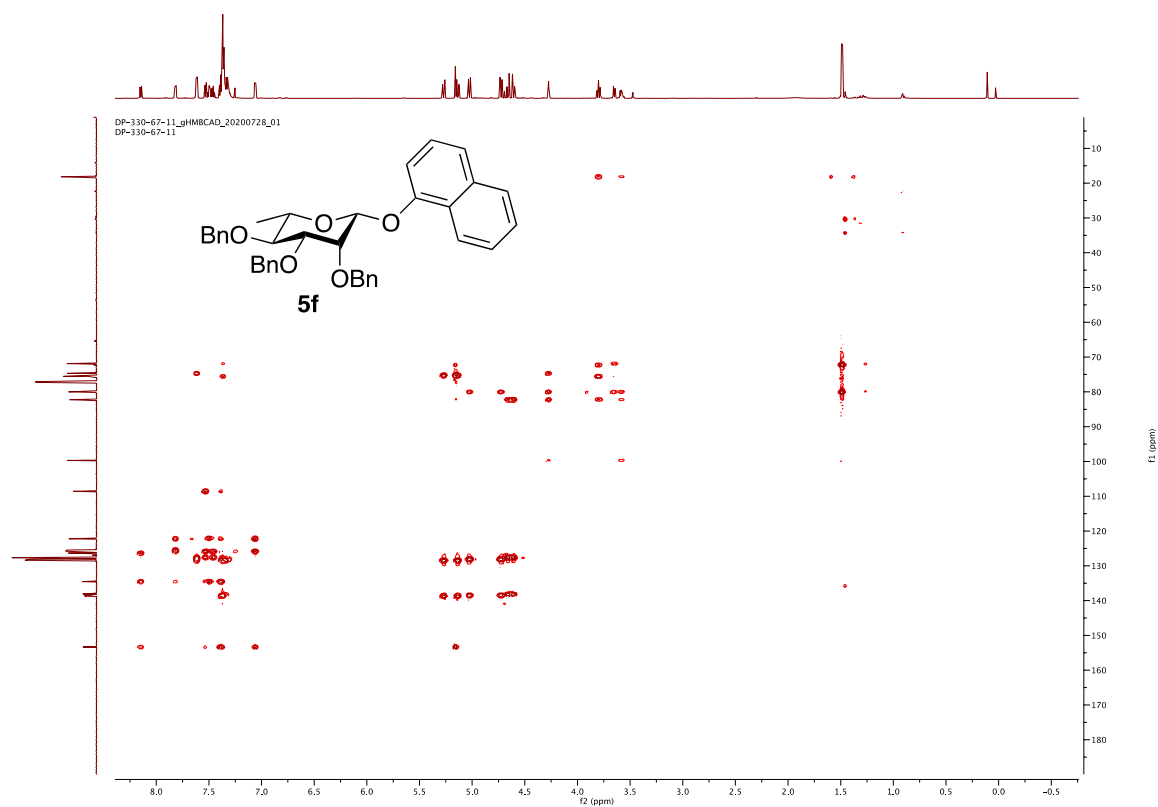
^{13}C - ^1H coupled HSQC (600 x 156 MHz, Chloroform-*d*) 5f



COSY (600 x 600 MHz, Chloroform-*d*) 5f

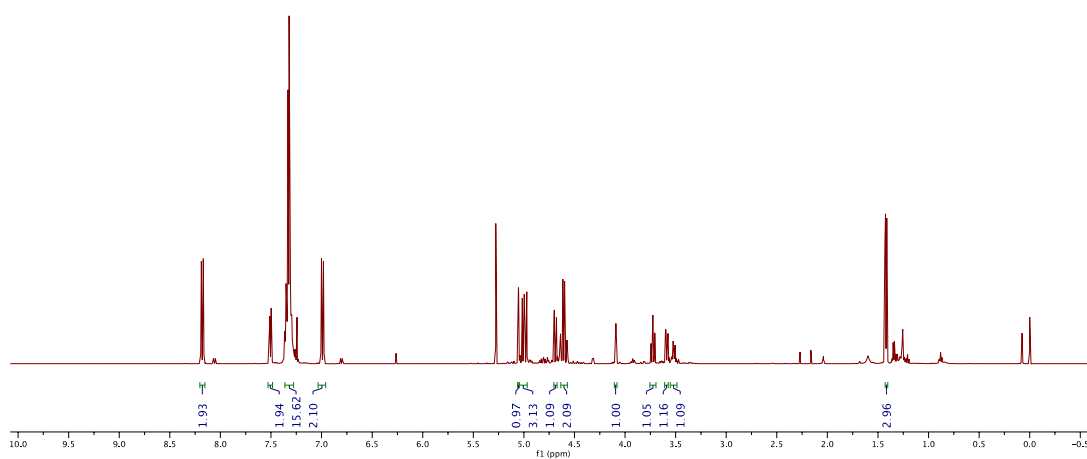
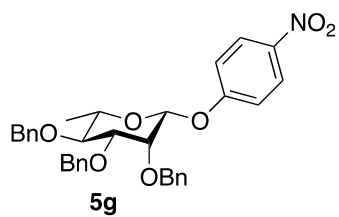


HMBC (600 x 151 MHz, Chloroform-*d*) 5f



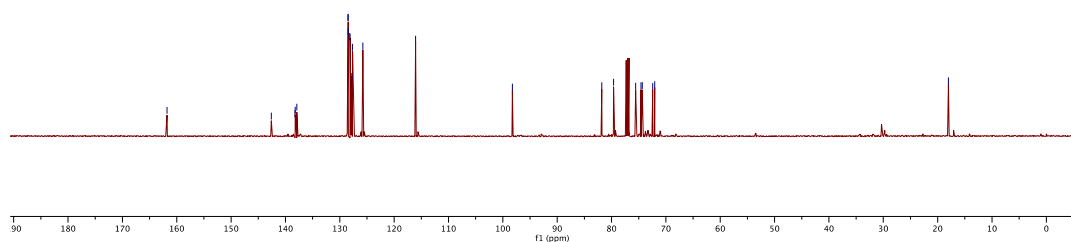
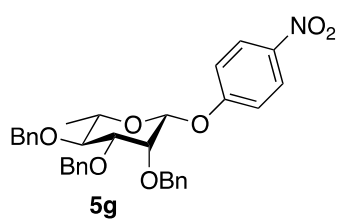
¹H NMR (500 MHz, Chloroform-*d*) 5g

DP-329-67-11-FCC_PROTON_20200728_01

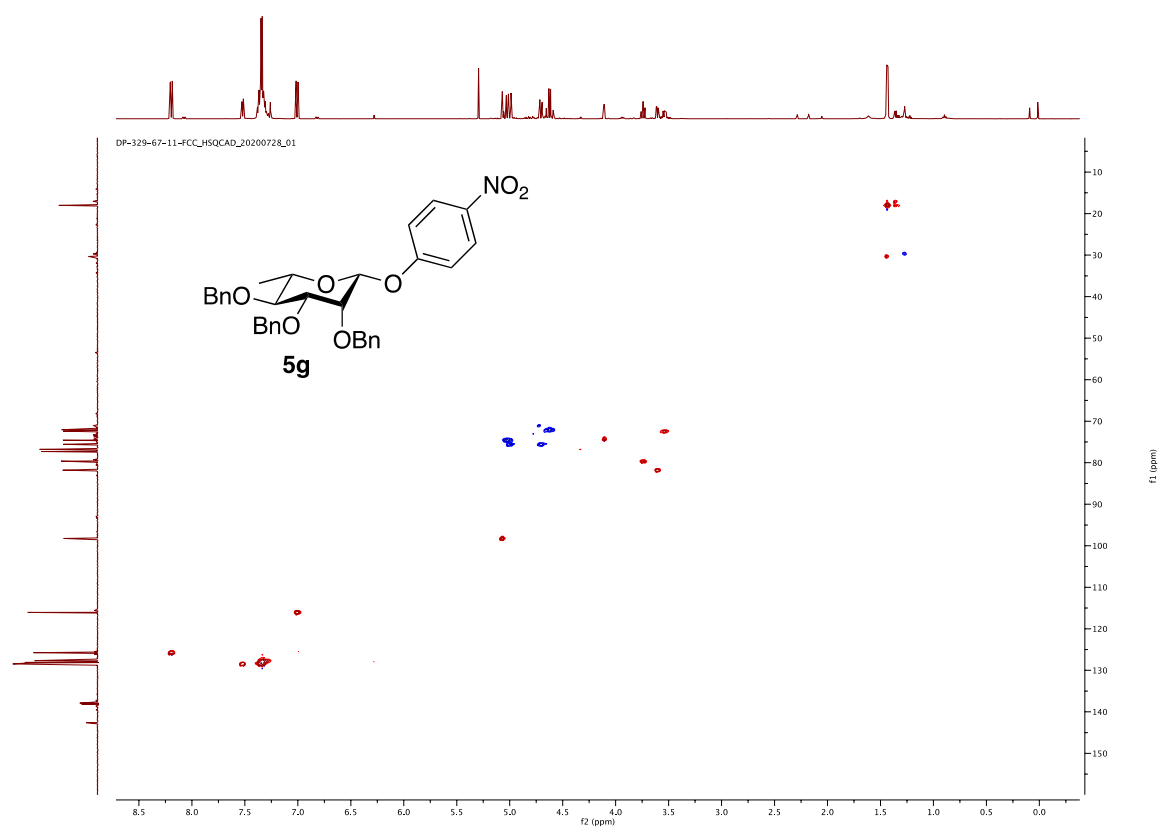


¹³C NMR (126 MHz, Chloroform-*d*) 5g

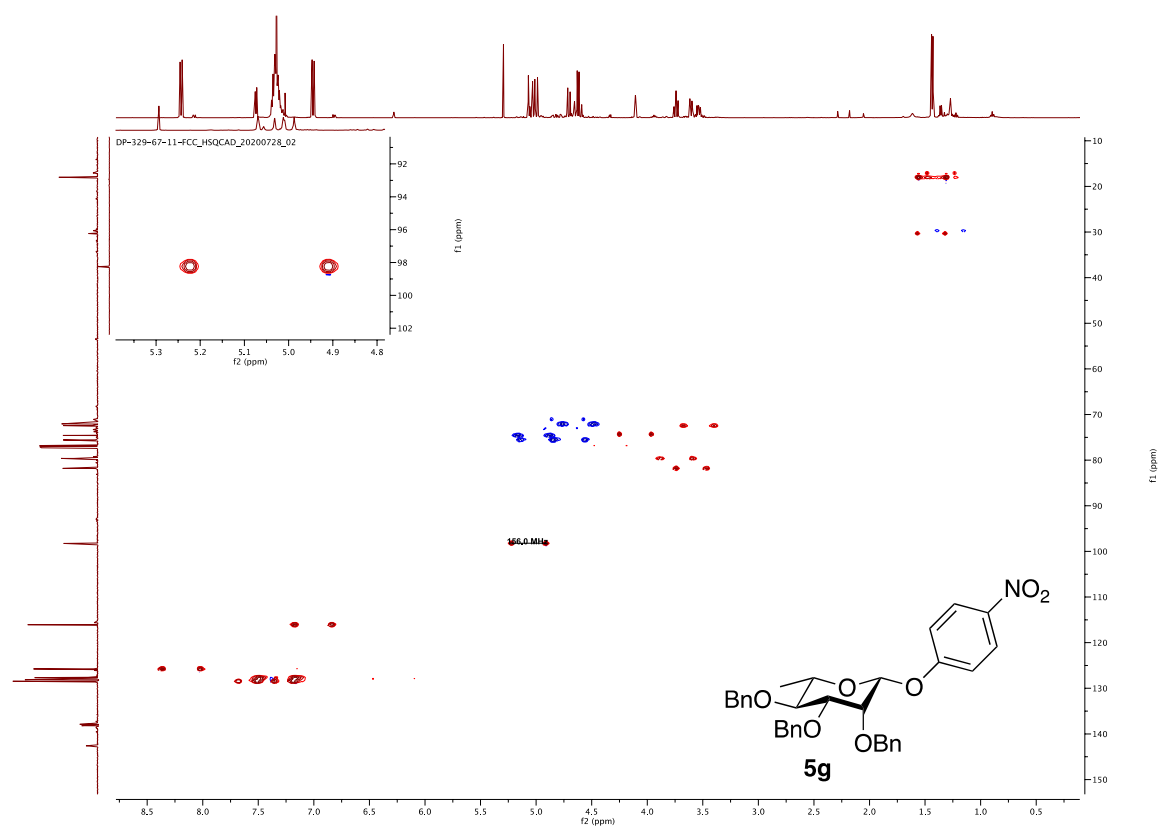
DP-329-67-11-FCC_CARBON_20200729_01



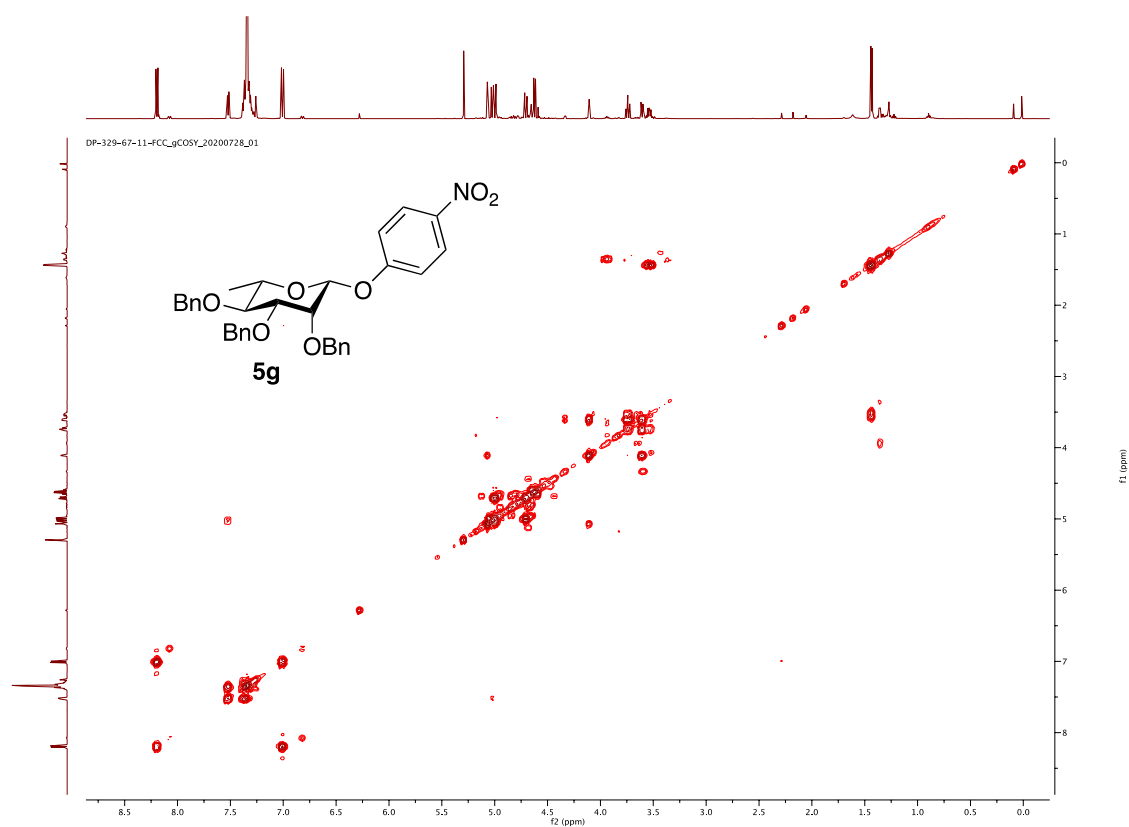
^{13}C - ^1H decoupled HSQC (500 x 126 MHz, Chloroform-*d*) 5g



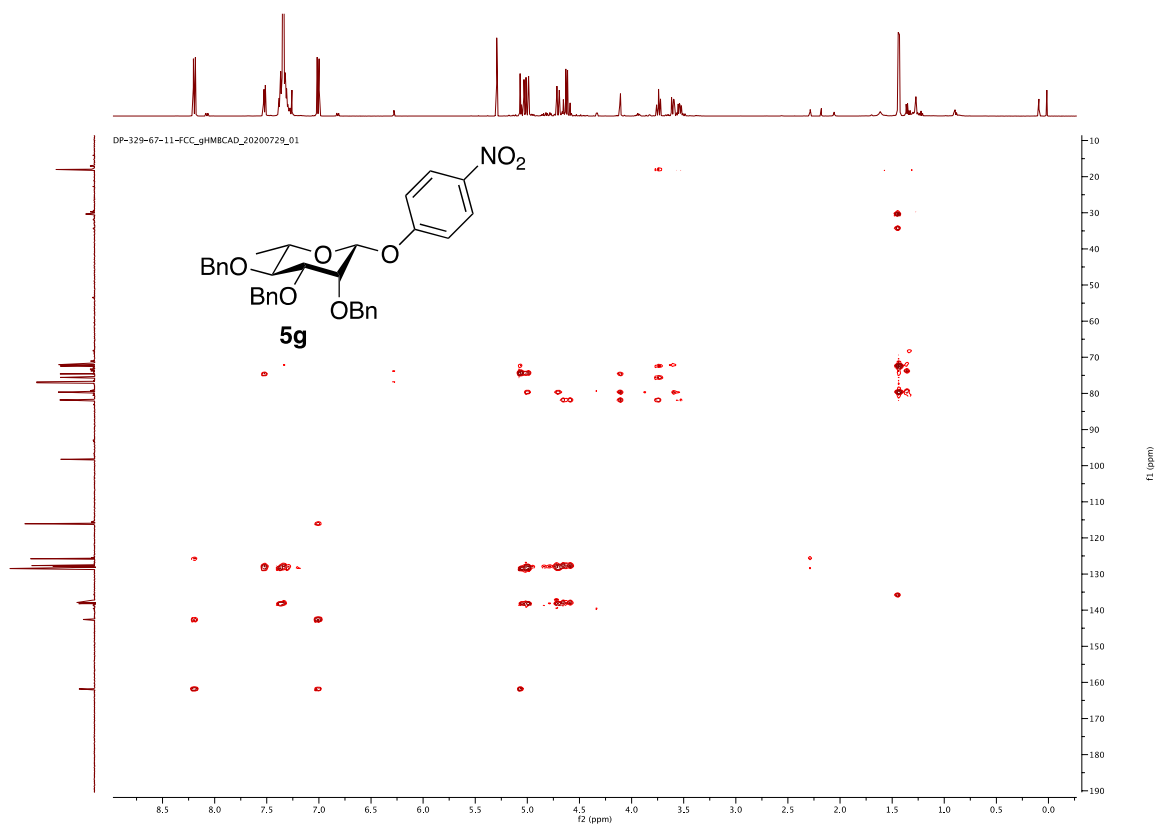
^{13}C - ^1H coupled HSQC (500 x 126 MHz, Chloroform-*d*) 5g



COSY (500 x 500 MHz, Chloroform-*d*) 5g

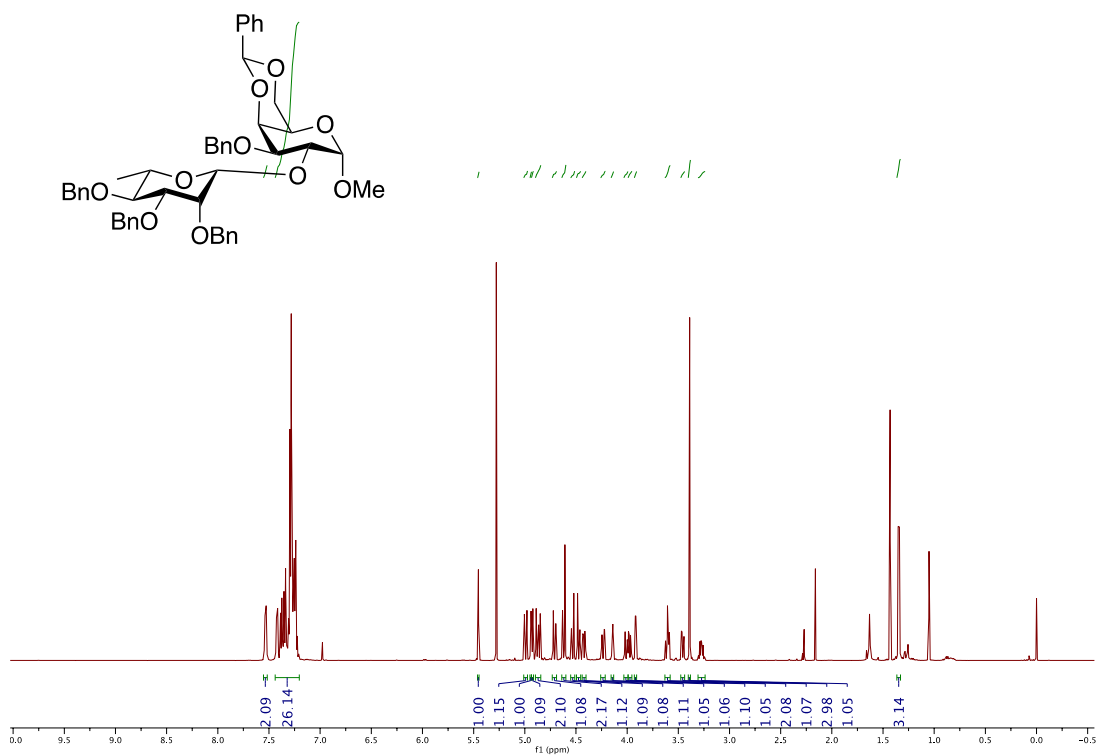


HMBC (500 x 126 MHz, Chloroform-*d*) 5g



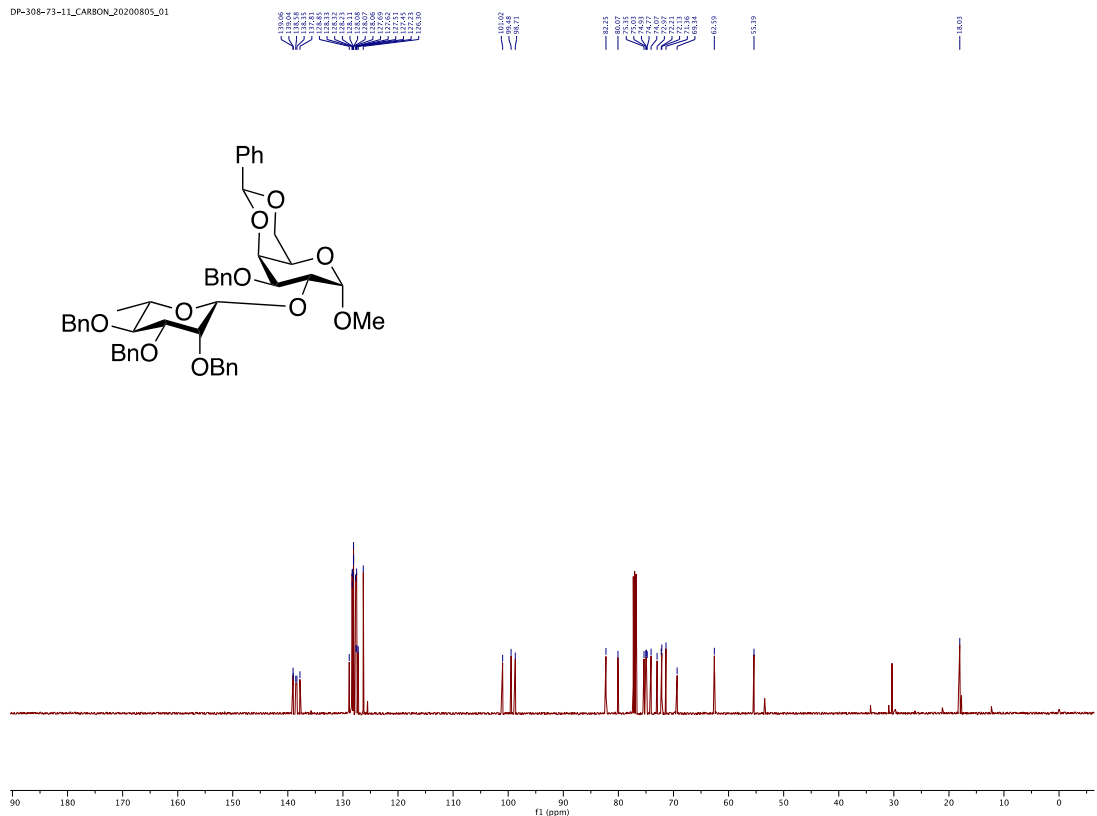
¹H NMR (500 MHz, Chloroform-*d*) 5j

DP-308-73-11_PROTON_20200805_01

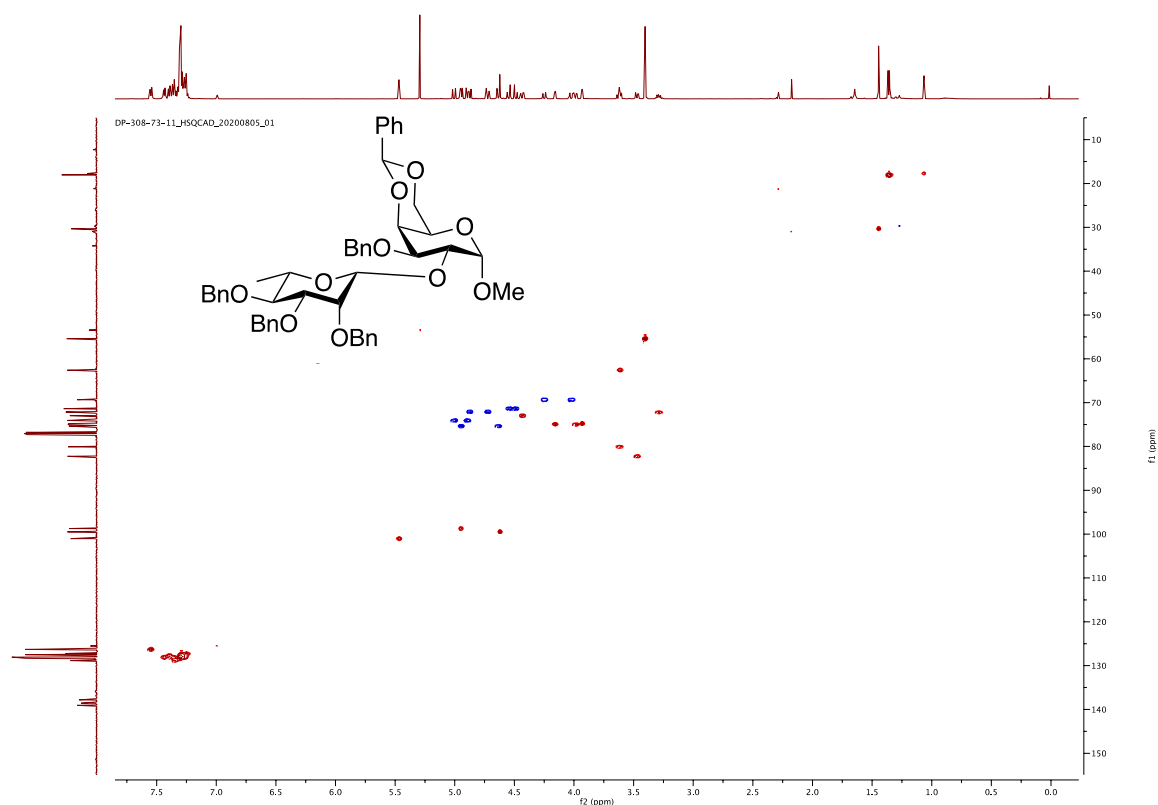


¹³C NMR (126 MHz, Chloroform-*d*) 5j

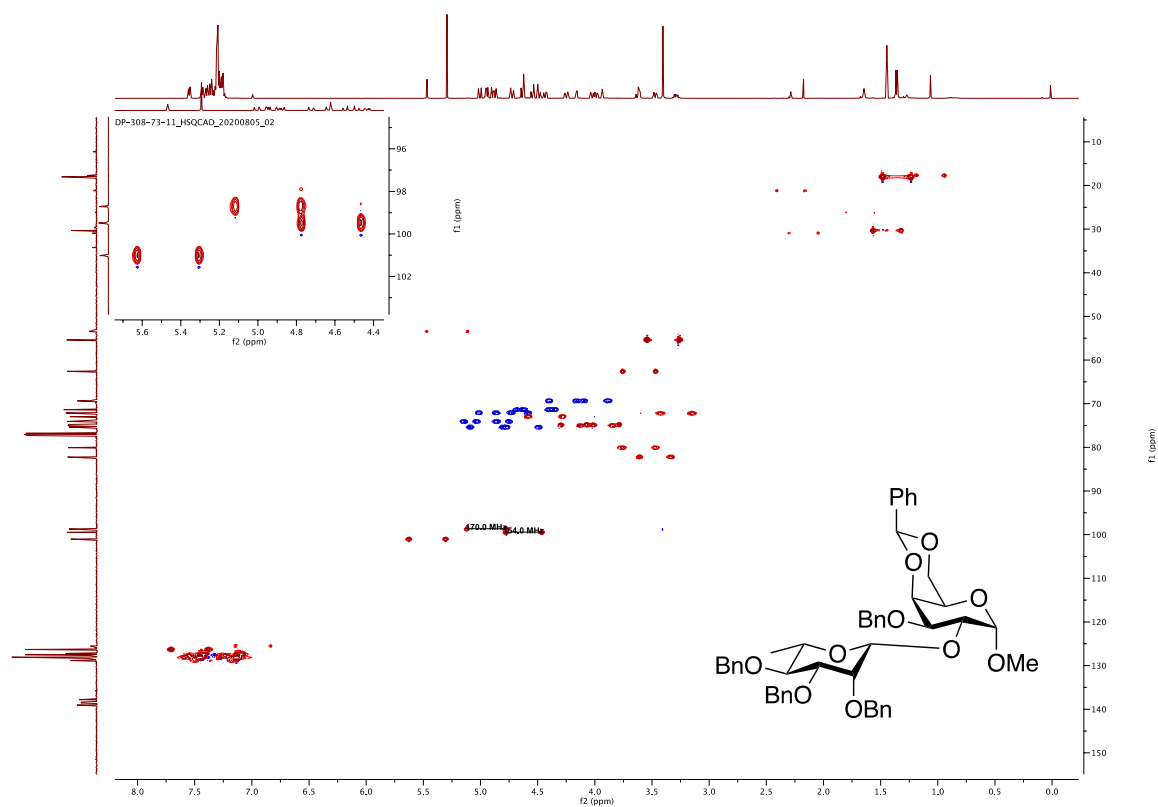
DP-308-73-11_CARBON_20200805_01



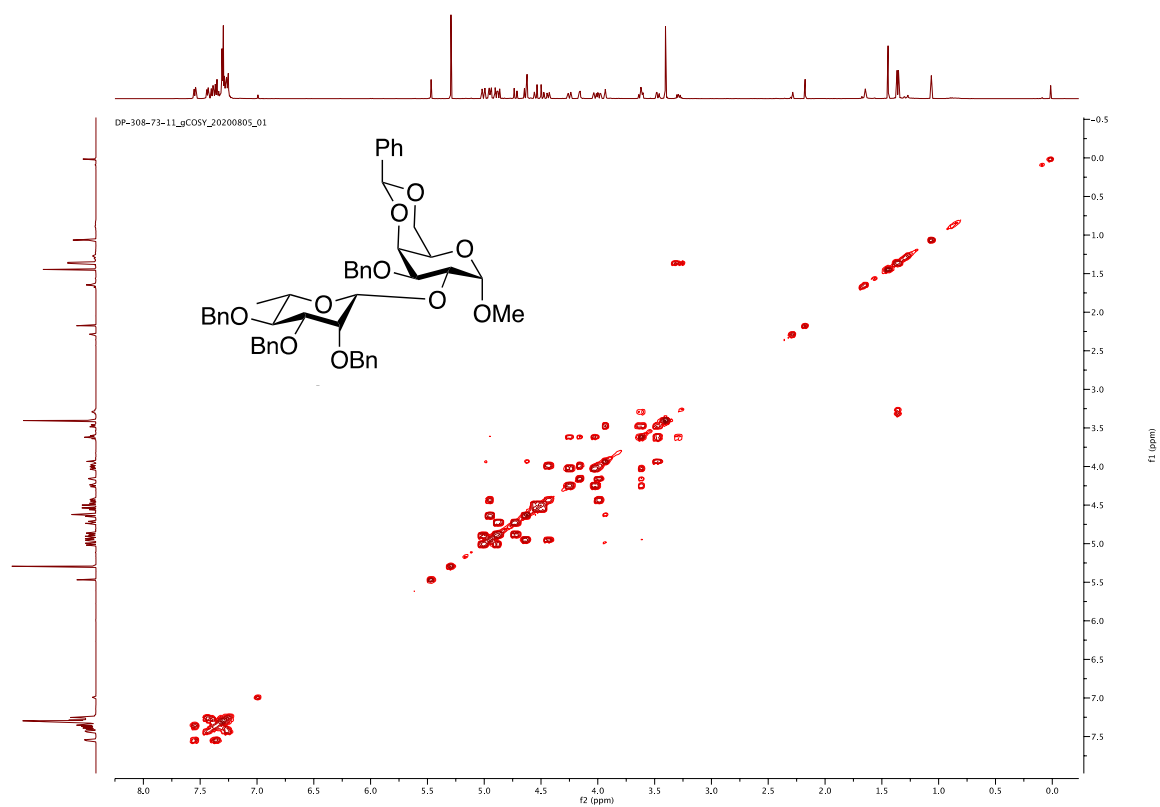
^{13}C - ^1H decoupled HSQC (500 x 126 MHz, Chloroform-*d*) 5j



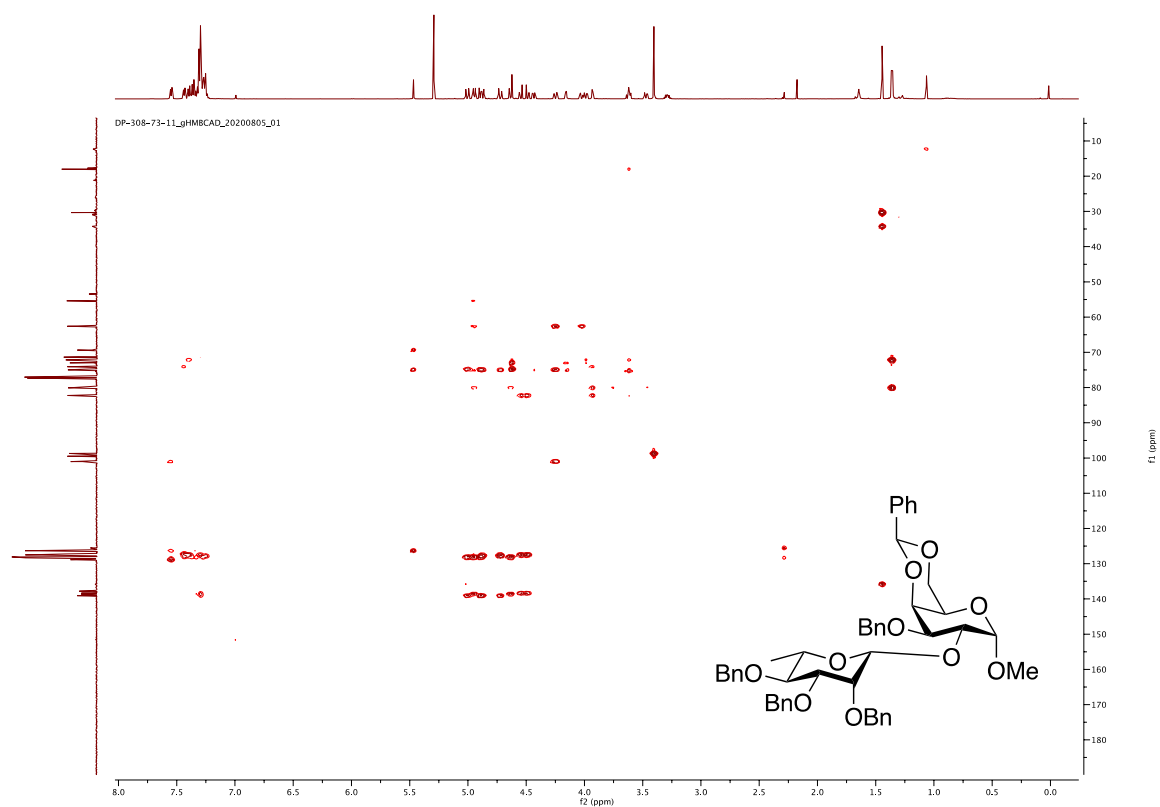
^{13}C - ^1H coupled HSQC (500 x 126 MHz, Chloroform-*d*) 5j



COSY (500 x 500 MHz, Chloroform-*d*) 5j

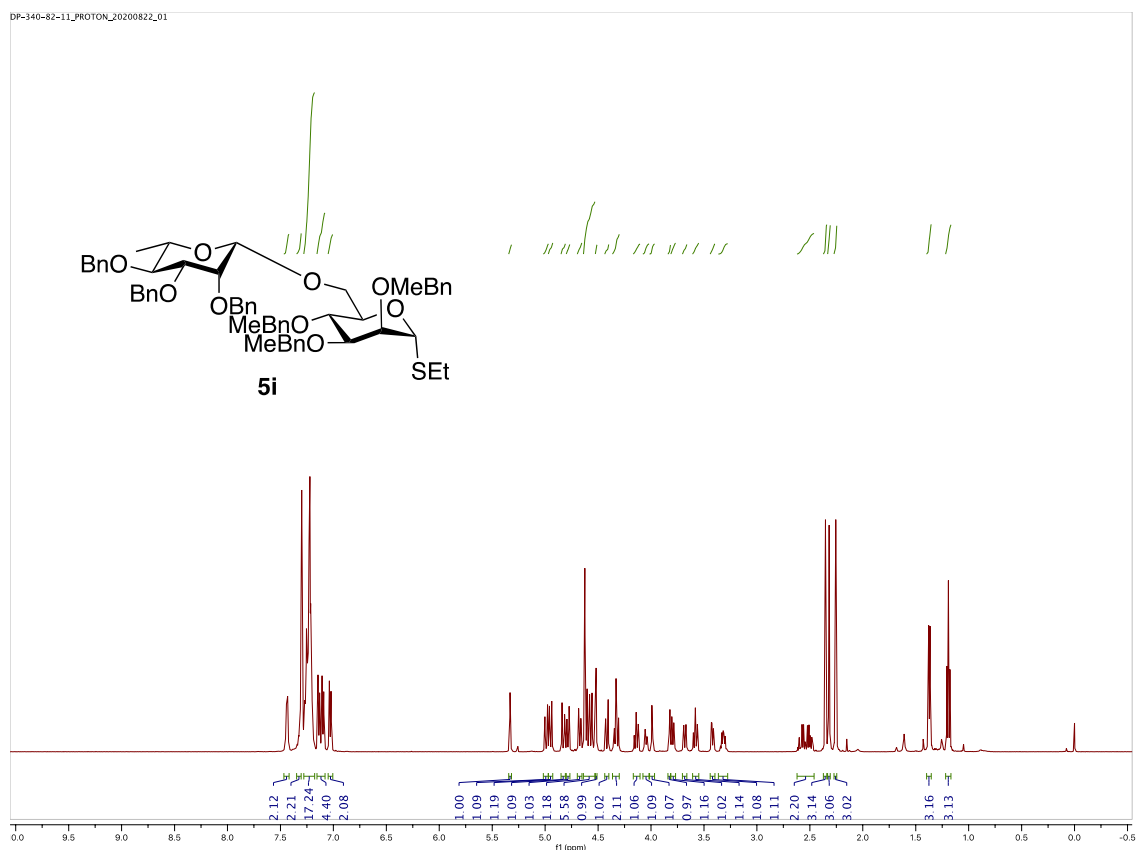


HMBC (500 x 126 MHz, Chloroform-*d*) 5j



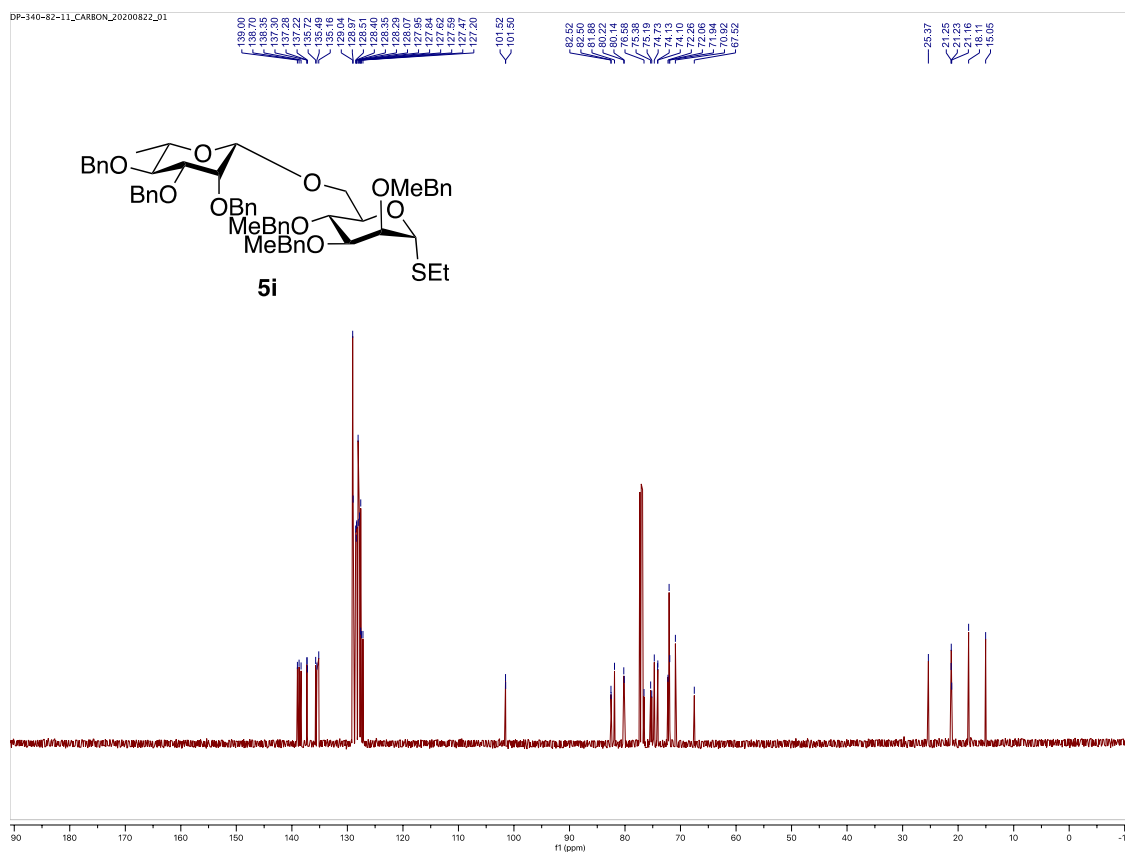
¹H NMR (500 MHz, Chloroform-*d*) 5i

DP-340-82-11 PROTON 20200822 01

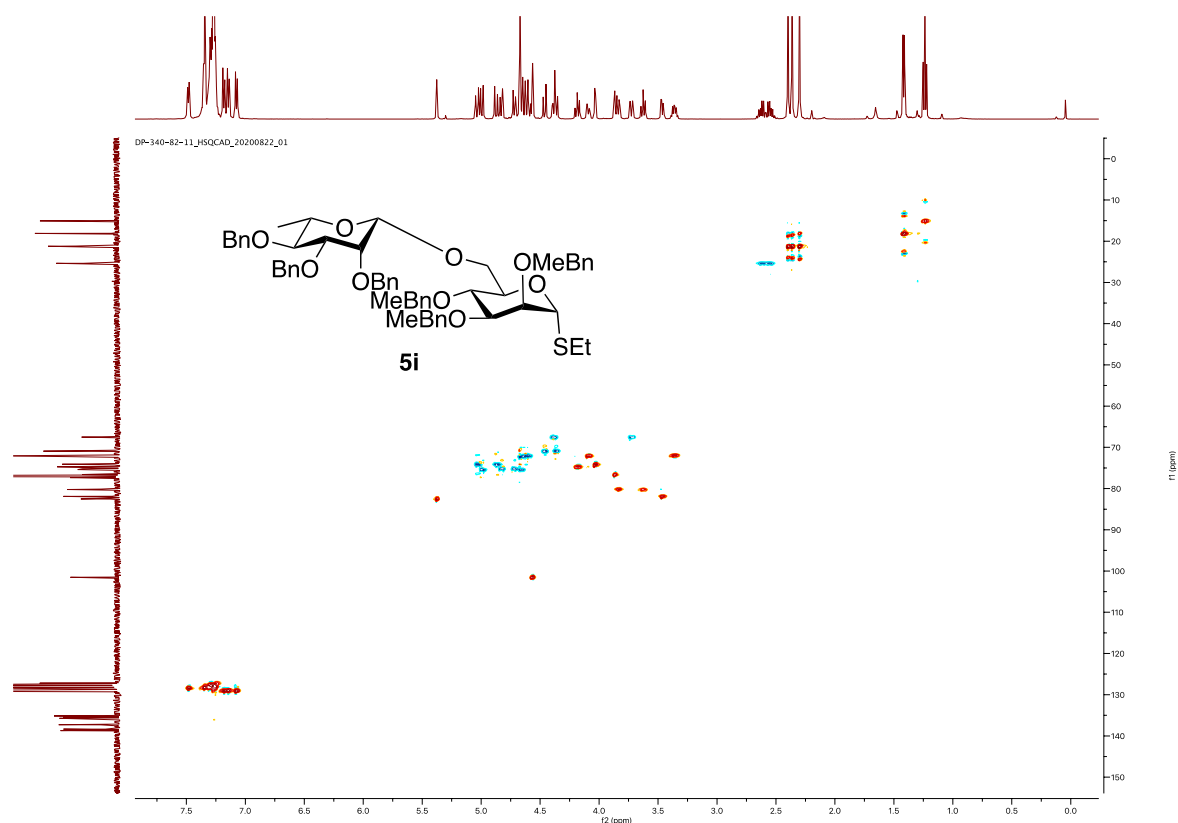


¹³C NMR (126 MHz, Chloroform-*d*) 5i

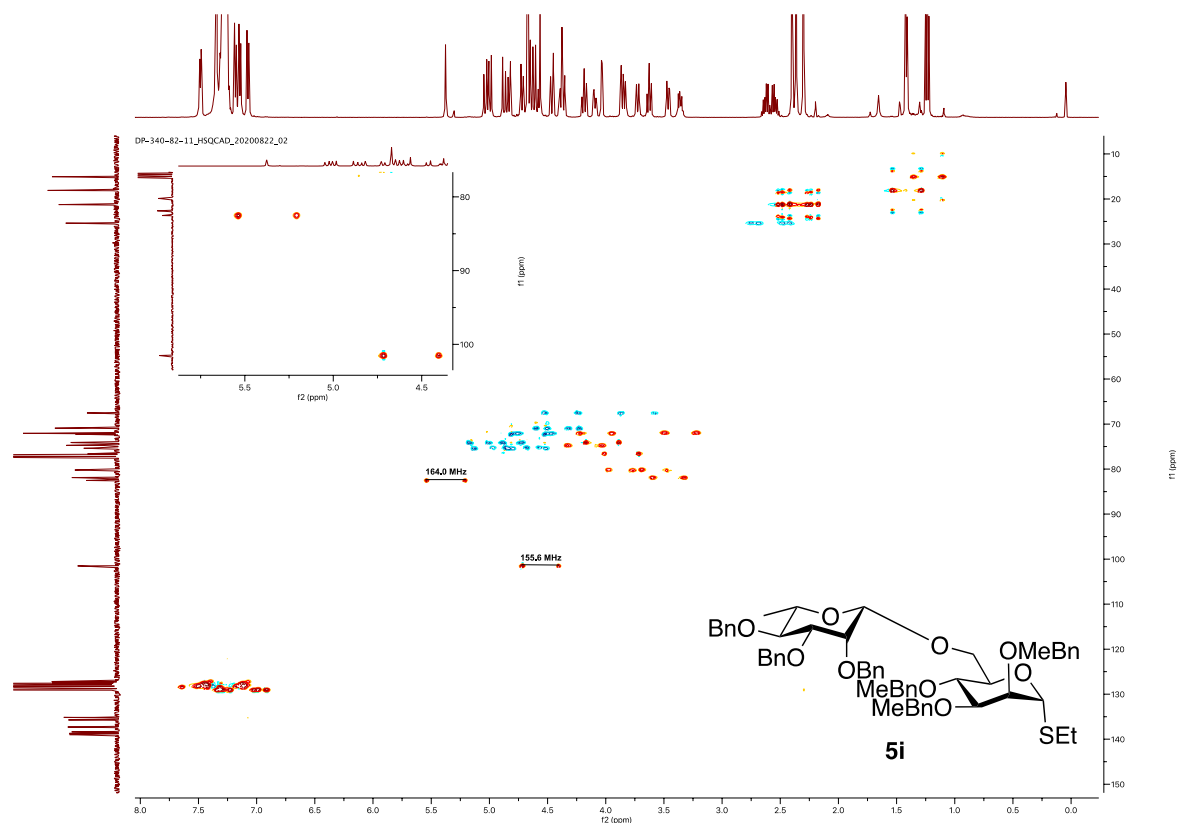
DP-340-82-11 CARBON 20200822 01



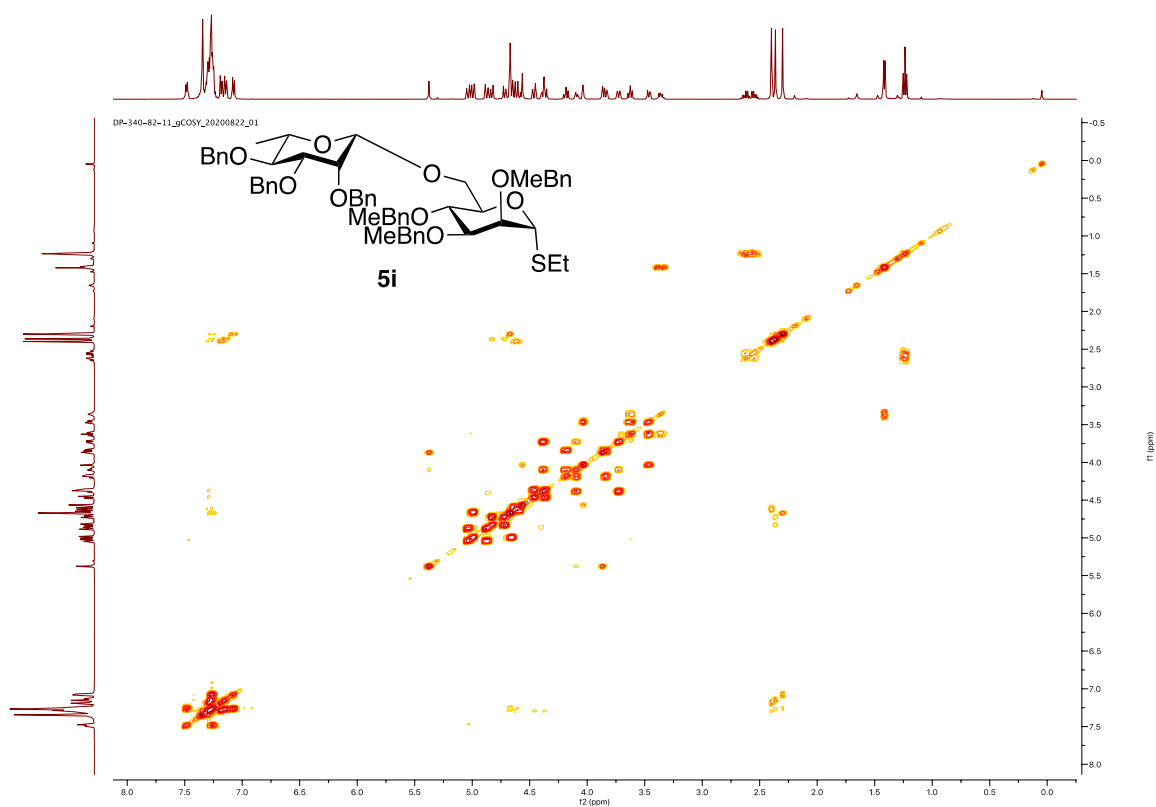
^{13}C - ^1H decoupled HSQC (500 x 126 MHz, Chloroform-*d*) 5i



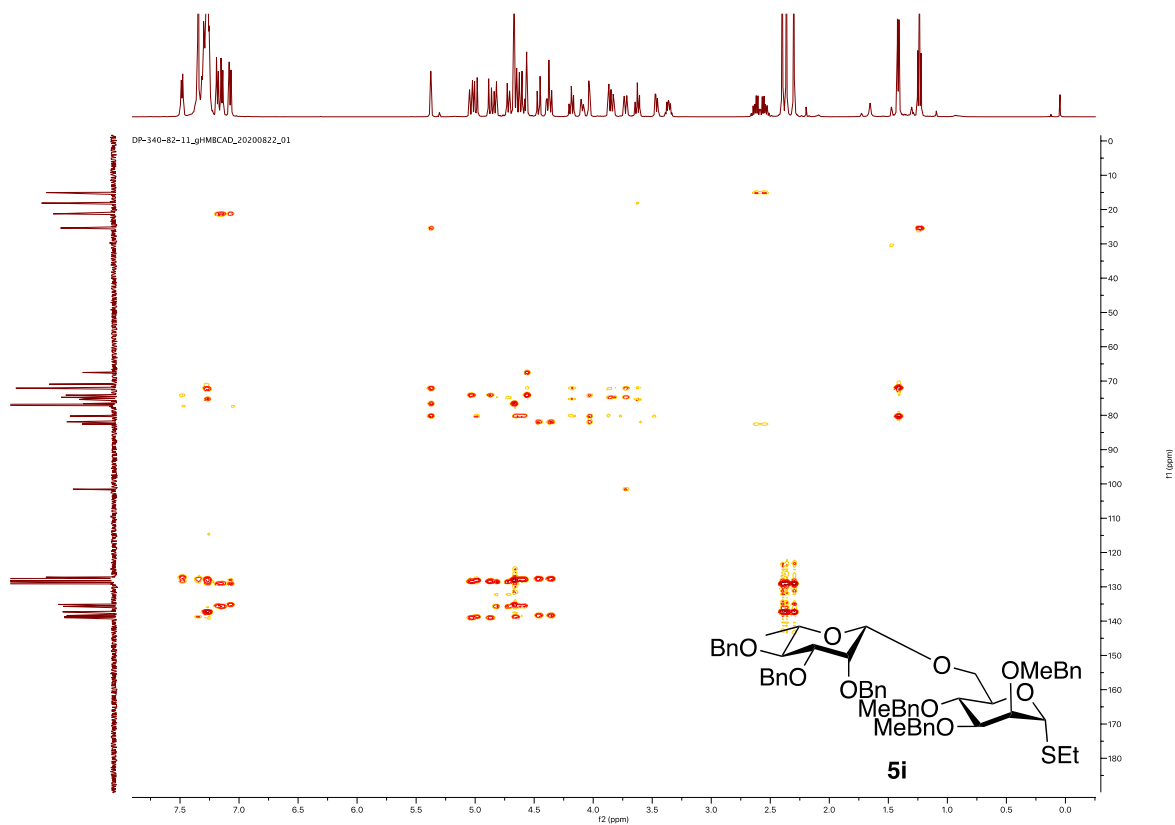
^{13}C - ^1H coupled HSQC (500 x 126 MHz, Chloroform-*d*) 5i



COSY (500 x 500 MHz, Chloroform-*d*) **5i**

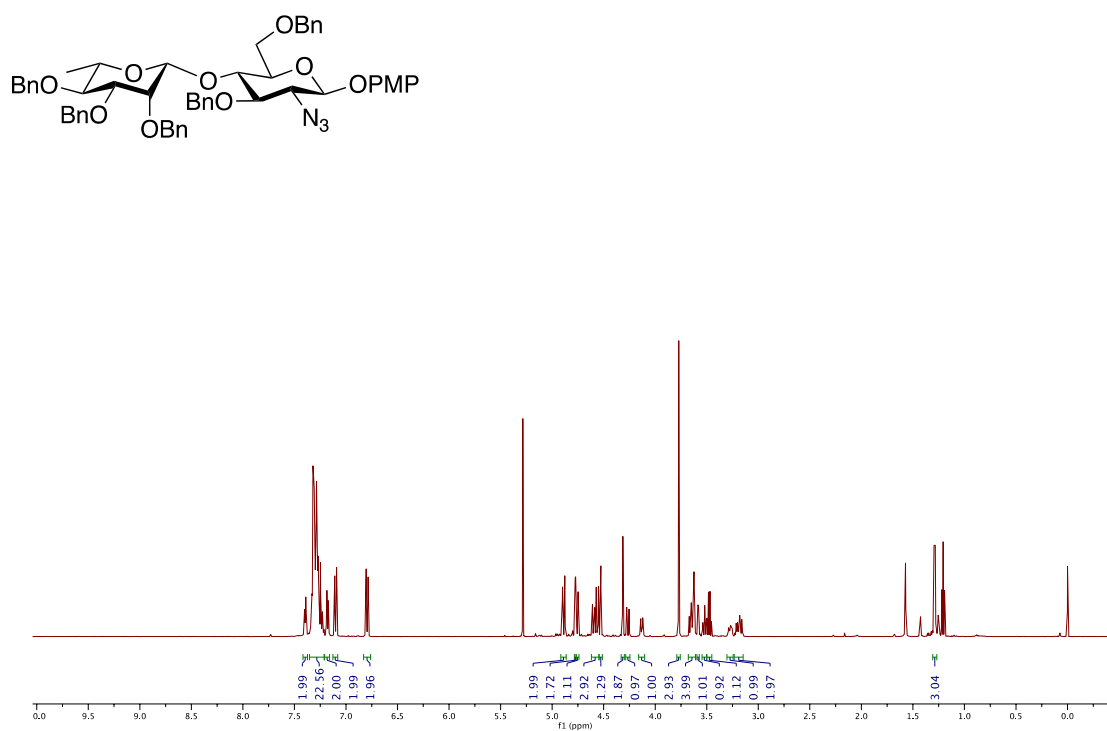


HMBC (500 x 126 MHz, Chloroform-*d*) **5i**



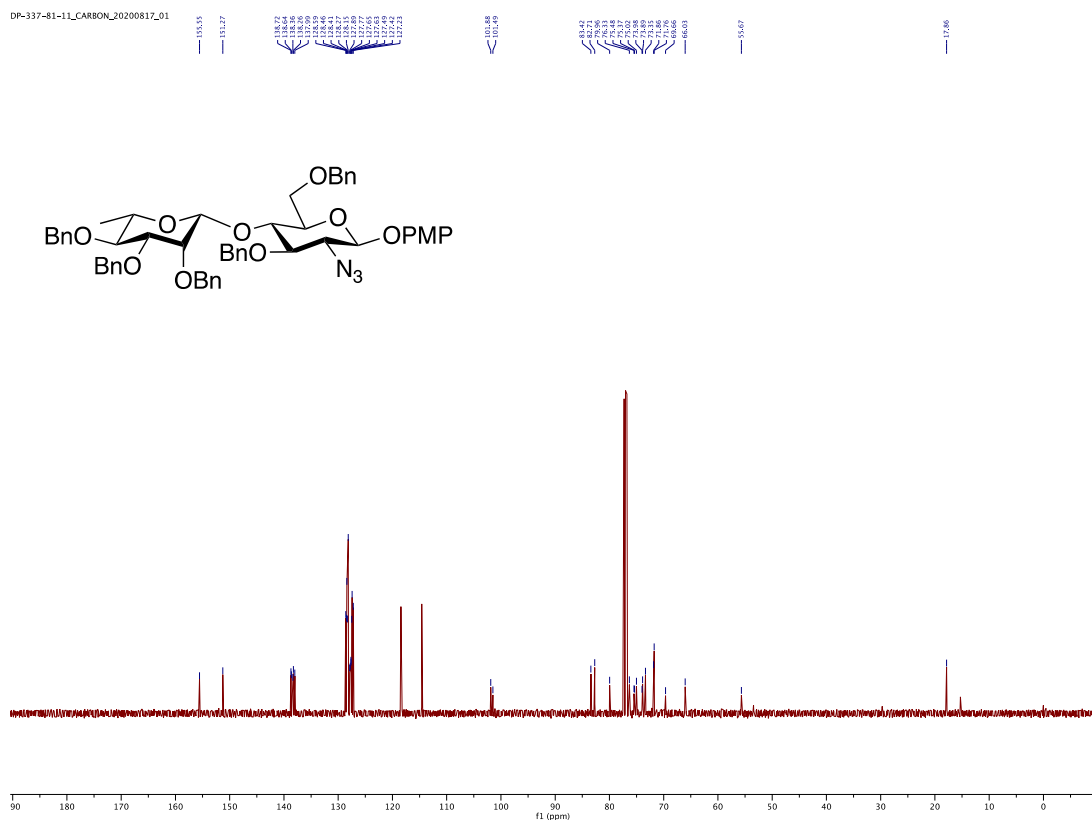
¹H NMR (500 MHz, Chloroform-*d*) 5h

DP-337-81-11_PROTON_20200817_01

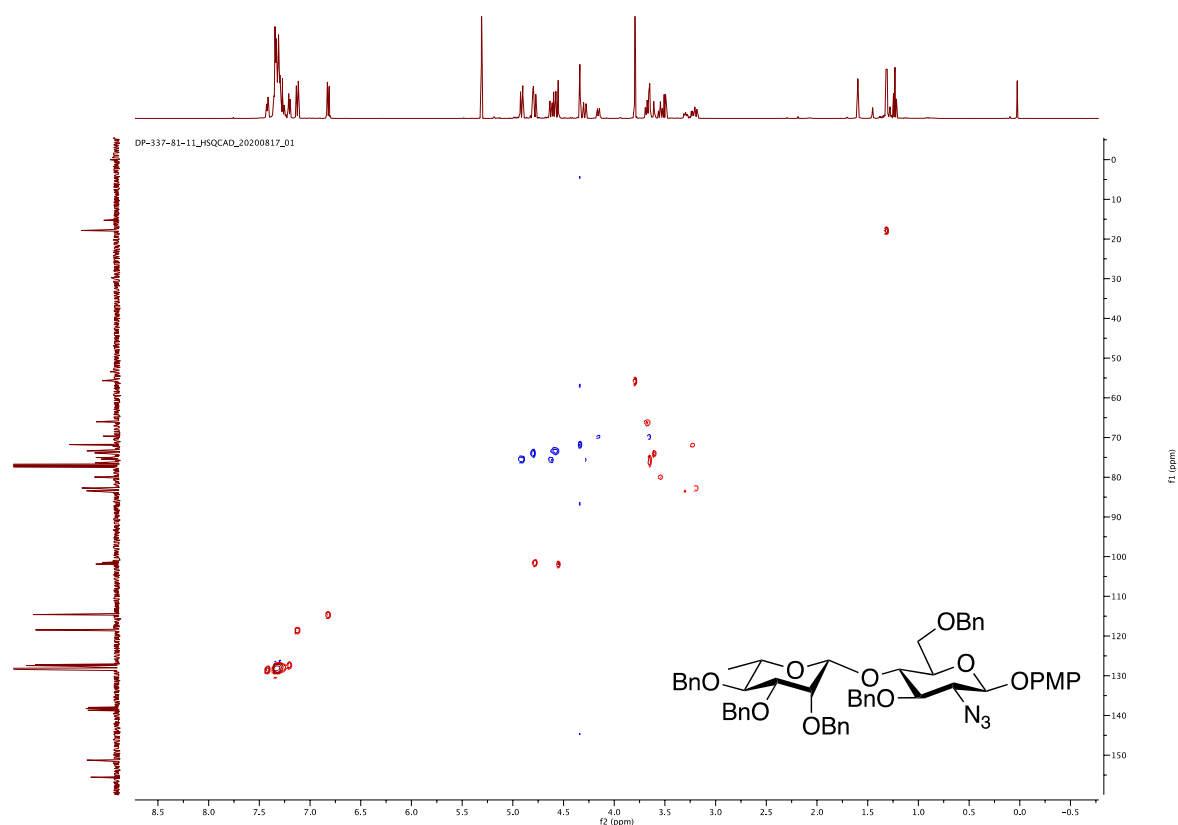


¹³C NMR (126 MHz, Chloroform-*d*) 5h

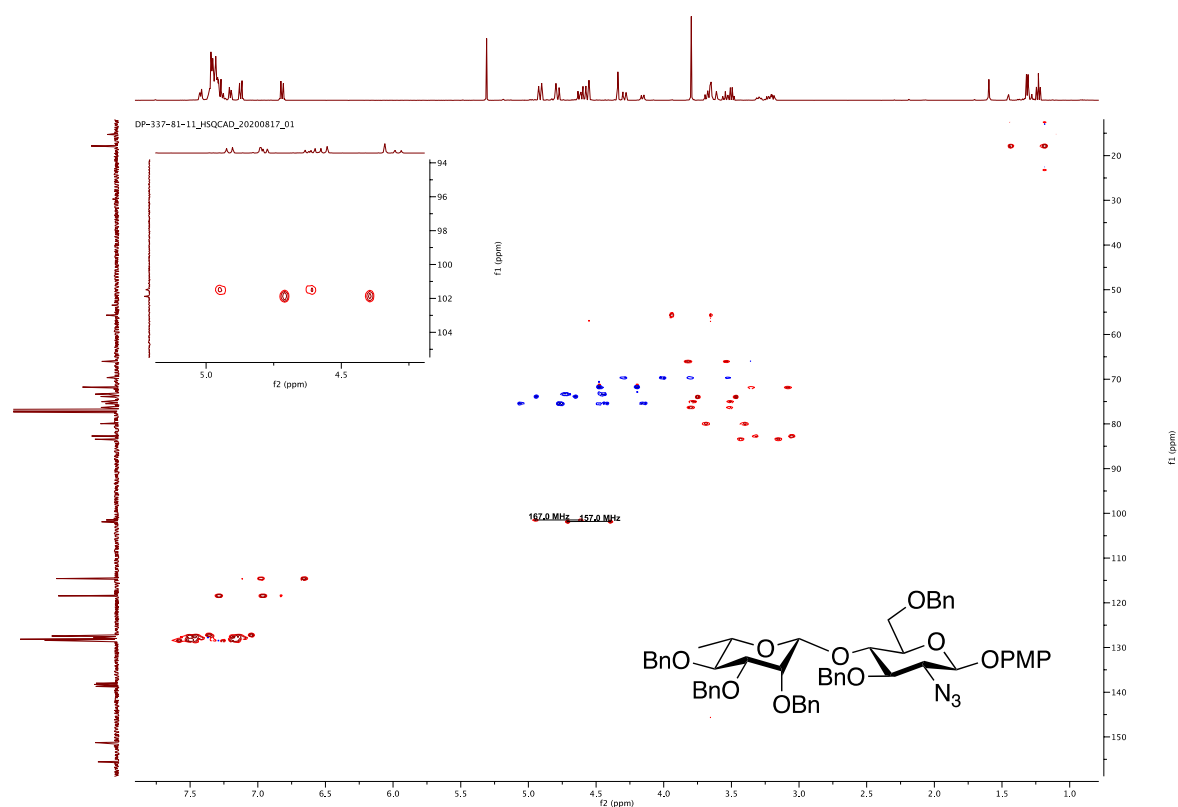
DP-337-81-11_CARBON_20200817_01



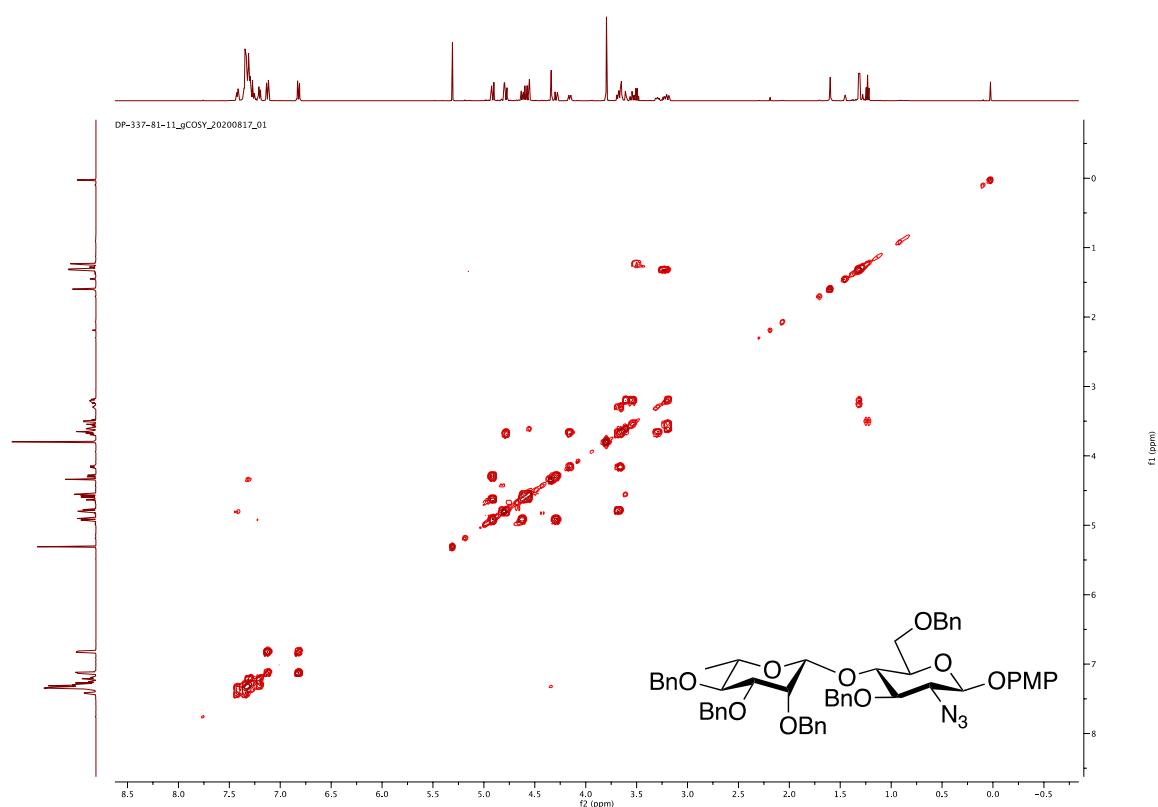
^{13}C - ^1H decoupled HSQC (500 x 126 MHz, Chloroform-*d*) 5h



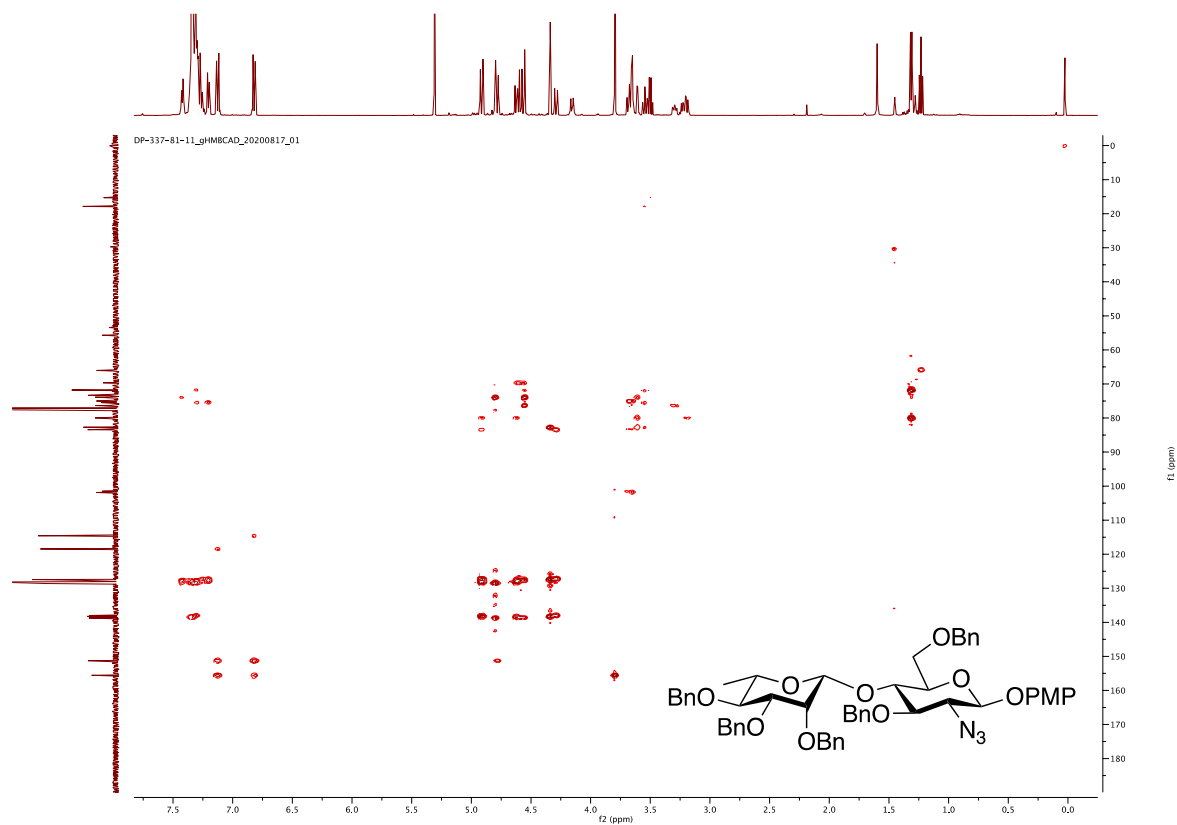
^{13}C - ^1H coupled HSQC (500 x 126 MHz, Chloroform-*d*) 5h



COSY (500 x 500 MHz, Chloroform-*d*) 5h

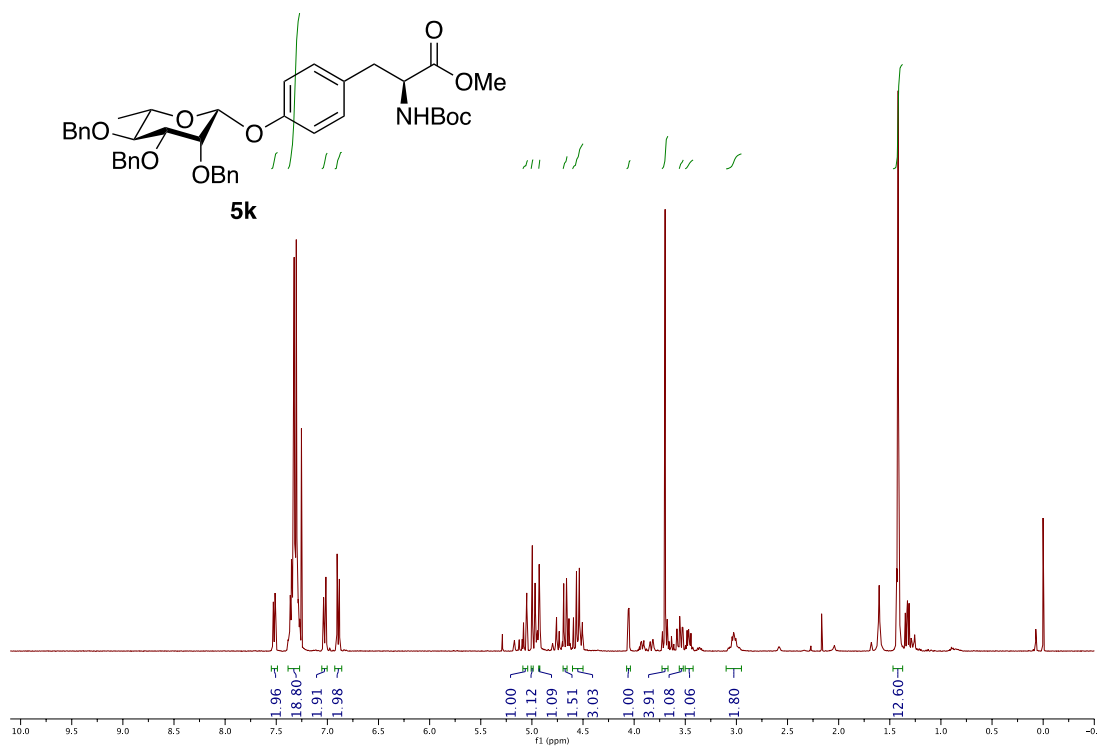


HMBC (500 x 126 MHz, Chloroform-*d*) 5h



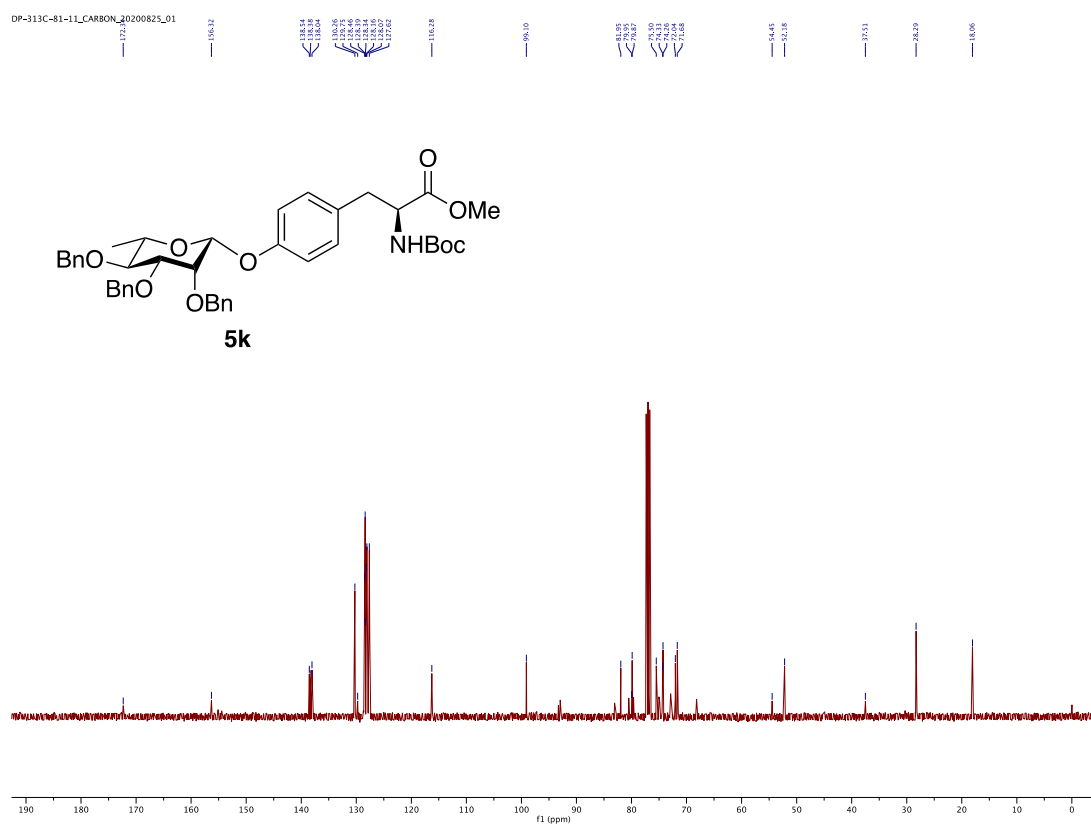
¹H NMR (500 MHz, Chloroform-*d*) 5k

DP-313C-81-11_PROTON_20200825_01

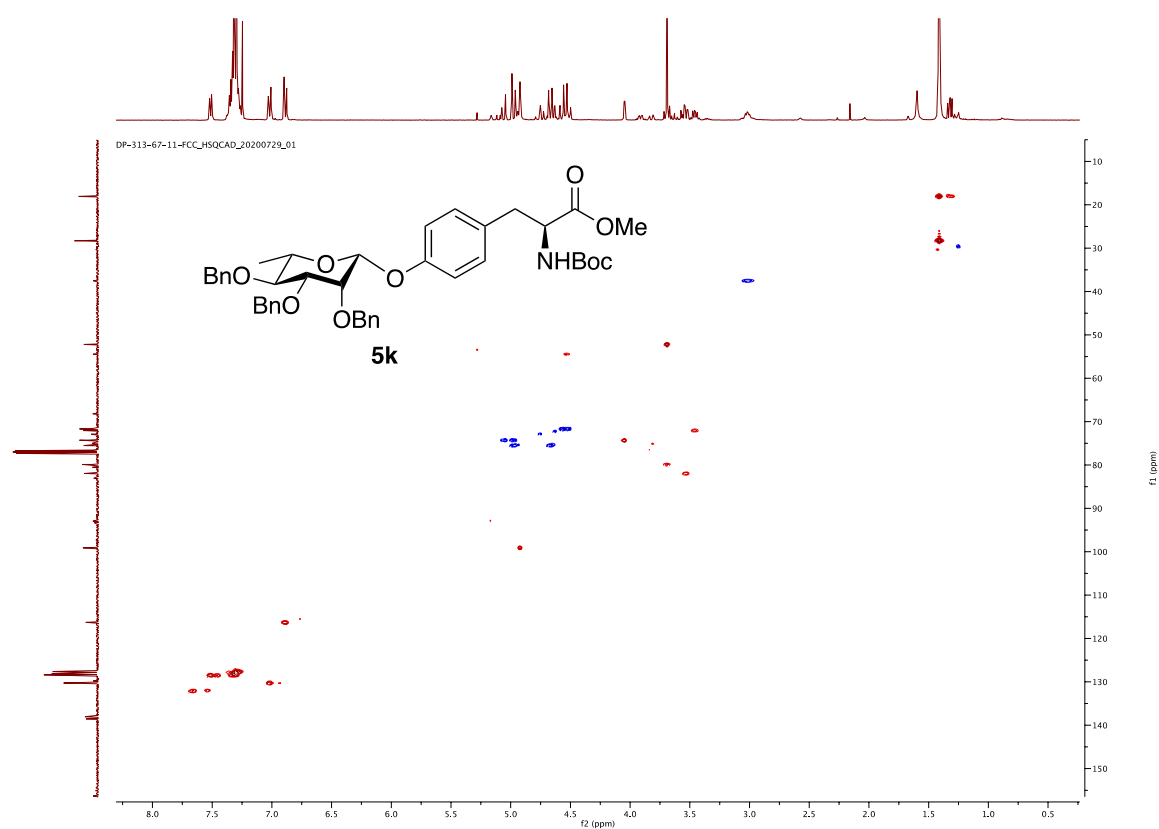


¹³C (500 MHz, Chloroform-*d*) 5k

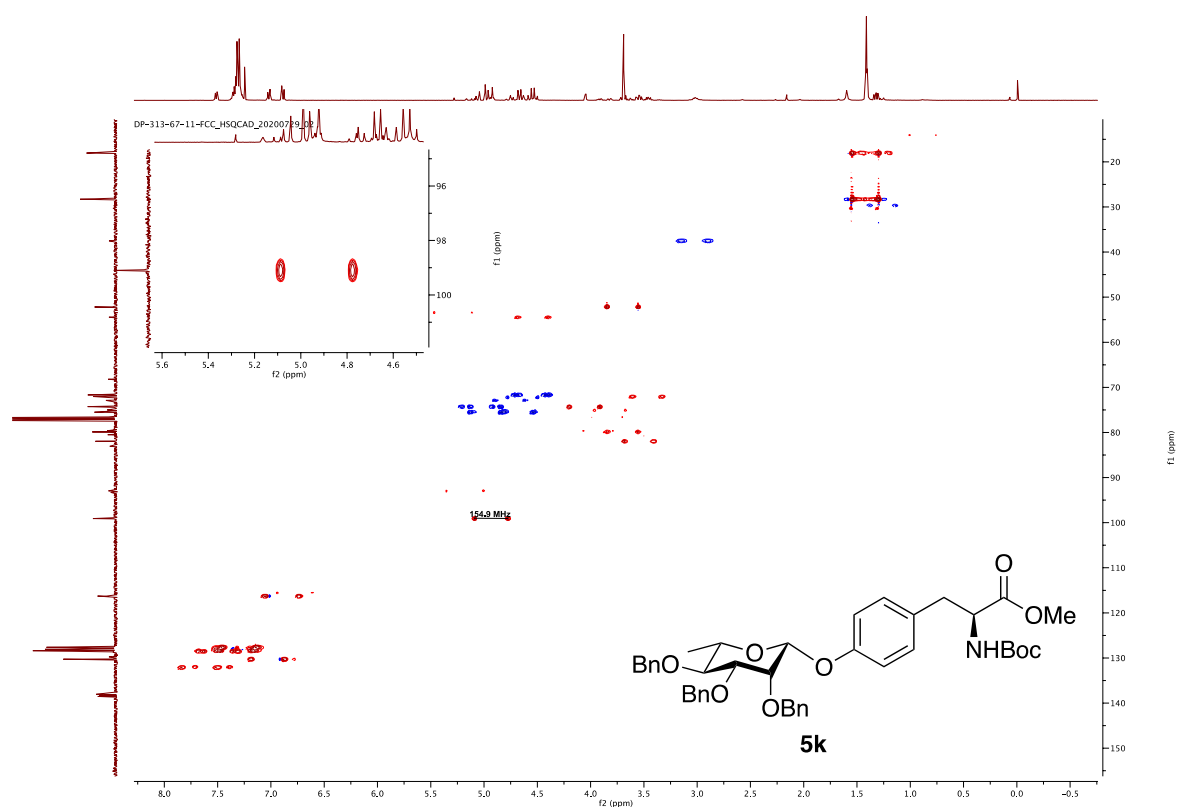
DP-313C-81-11_CARBON_20200825_01



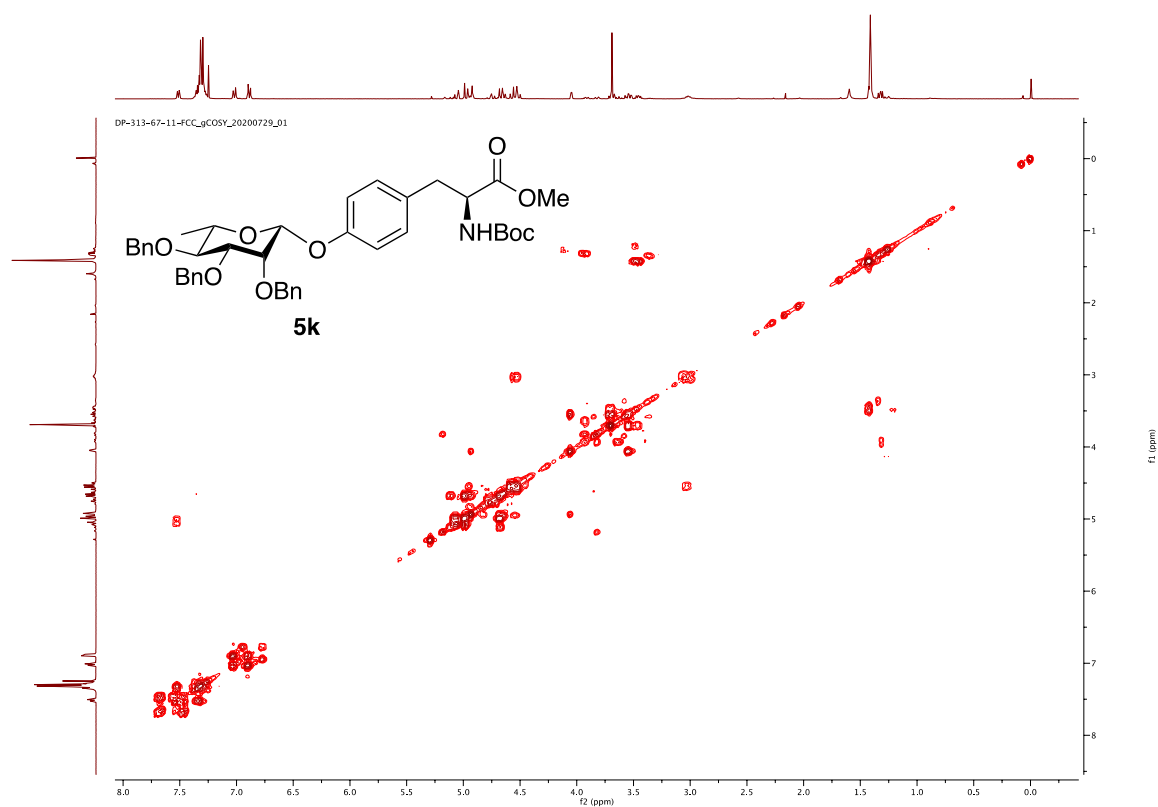
^{13}C - ^1H decoupled HSQC (500 x 126 MHz, Chloroform-*d*) 5k



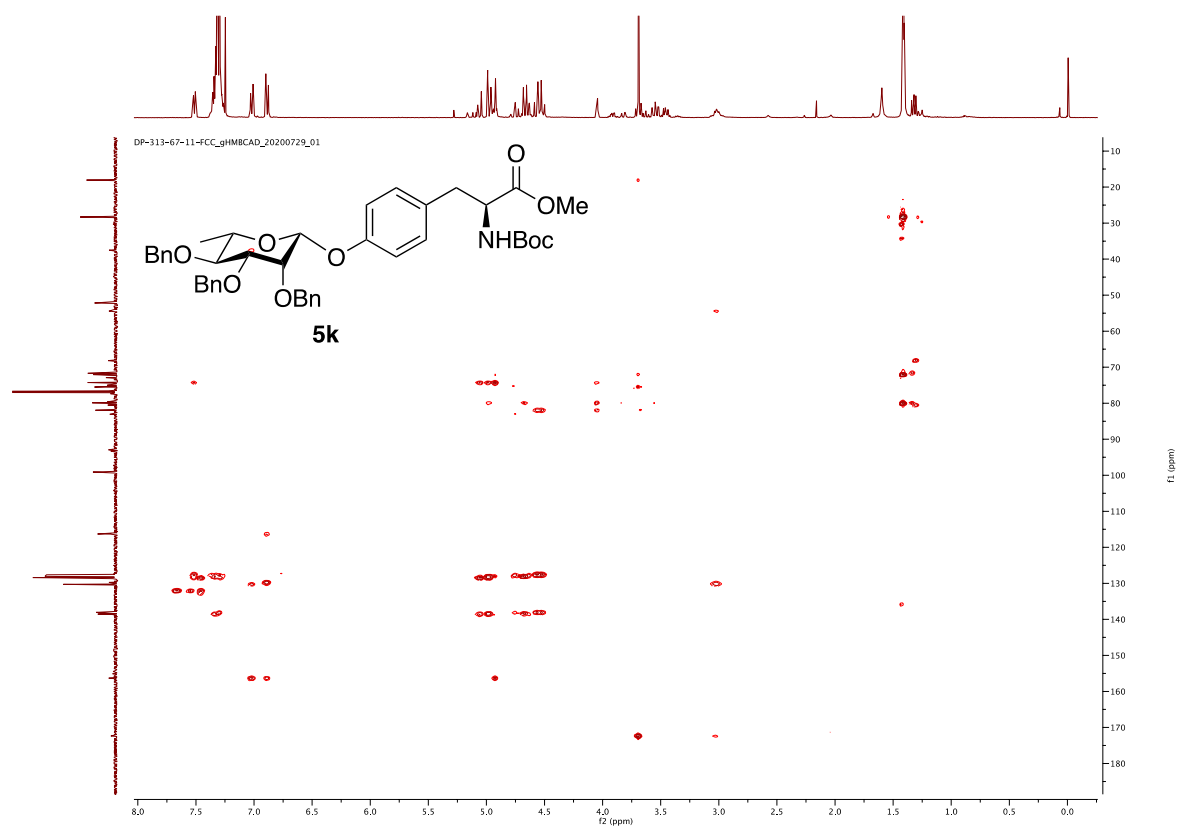
^{13}C - ^1H coupled HSQC (500 x 126 MHz, Chloroform-*d*) 5k



COSY (500 x 500 MHz, Chloroform-*d*) 5k

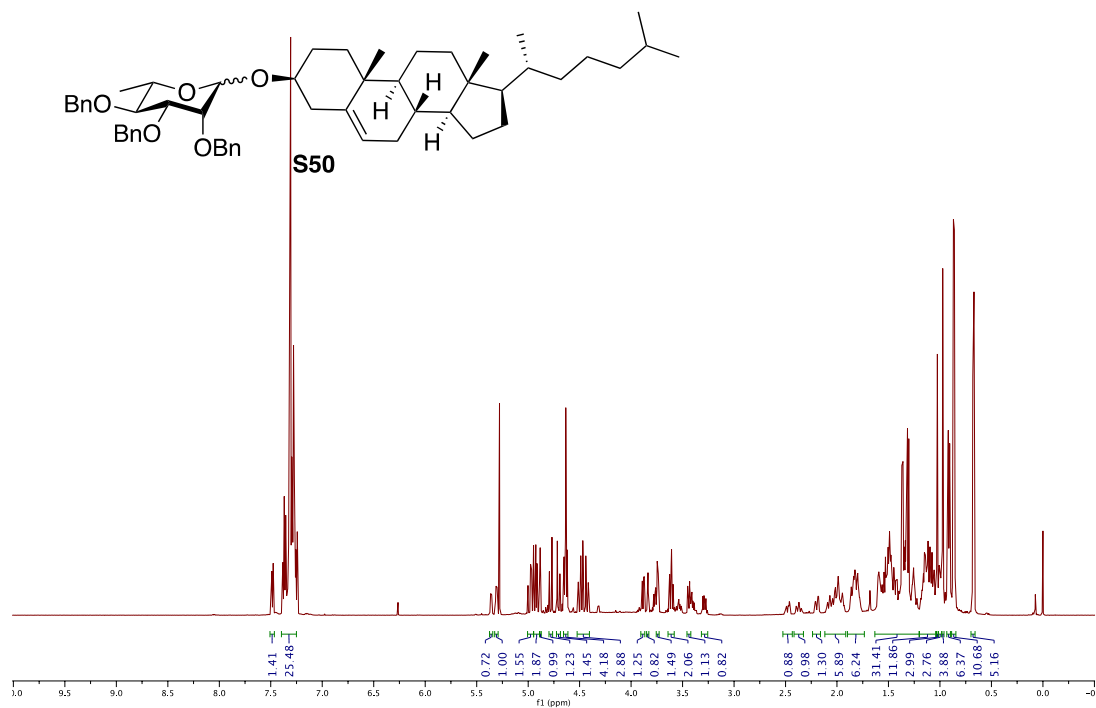


HMBC (500 x 126 MHz, Chloroform-*d*) 5k



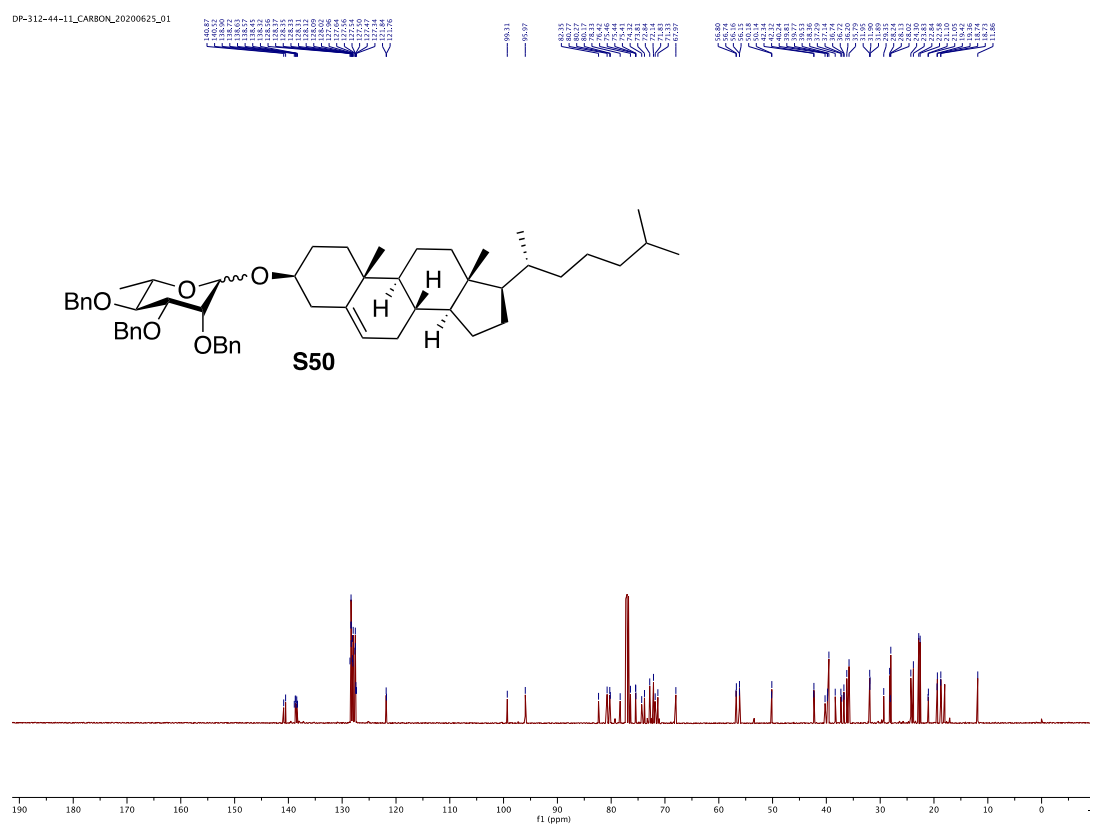
¹H NMR (500 MHz, Chloroform-*d*) S50

DP-312-44-11_PROTON_20200625_01

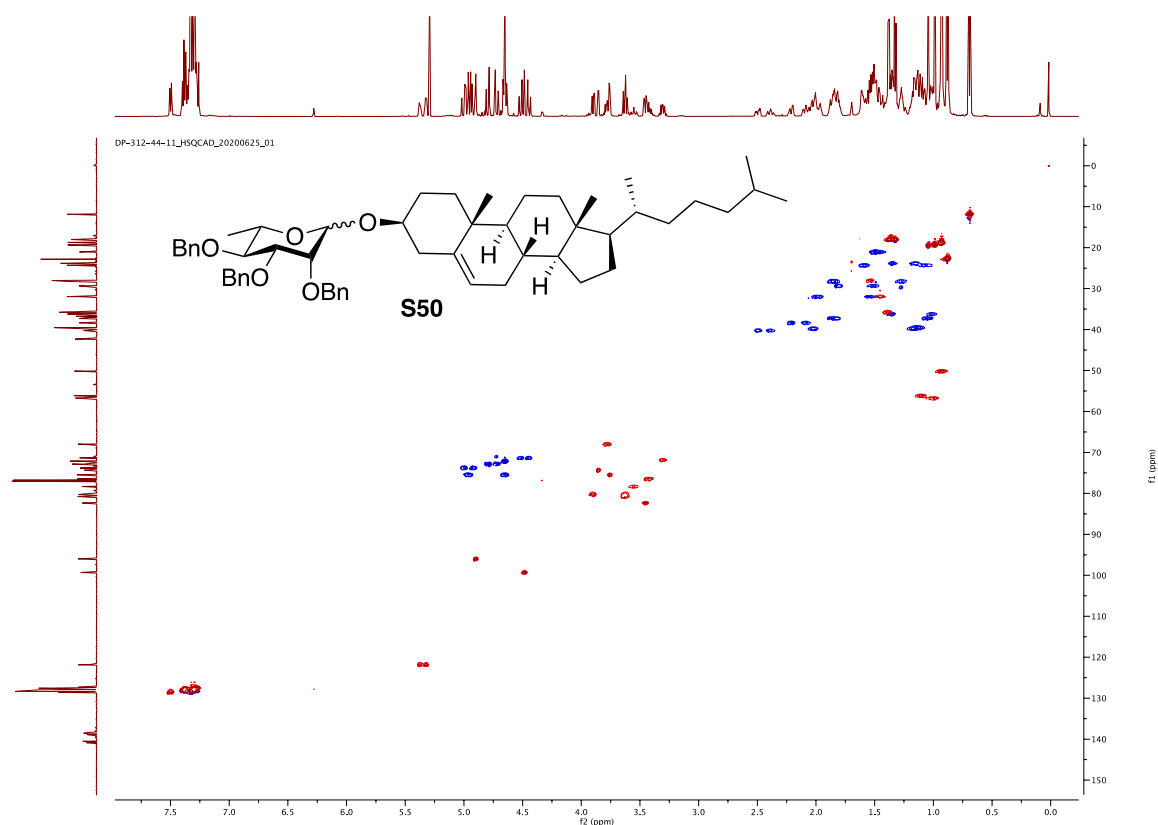


¹³C NMR (101 MHz, Chloroform-*d*) S50

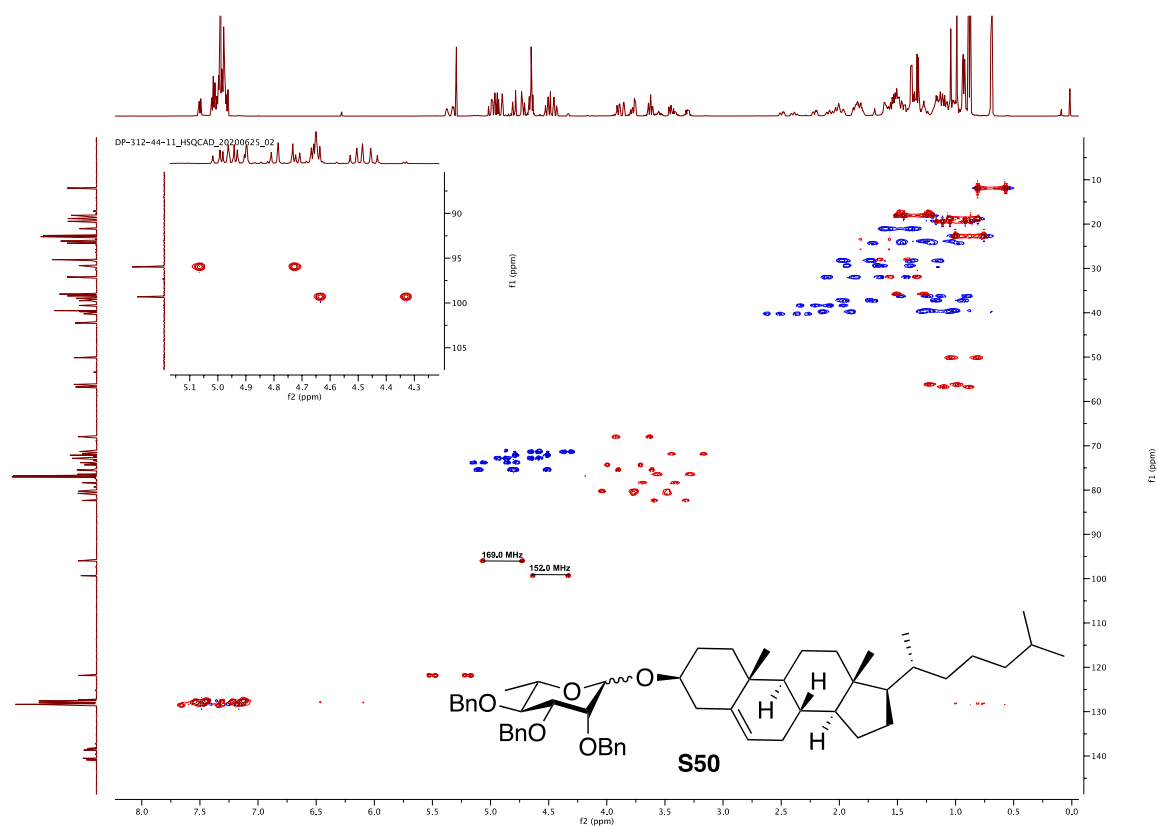
DP-312-44-11_CARBON_20200625_01



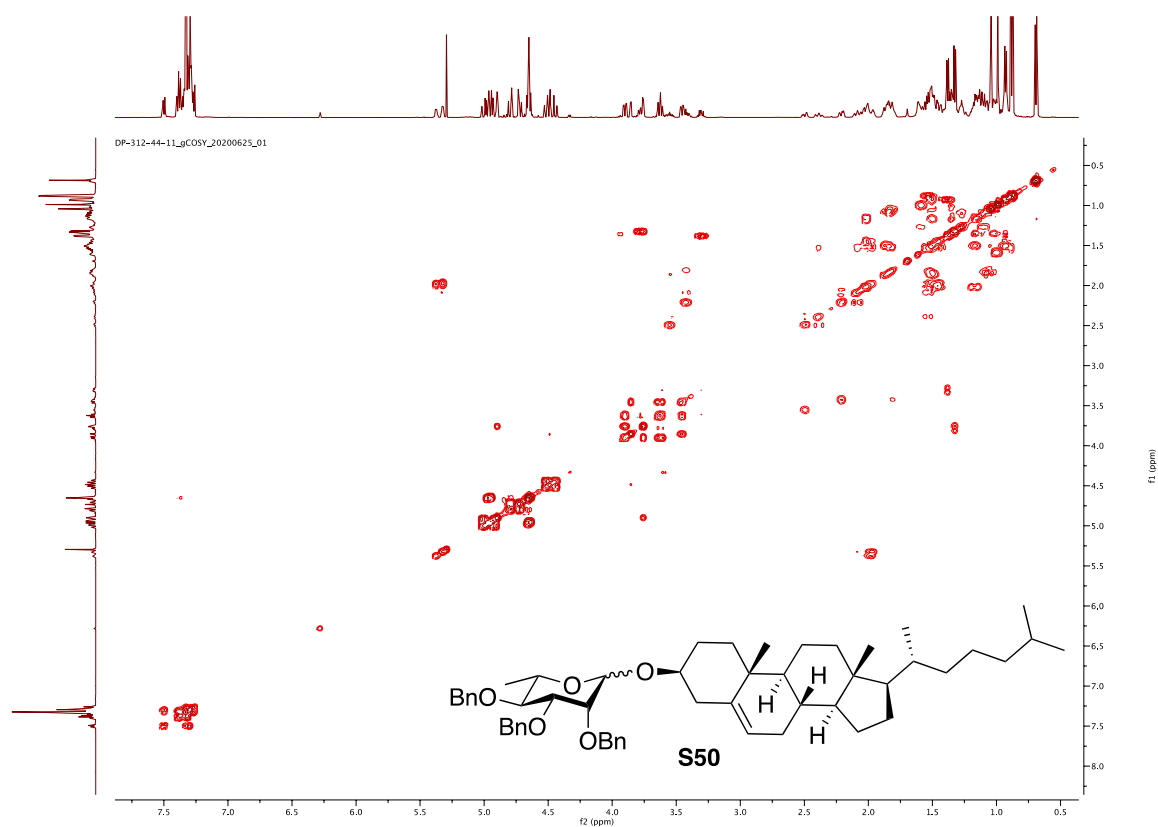
^{13}C - ^1H decoupled HSQC (500 x 126 MHz, Chloroform-*d*) S50



^{13}C - ^1H coupled HSQC (500 x 126 MHz, Chloroform-*d*) S50



COSY (500 x 500 MHz, Chloroform-*d*) S50



HMBC (500 x 126 MHz, Chloroform-*d*) S50

