SUPPORTING INFORMATION

Identification of Spirodioxolane nsP2 Helicase Inhibitors with Antialphaviral Activity

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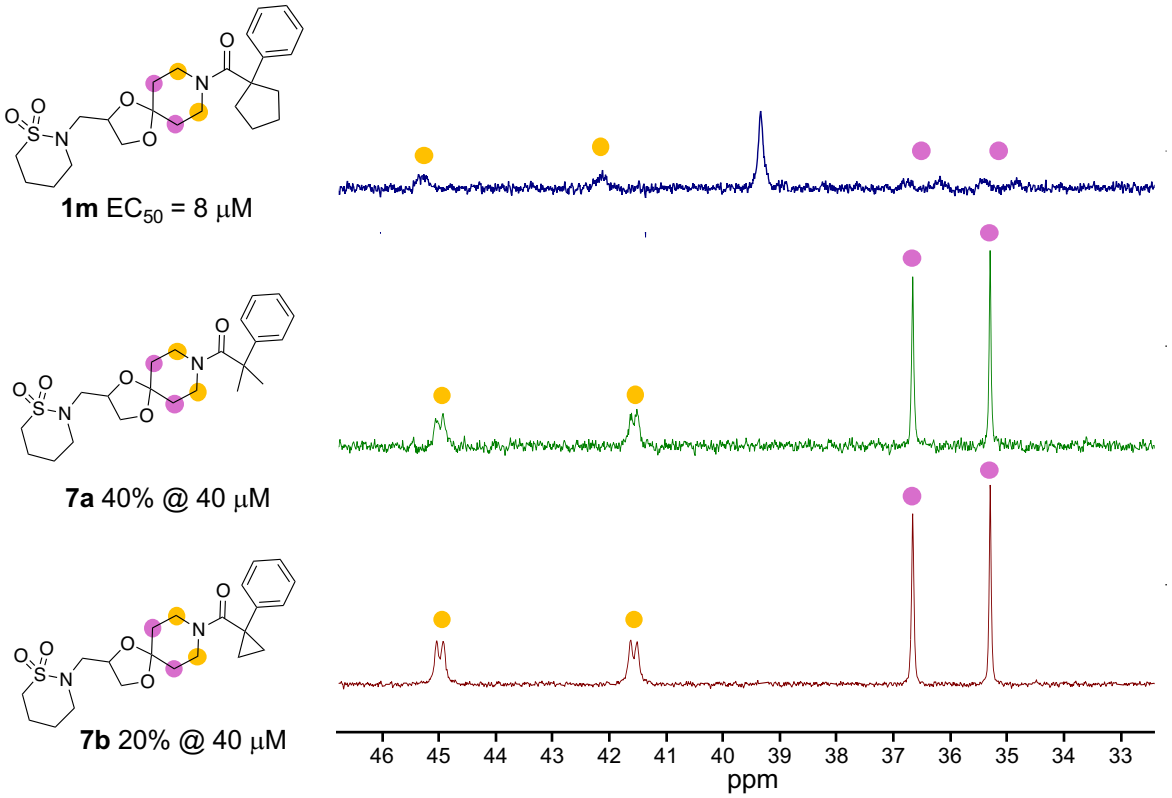
Fig. S1 ^{13}C NMR of Spirodioxolanes



^{13}C NMR spectra recorded at 126 MHz in CD_3OD at 25 ºC. The region from 33–46 ppm is displayed, which contains the signals for the carbons on the piperidine ring (orange and magenta dots). For active analog **1m** (CHIKV-nLuc EC_{50} = 8 μM)**,** signals from the four piperidine carbons are broad. The signal at 39.3 ppm is from two carbons of the cyclopentane ring. With weakly active analogs **7a** and **7b** (CHIKV-nLuc <50% at 40 μM), sharp signals are seen from the carbons adjacent to the nitrogen of the piperidine (magenta dots) while the other piperidine carbons (orange dots) appear as doublets.

NMR Spectra of Final Compounds

Figure S2: ^{1}H NMR (500 MHz, CD_3OD) for intermediate **II**

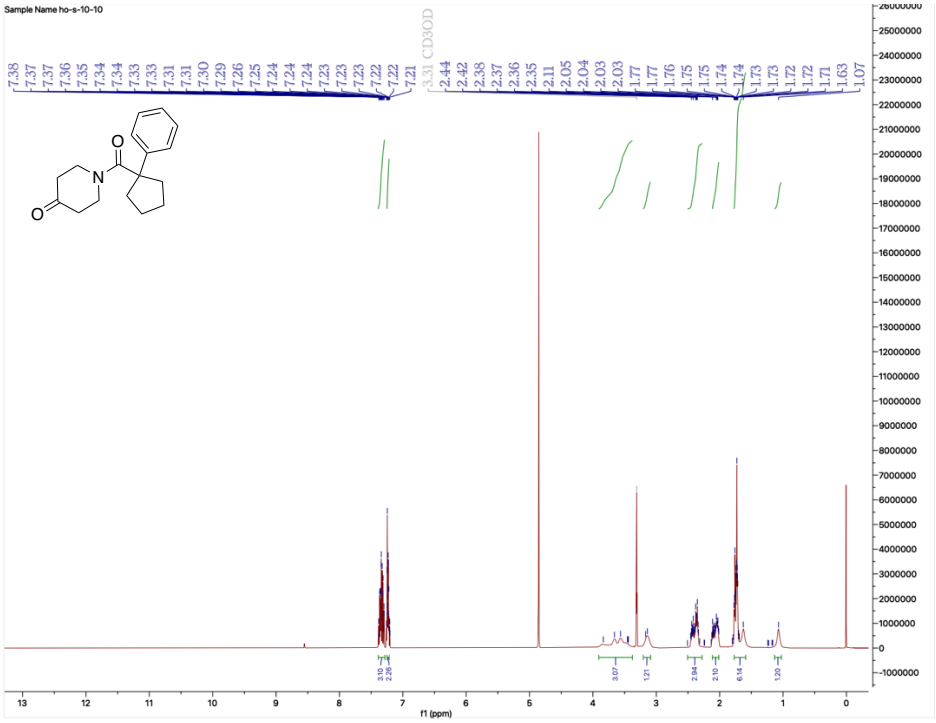


Figure S3: ^{13}C NMR (126 MHz, CD_3OD) for intermediate **II**

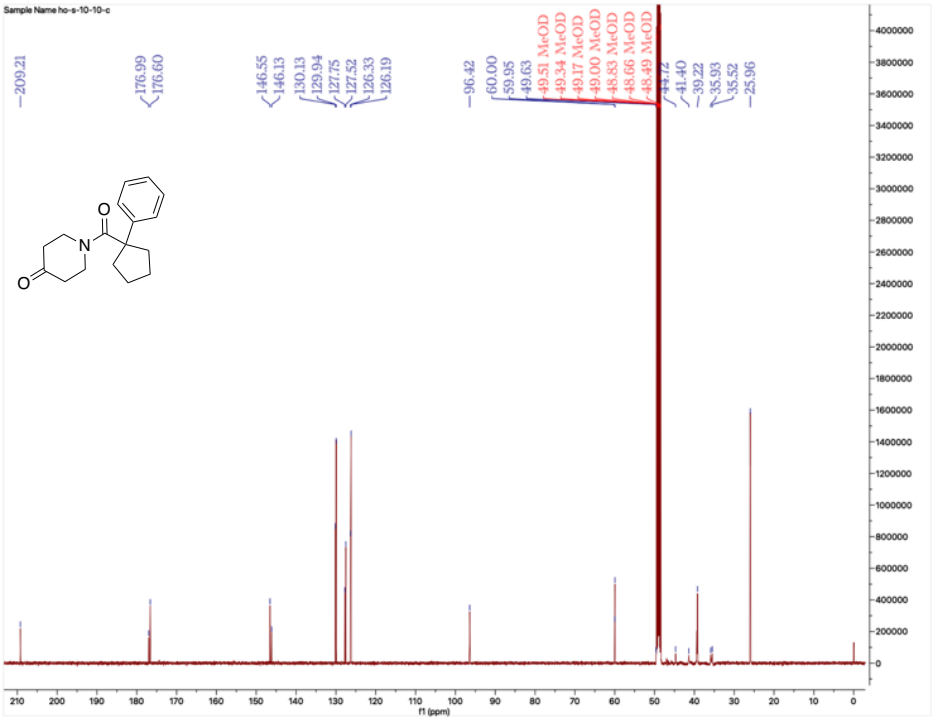


Figure S4: ^{1}H NMR (500 MHz, CD_3OD) for **1a**

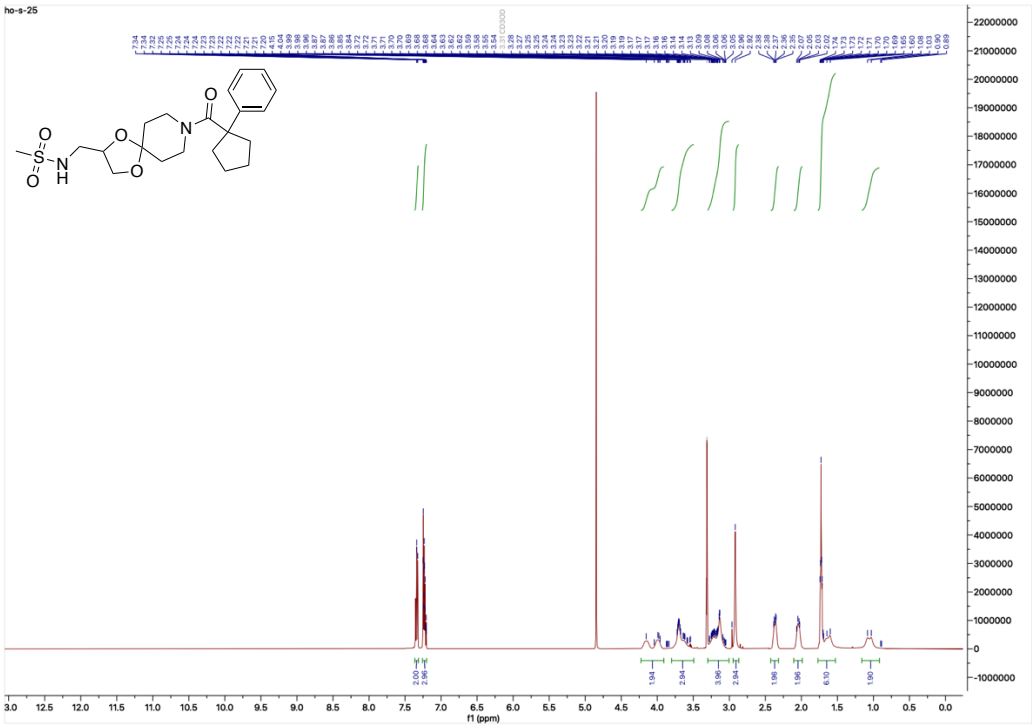


Figure S5: ^{13}C NMR (126 MHz, CD_3OD) for **1a**

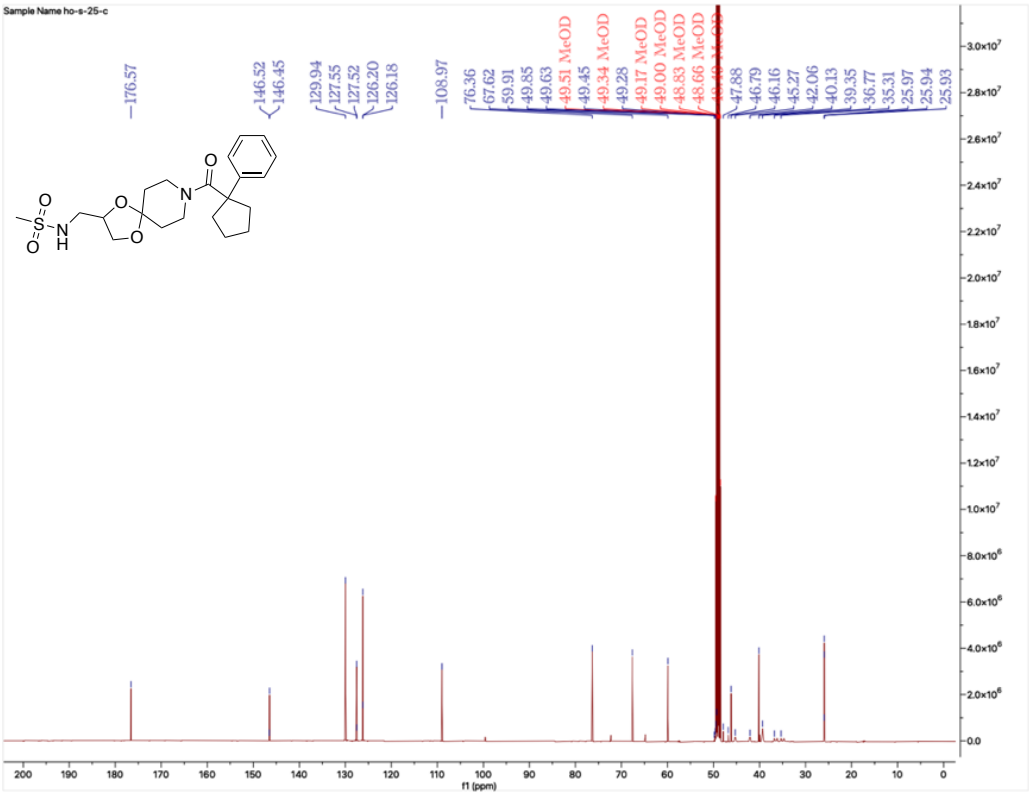


Figure S6: ^{1}H NMR (500 MHz, CD_3OD) for **1b**

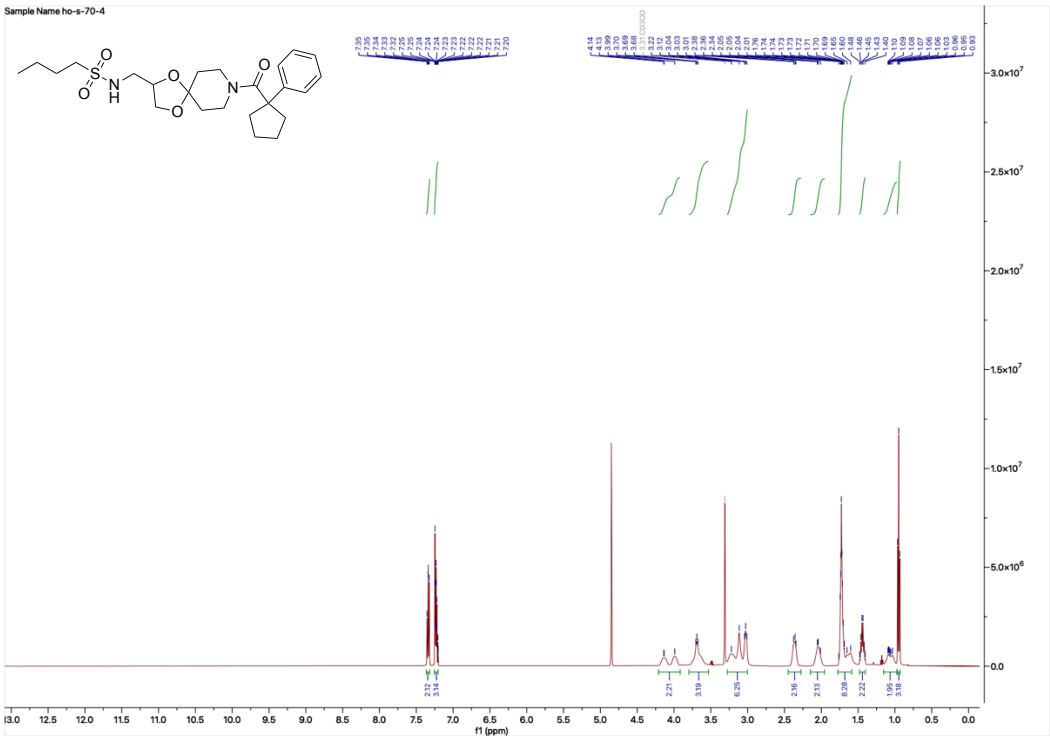


Figure S7: ^{13}C NMR (126 MHz, CD_3OD) for **1b**

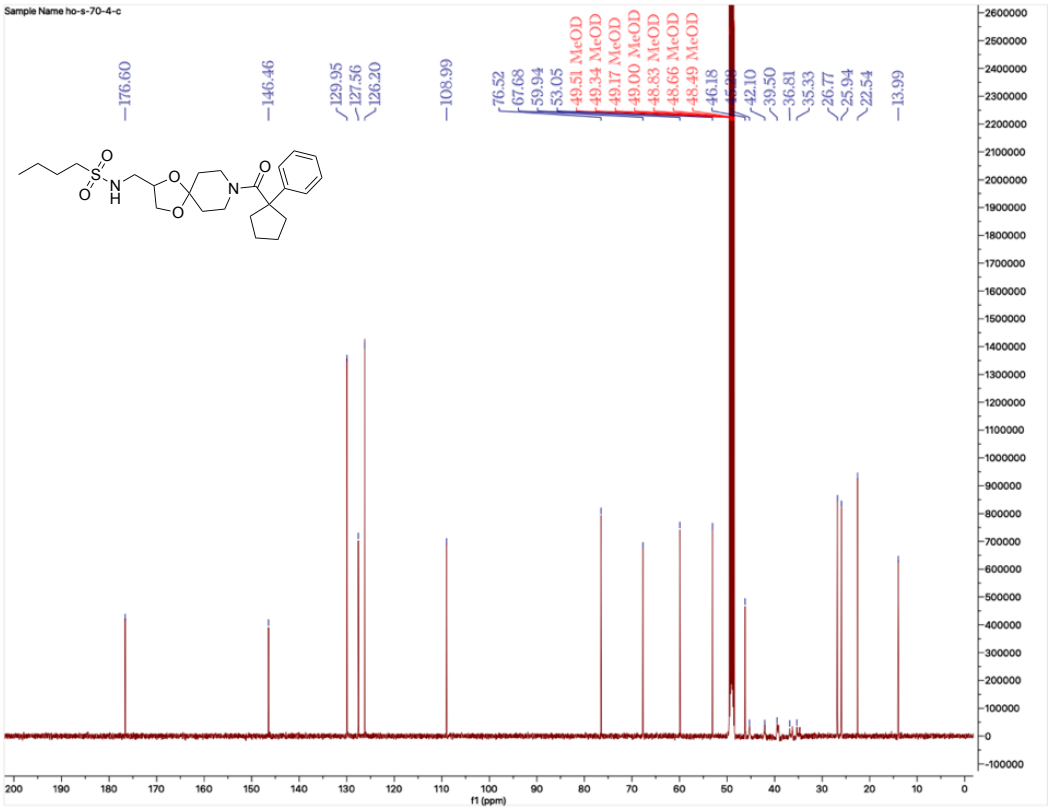


Figure S8: ^{1}H NMR (500 MHz, CD_3OD) for **1c**

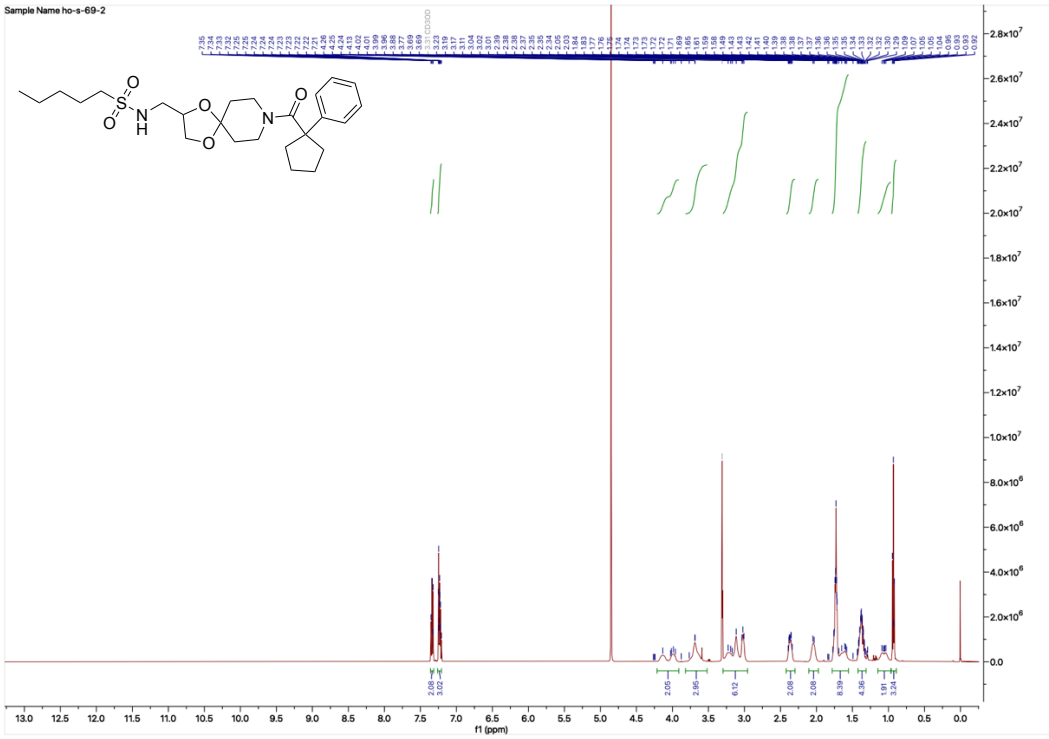


Figure S9: ^{13}C NMR (126 MHz, CD_3OD) for **1c**

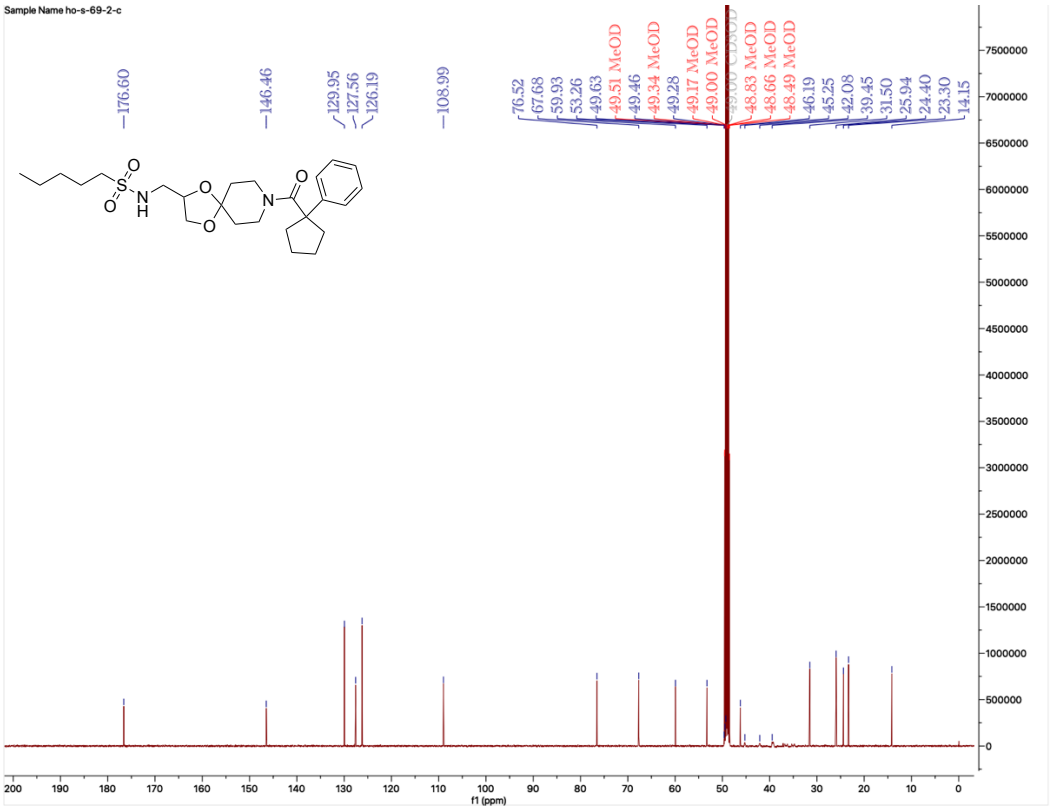


Figure S10: ^{1}H NMR (500 MHz, CD_3OD) for **1d**

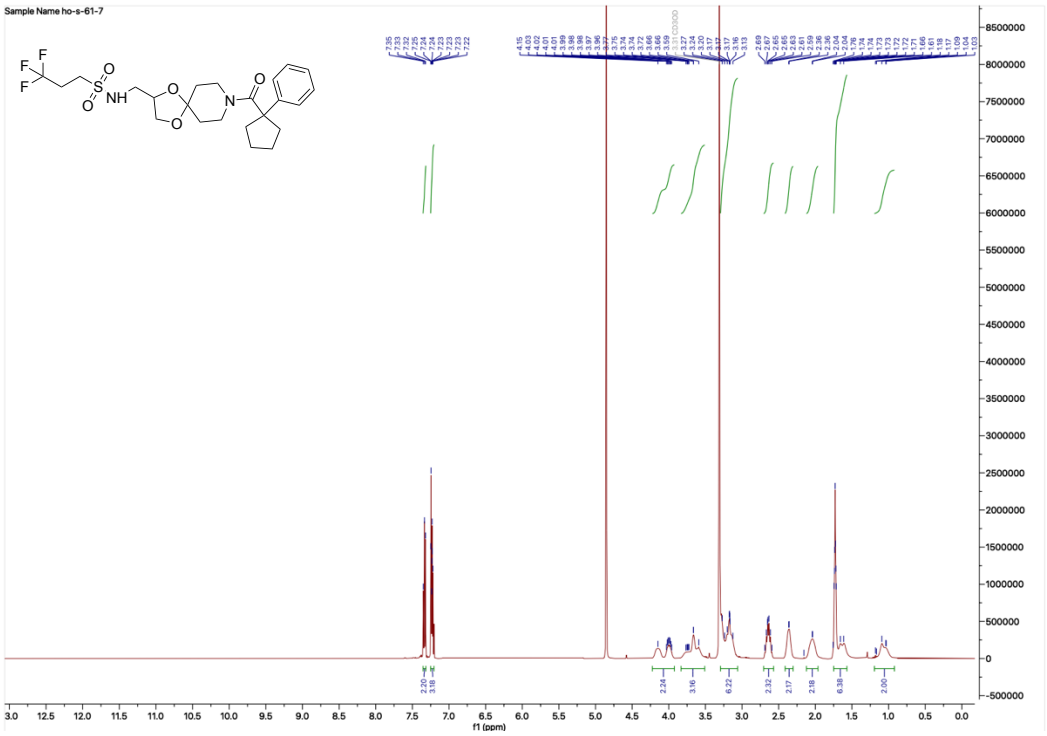


Figure S11: ^{13}C NMR (126 MHz, CD_3OD) for **1d**

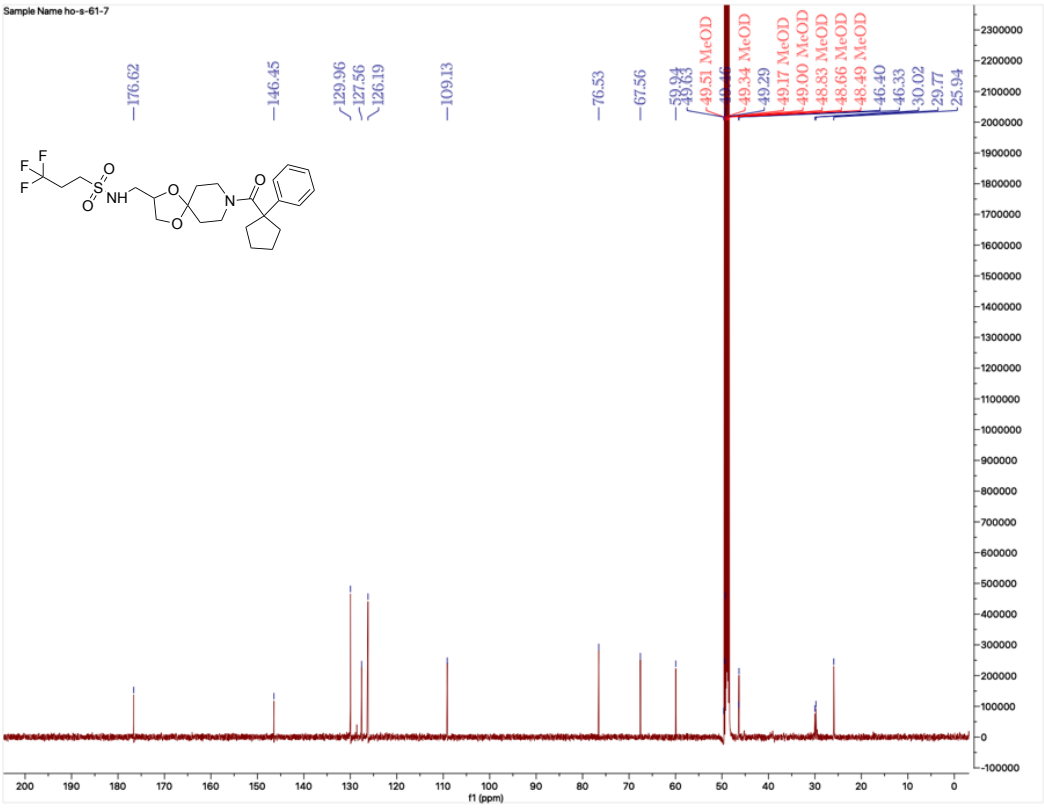


Figure S12: ^{1}H NMR (500 MHz, CD_3OD) for **1e**

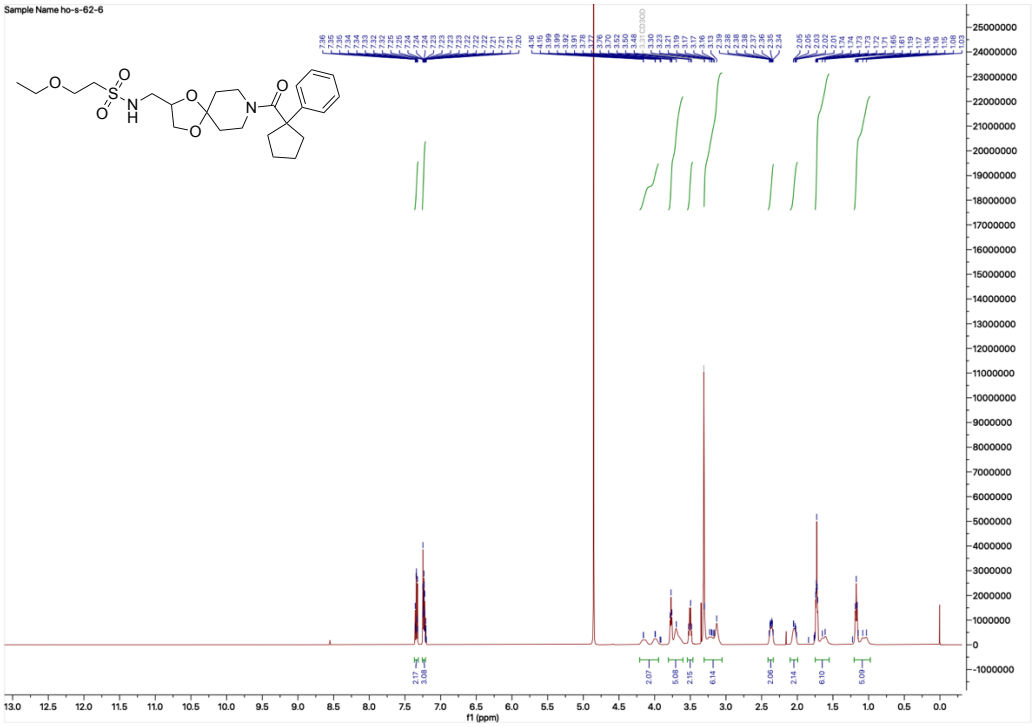


Figure S13: ^{13}C NMR (126 MHz, CD_3OD) for **1e**

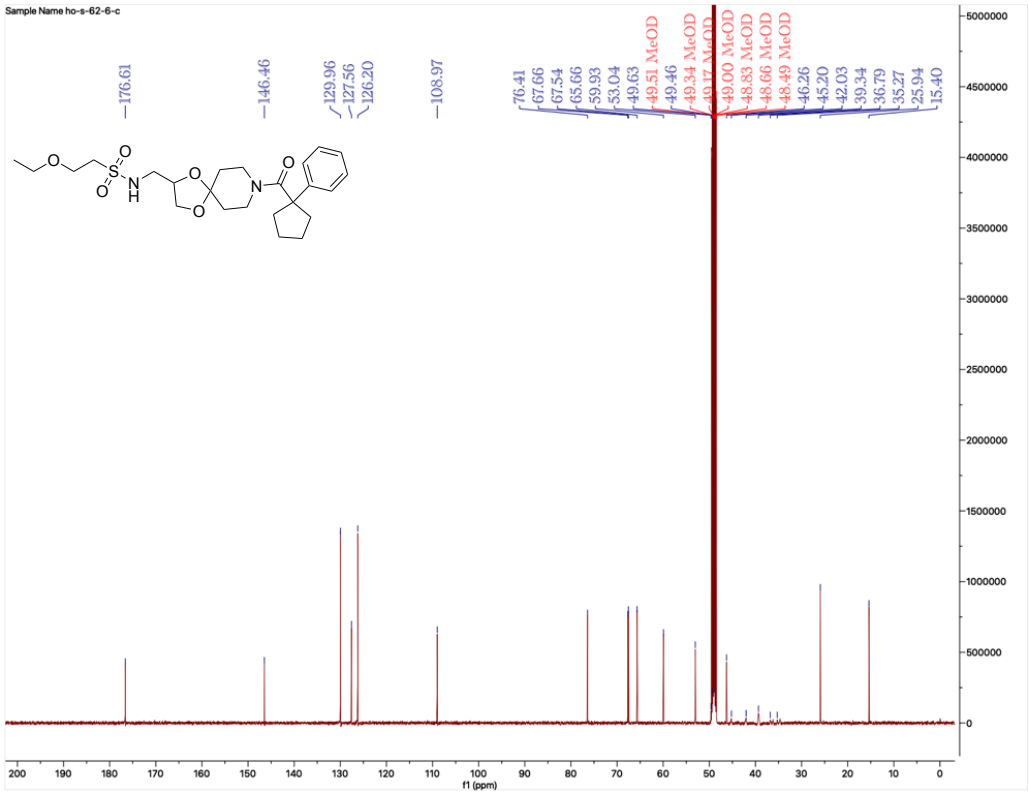


Figure S14: ^{1}H NMR (500 MHz, CD_3OD) for **1f**

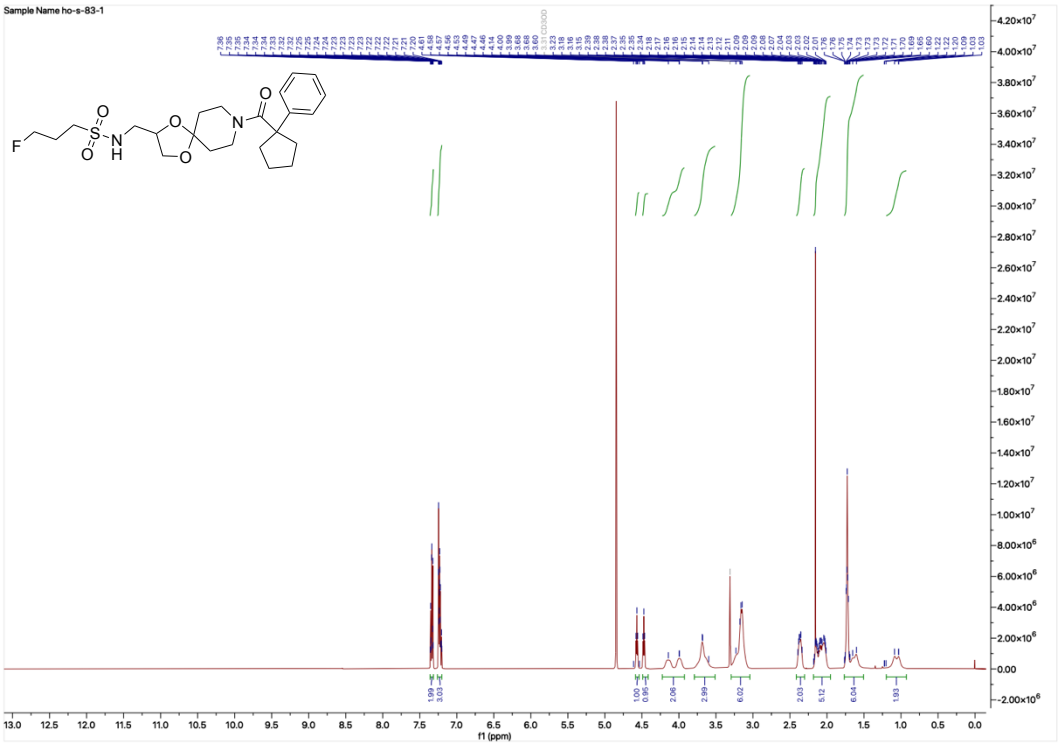


Figure S15: ^{13}C NMR (126 MHz, CD_3OD) for **1f**

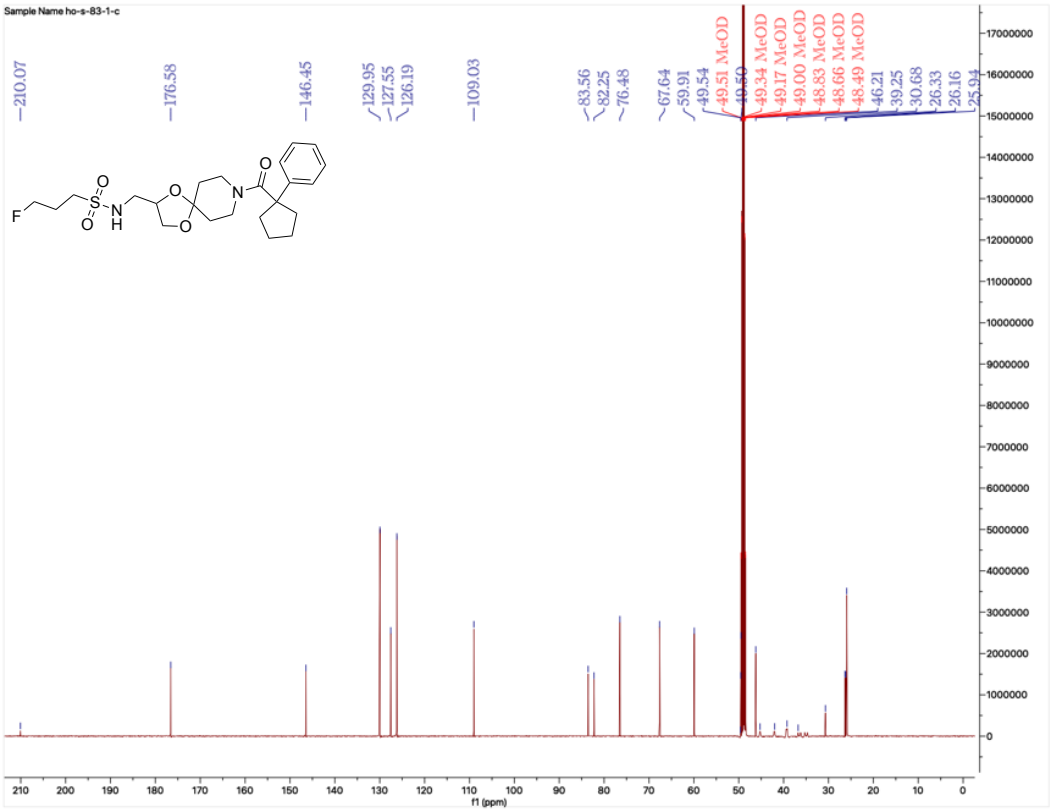


Figure S16: ^{1}H NMR (500 MHz, CD_3OD) for **1g**

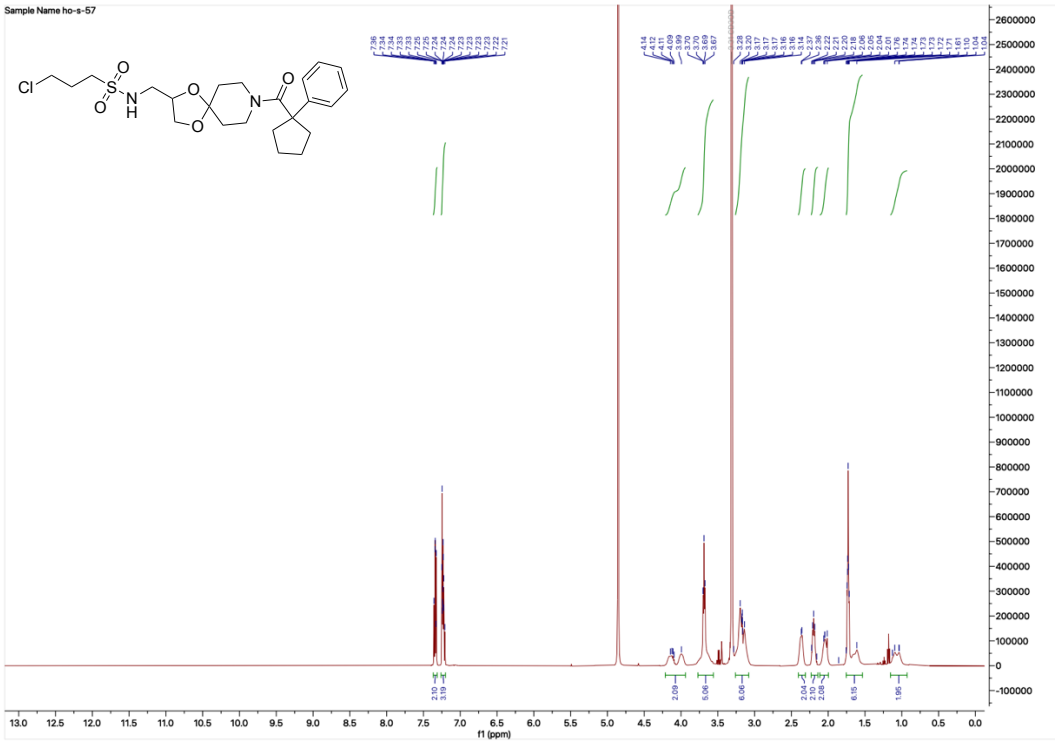


Figure S17: ^{13}C NMR (126 MHz, CD_3OD) for **1g**

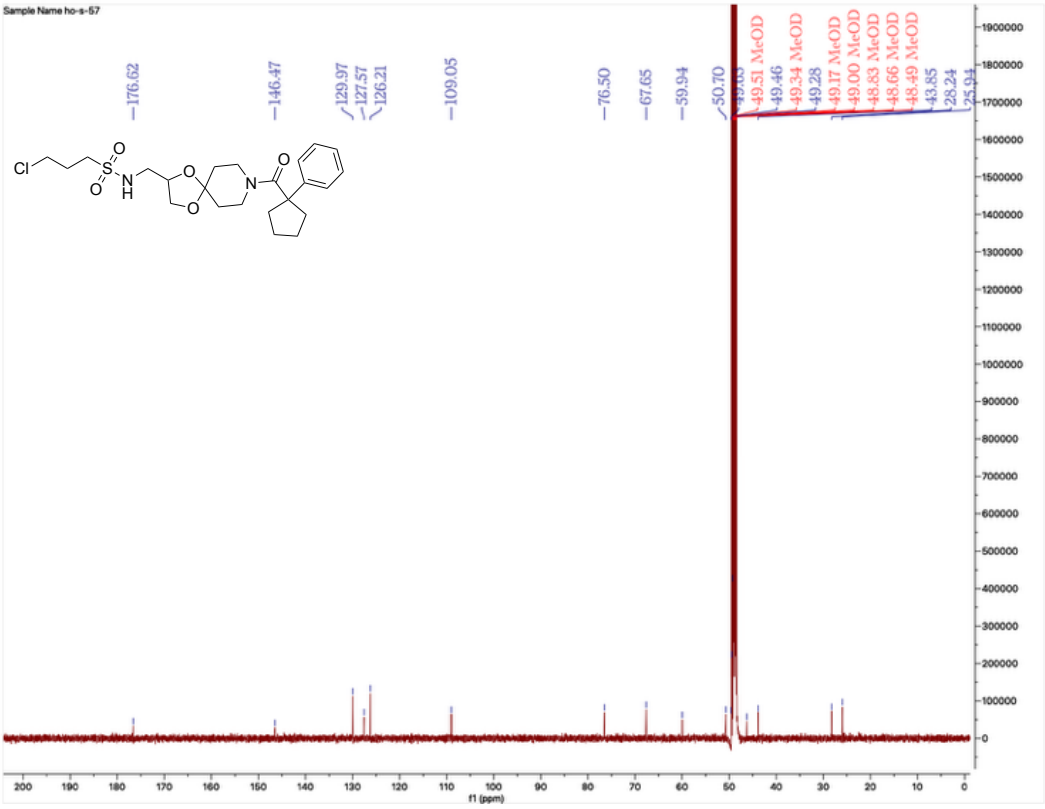


Figure S18: ^{1}H NMR (500 MHz, CD_3OD) for **1h**

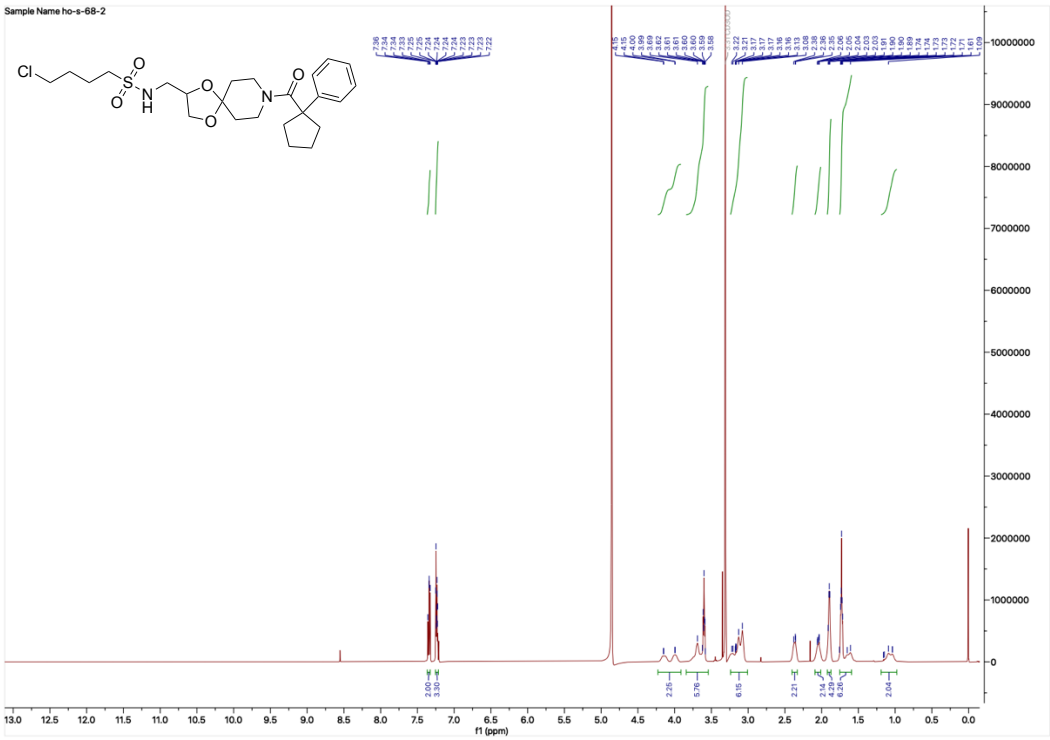


Figure S19: ^{13}C NMR (126 MHz, CD_3OD) for **1h**

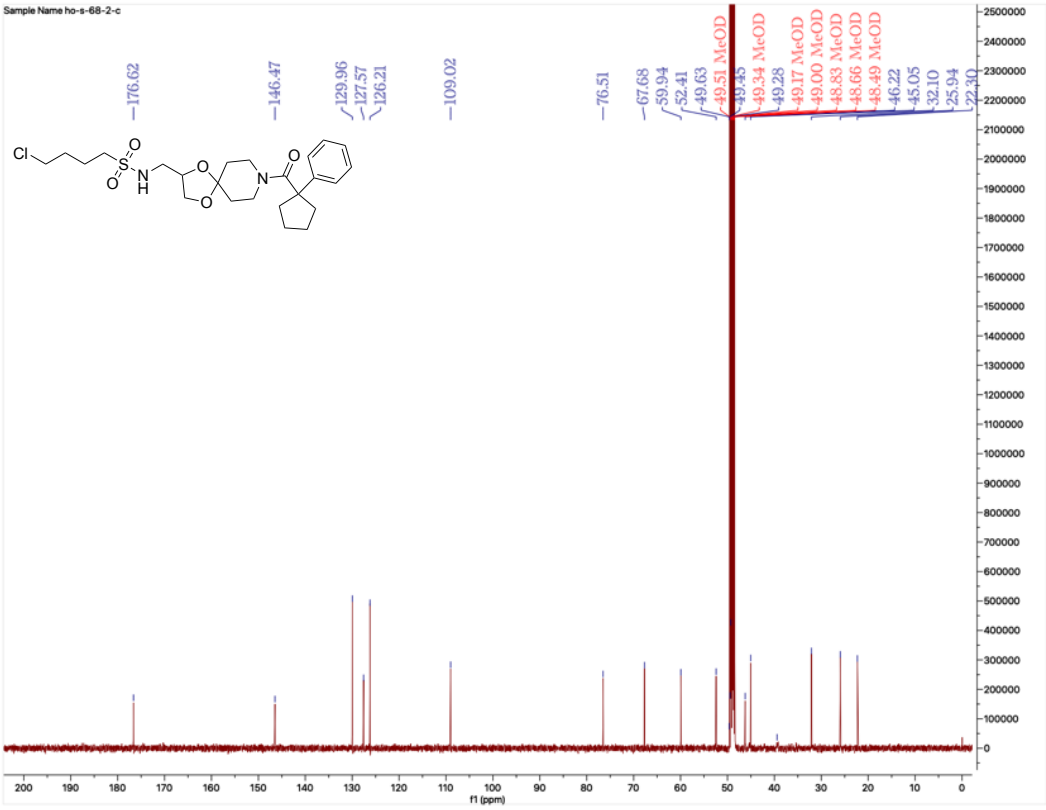


Figure S20: ^{1}H NMR (500 MHz, CD_3OD) for **1i**

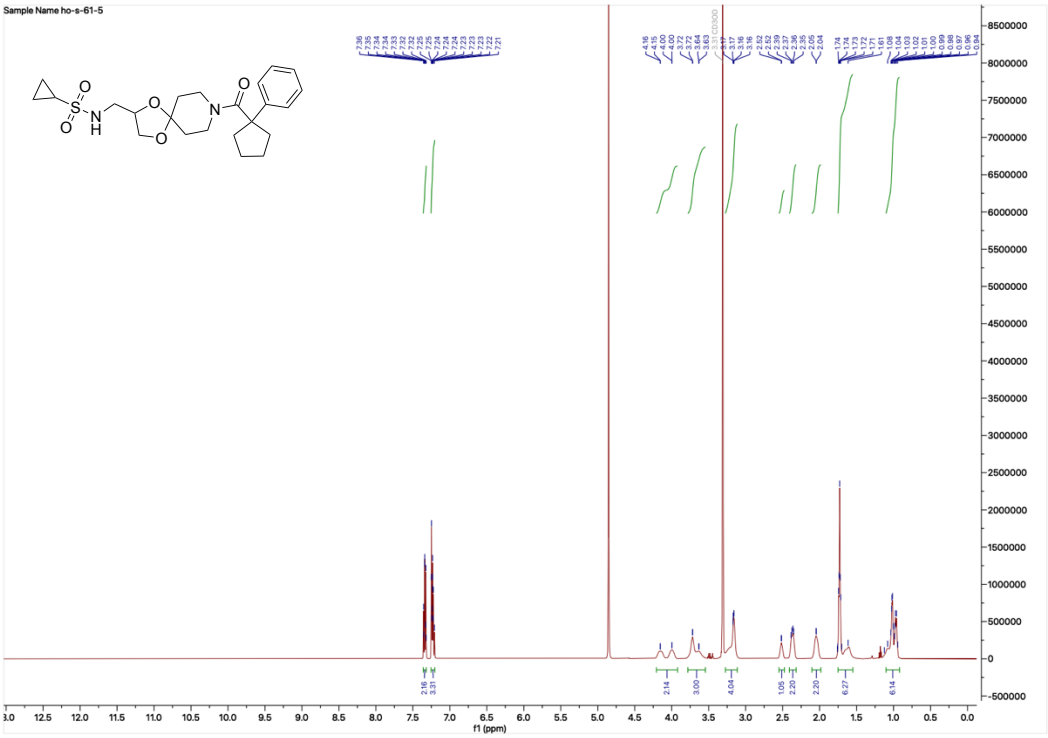


Figure S21: ^{13}C NMR (126 MHz, CD_3OD) for **1i**

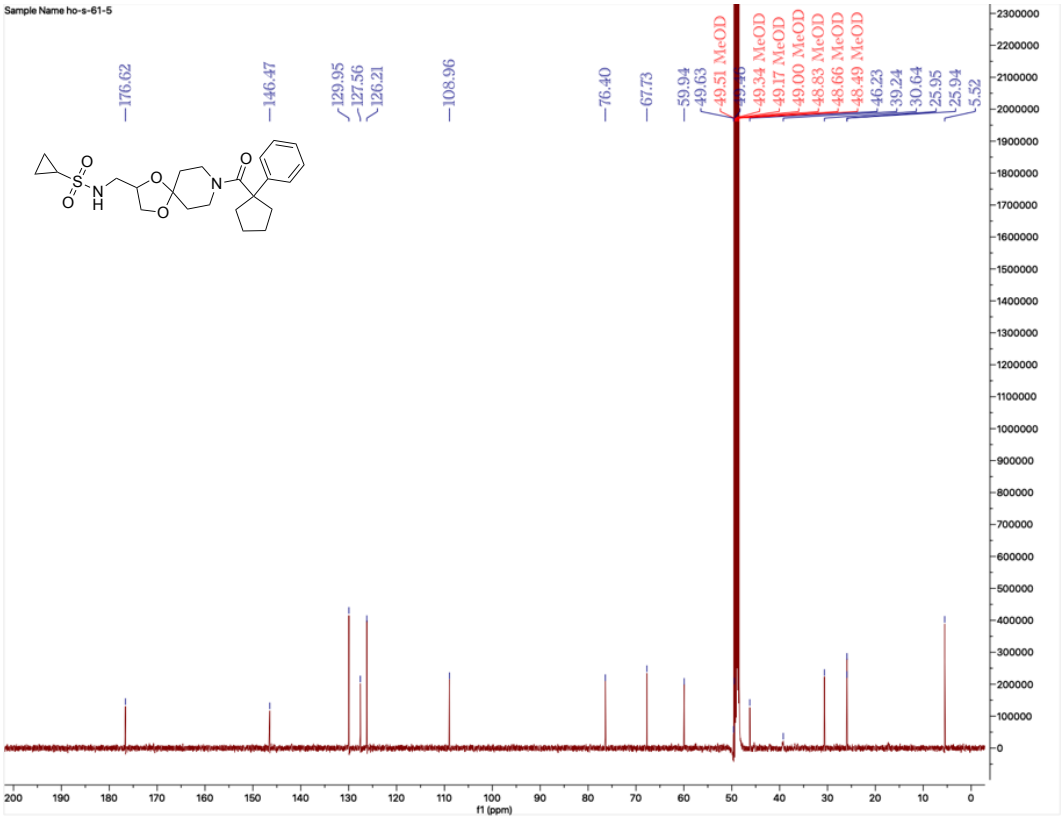


Figure S22: ^{1}H NMR (500 MHz, CD_3OD) for **1j**

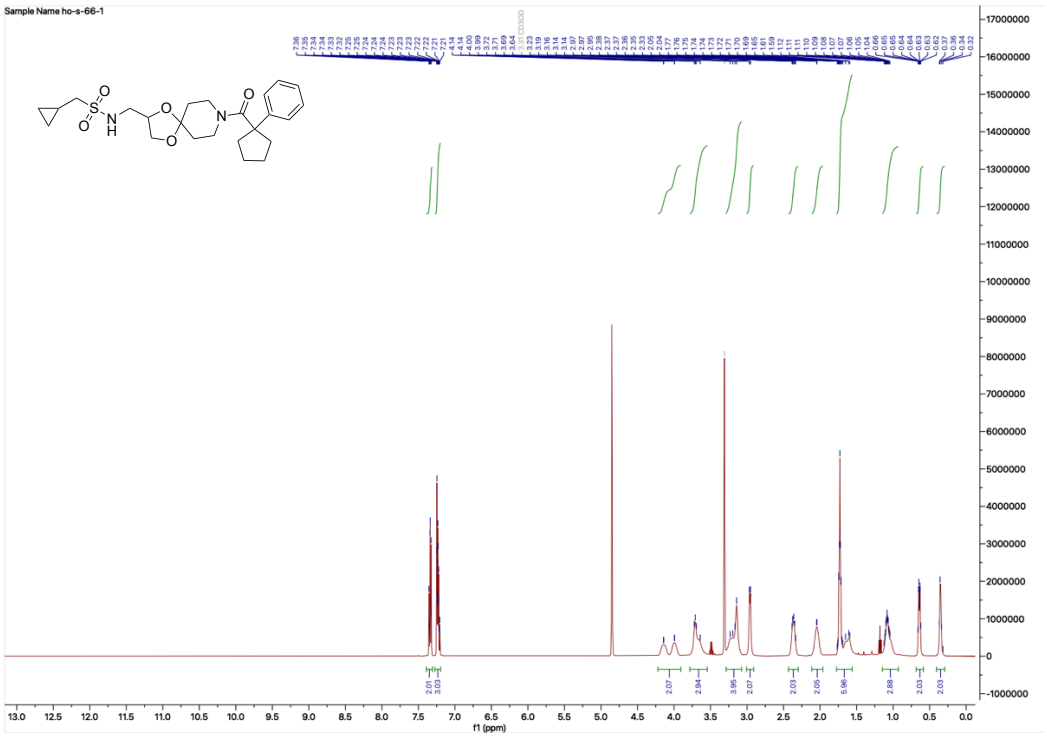


Figure S23: ^{13}C NMR (126 MHz, CD_3OD) for **1j**

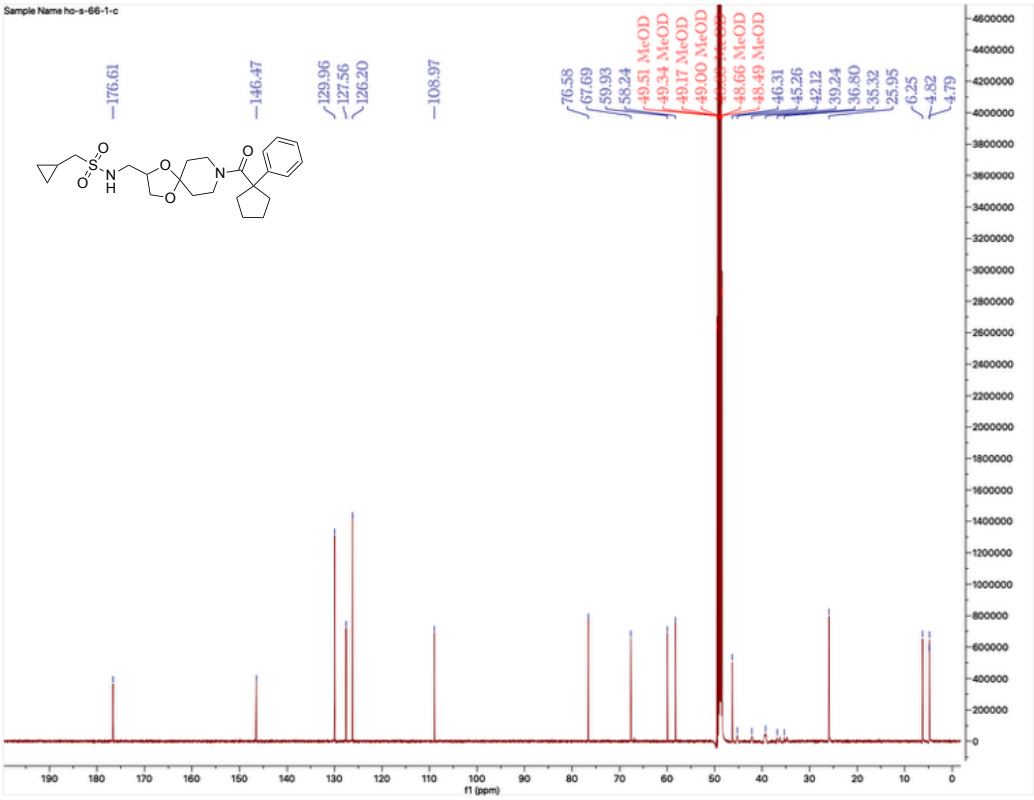


Figure S24: ^{1}H NMR (500 MHz, CD_3OD) for **1k**

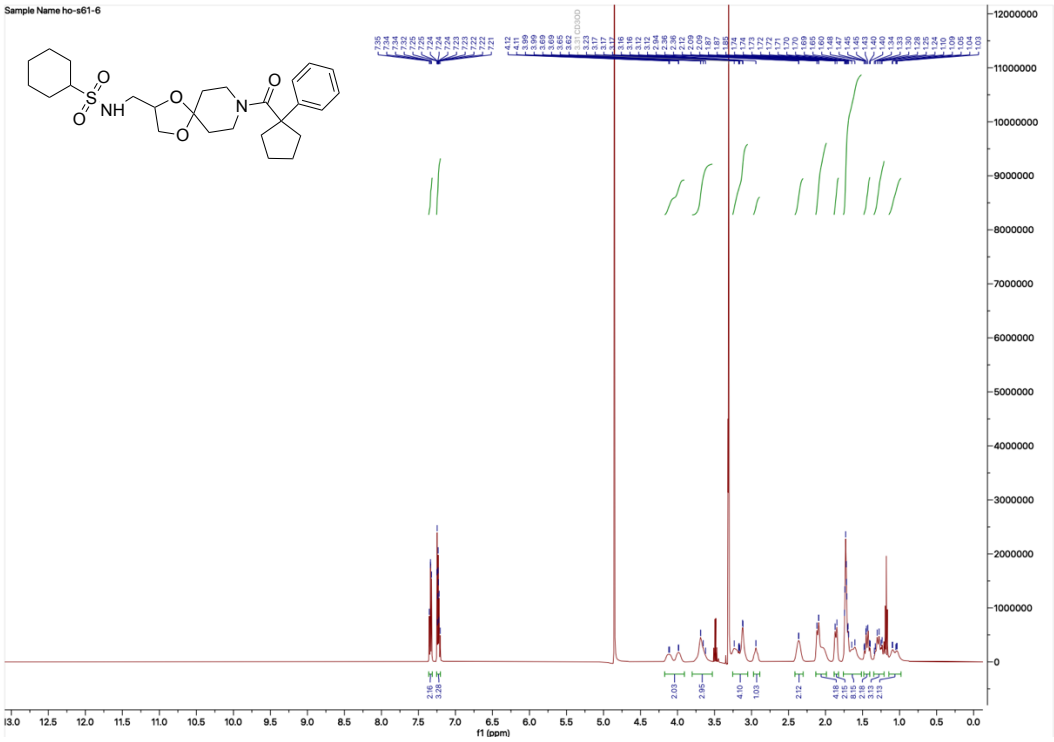


Figure S25: ^{13}C NMR (126 MHz, CD_3OD) for **1k**

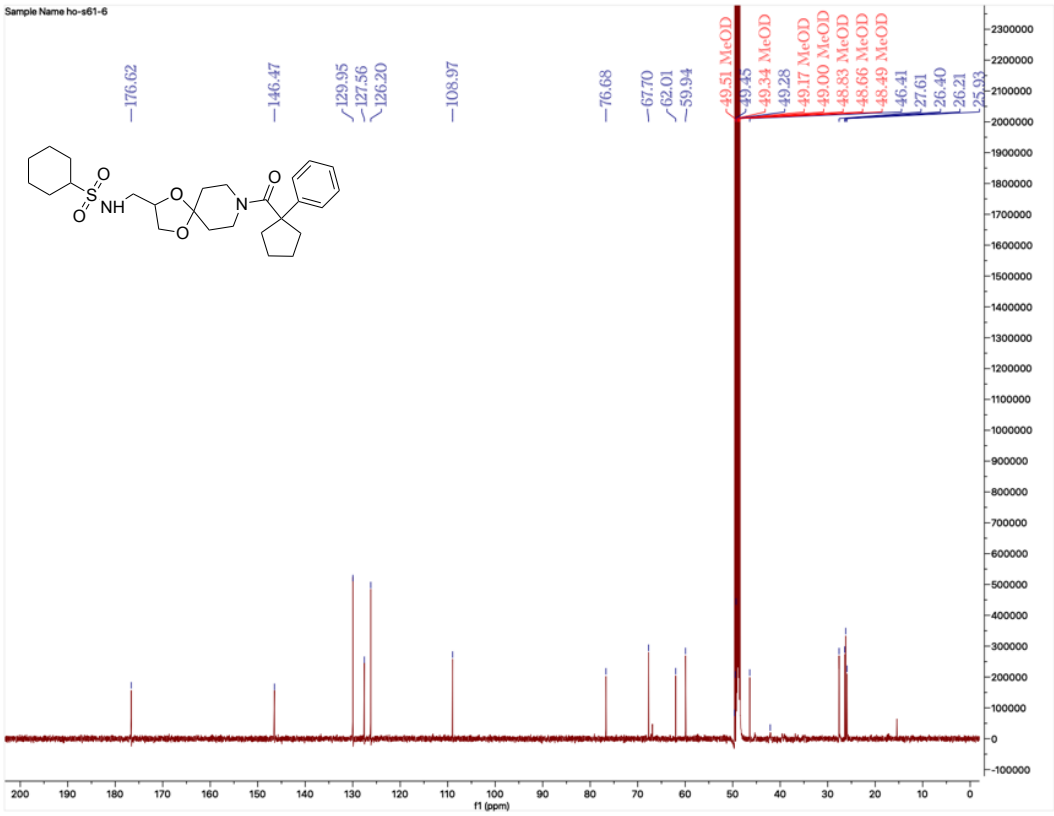


Figure S26: ^{1}H NMR (500 MHz, CD_3OD) for **1l**

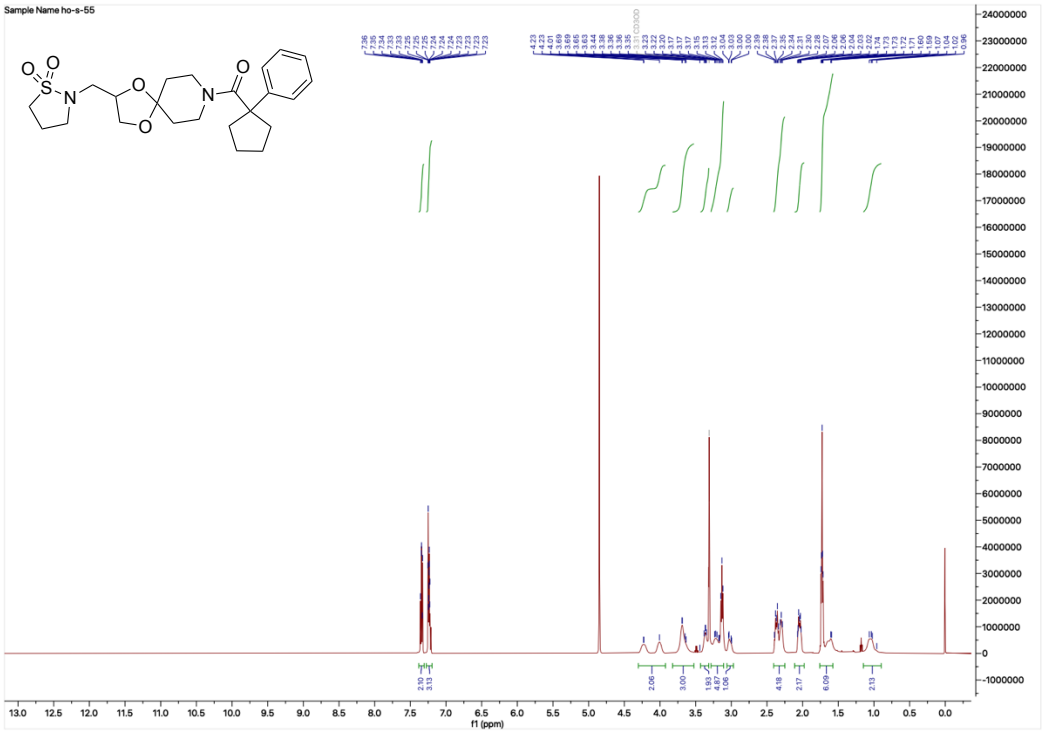


Figure S27: ^{13}C NMR (126 MHz, CD_3OD) for **1l**

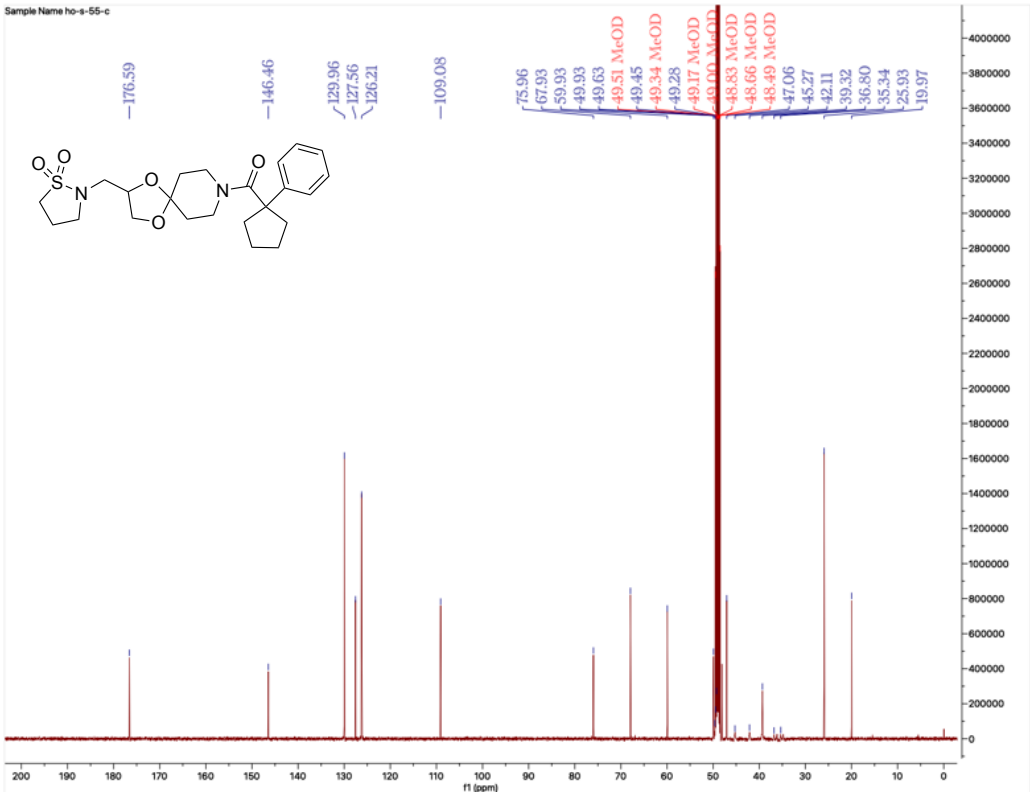


Figure S28: ^{1}H NMR (500 MHz, CD_3OD) for **1m**

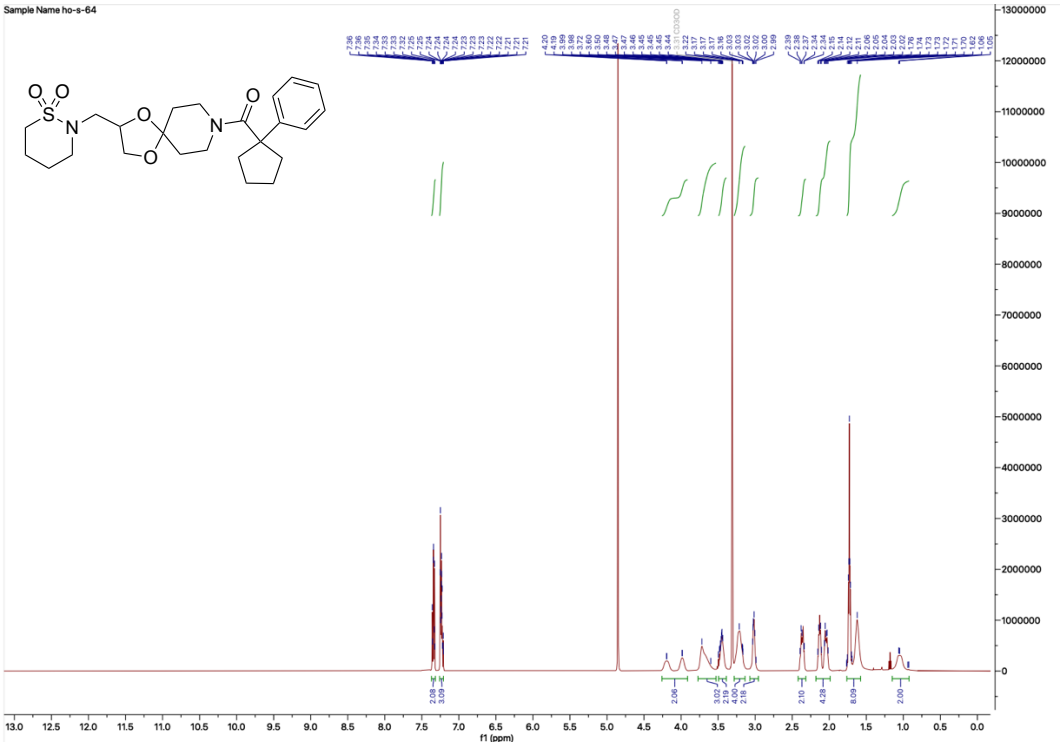


Figure S29: ^{13}C NMR (126 MHz, CD_3OD) for **1m**

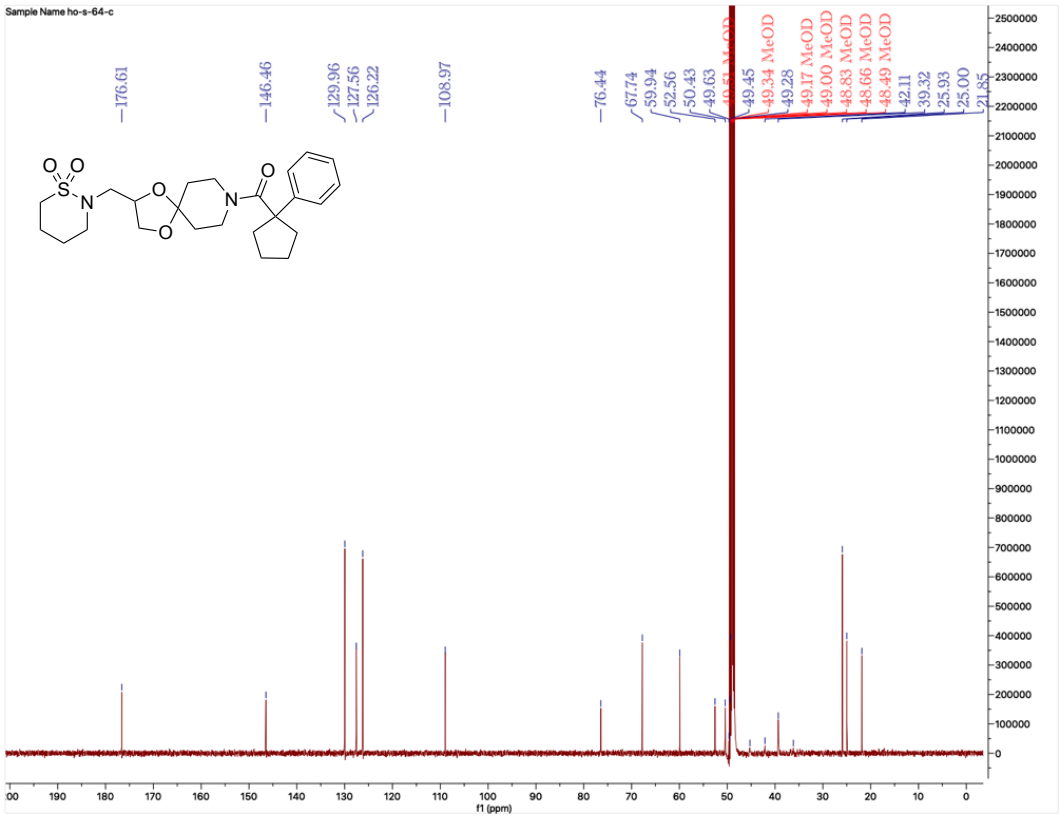


Figure S30: ^{1}H NMR (500 MHz, CD_3OD) for **2a**

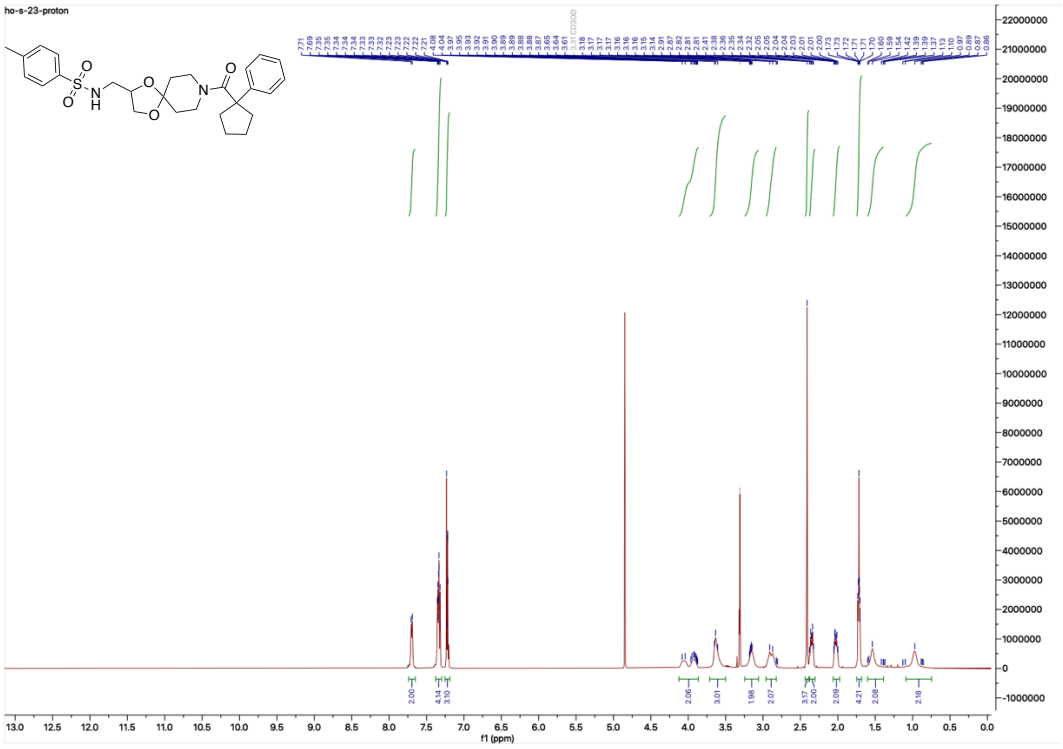


Figure S31: ^{13}C NMR (126 MHz, CD_3OD) for **2a**

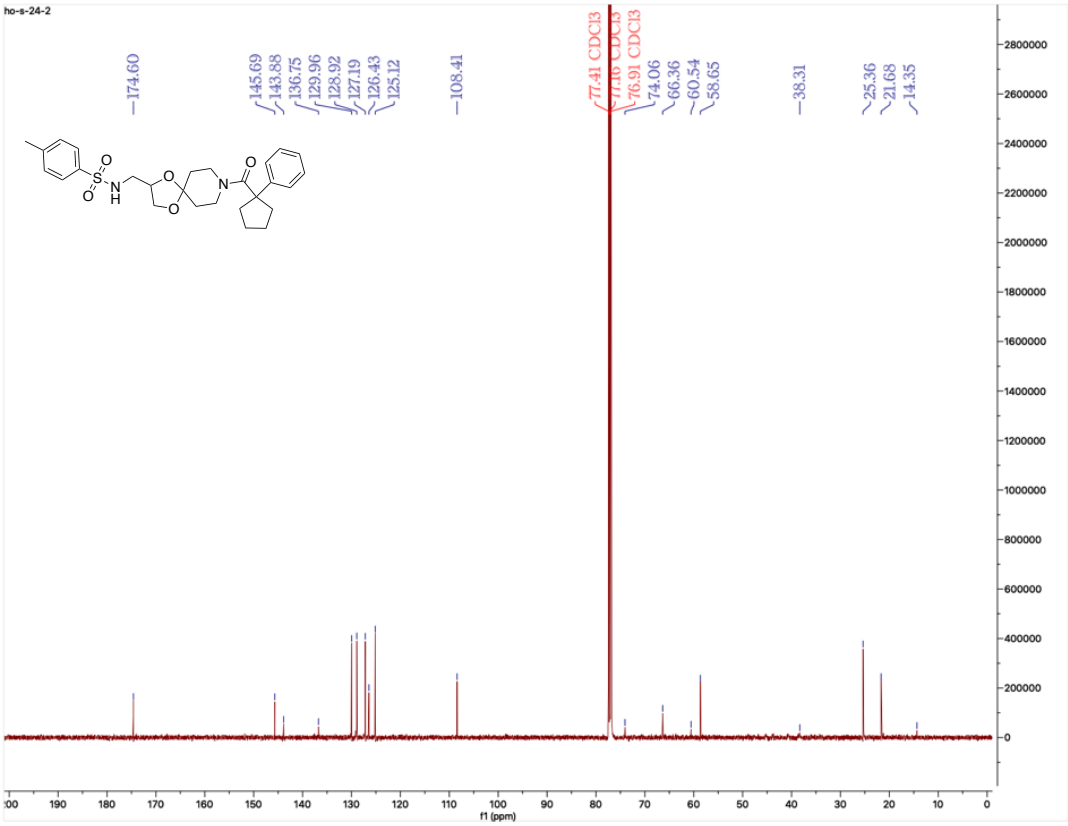


Figure S32: ^{1}H NMR (500 MHz, CD_3OD) for **2b**

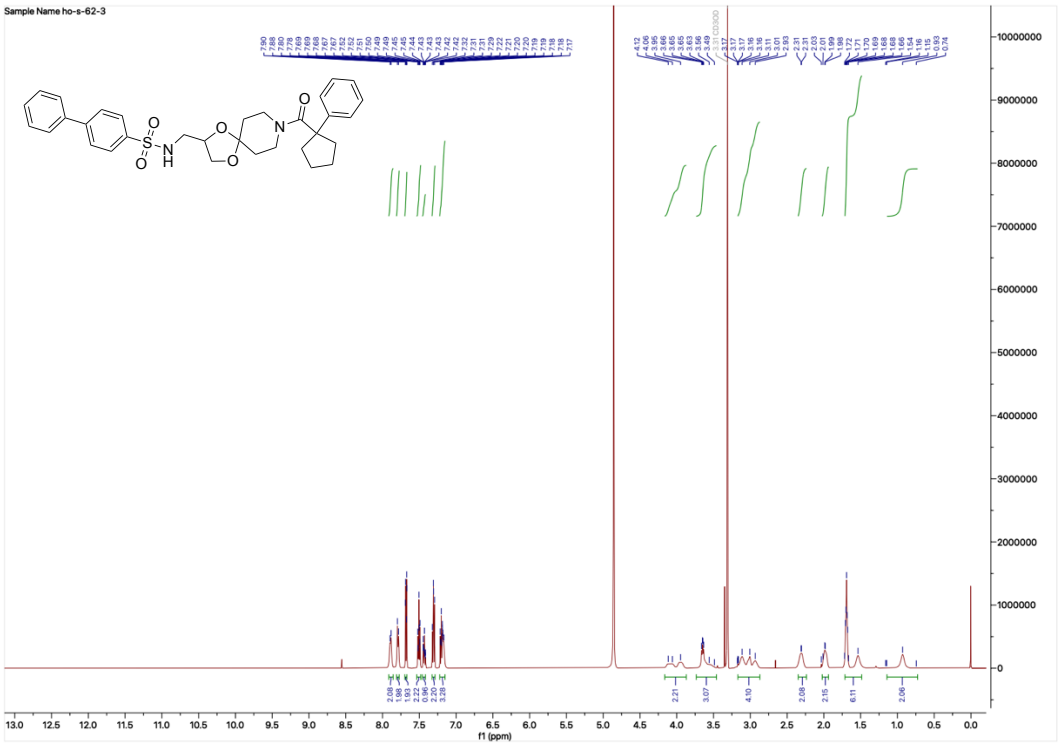


Figure S33: ^{13}C NMR (126 MHz, CD_3OD) for **2b**

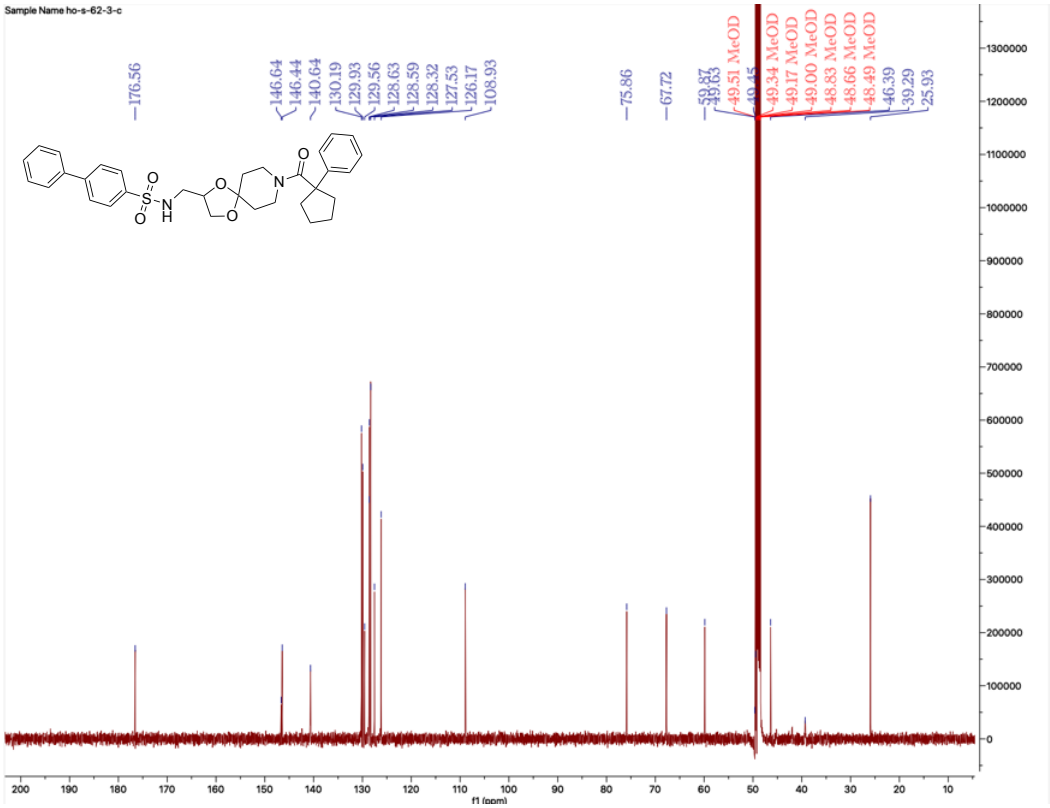


Figure S34: ^{1}H NMR (500 MHz, CD_3OD) for **2c**

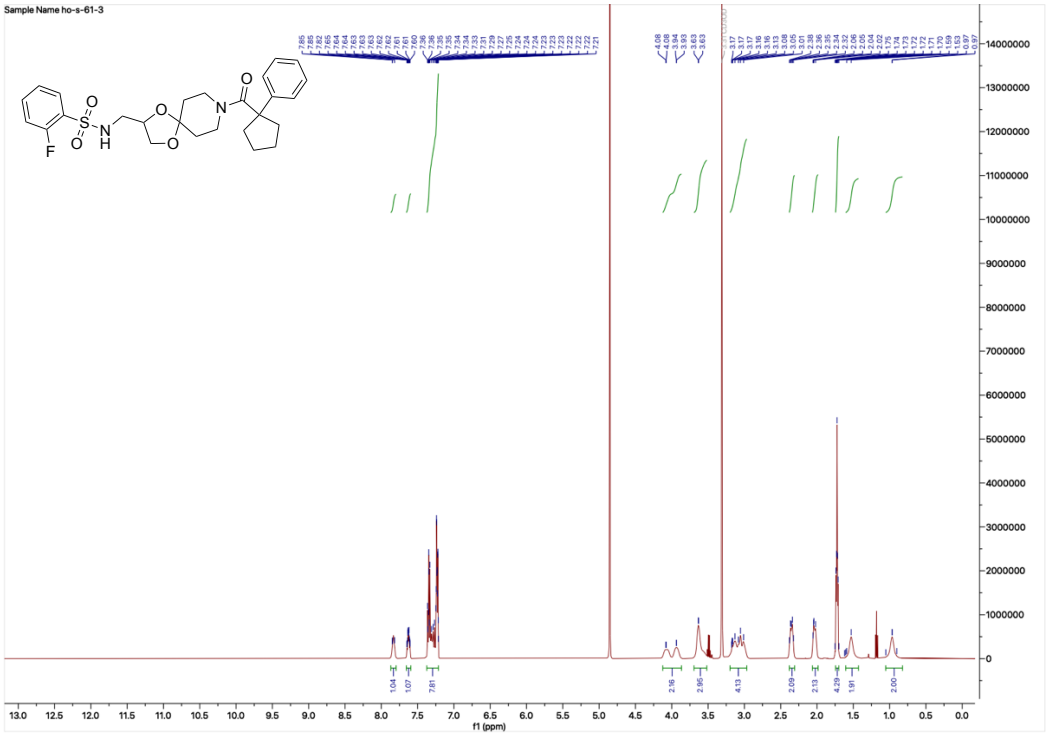


Figure S35: ^{13}C NMR (126 MHz, CD_3OD) for **2c**

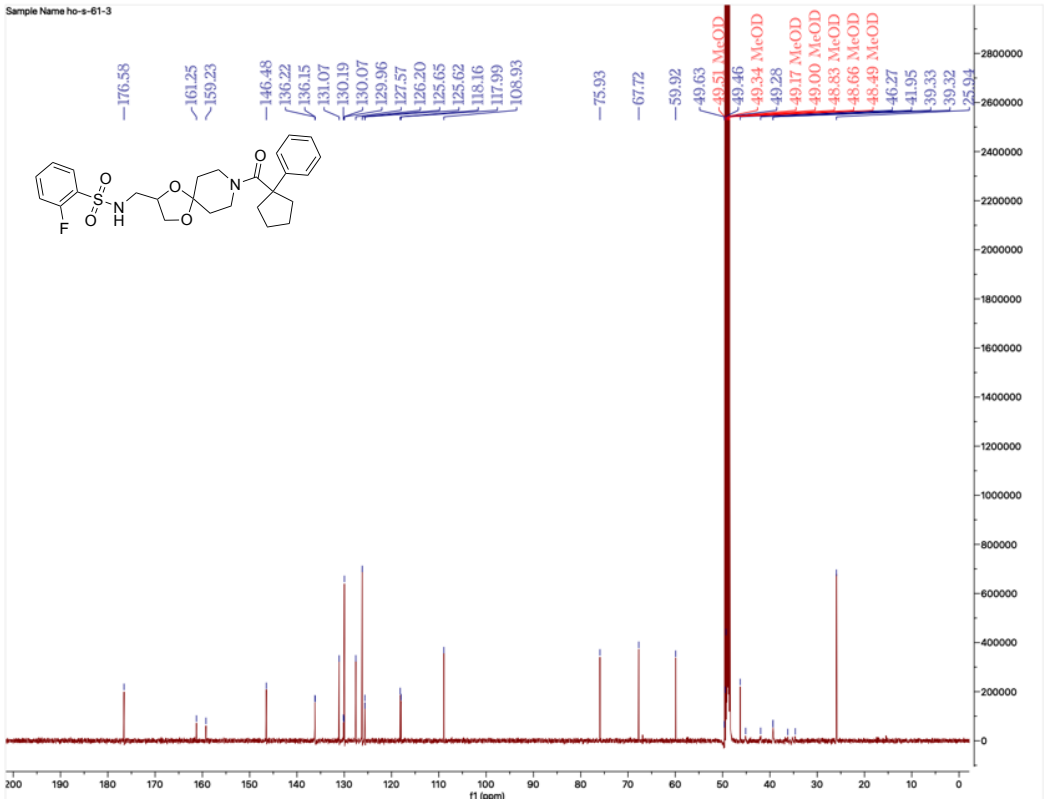


Figure S36: ^{1}H NMR (500 MHz, CD_3OD) for **2d**

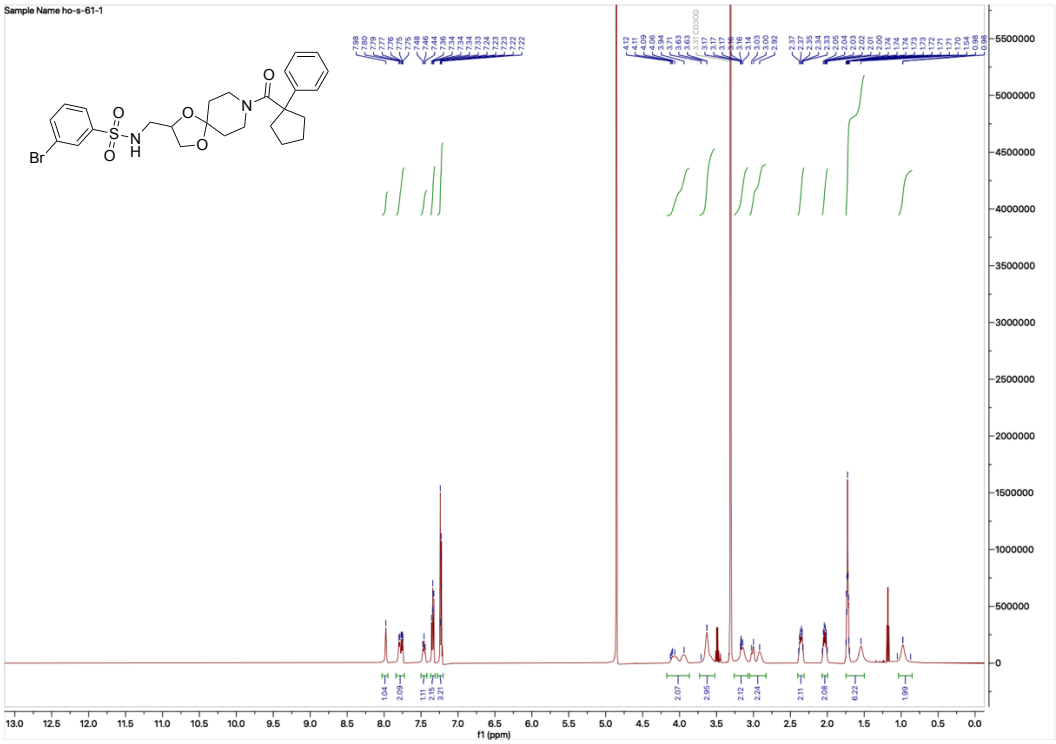


Figure S37: ^{13}C NMR (126 MHz, CD_3OD) for **2d**

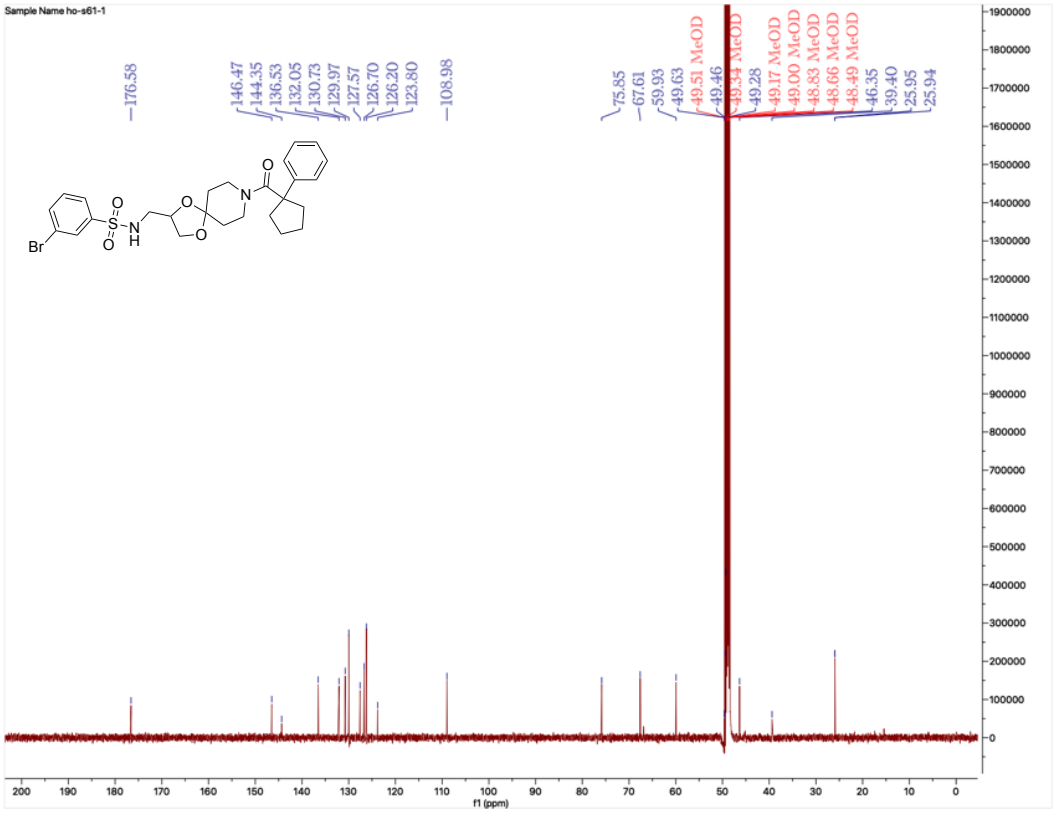


Figure S38: ^{1}H NMR (500 MHz, CD_3OD) for **2e**

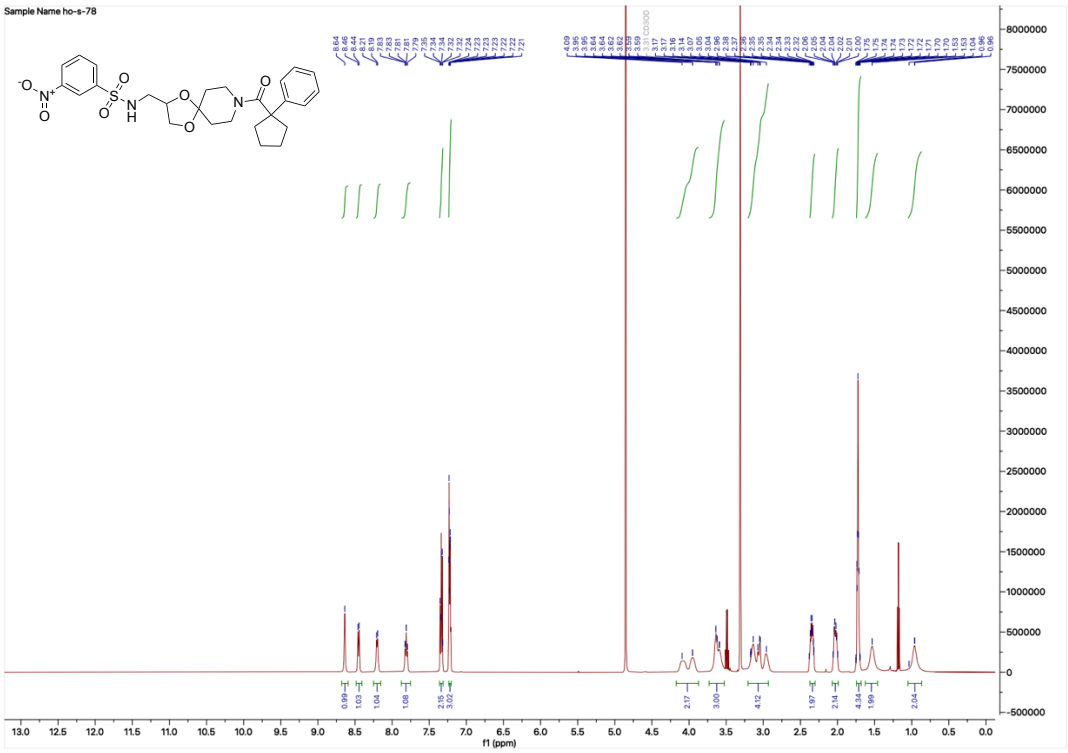


Figure S39: ^{13}C NMR (126 MHz, CD_3OD) for **2e**

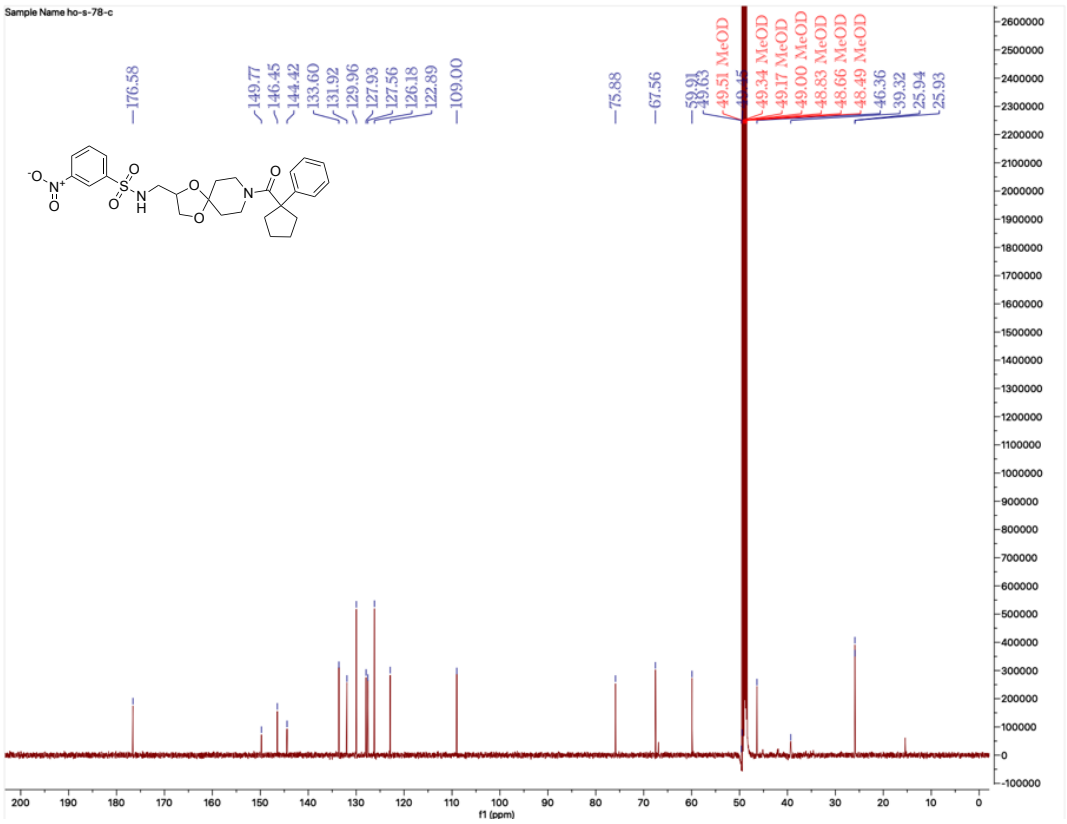


Figure S40: ^{1}H NMR (500 MHz, CD_3OD) for **2f**

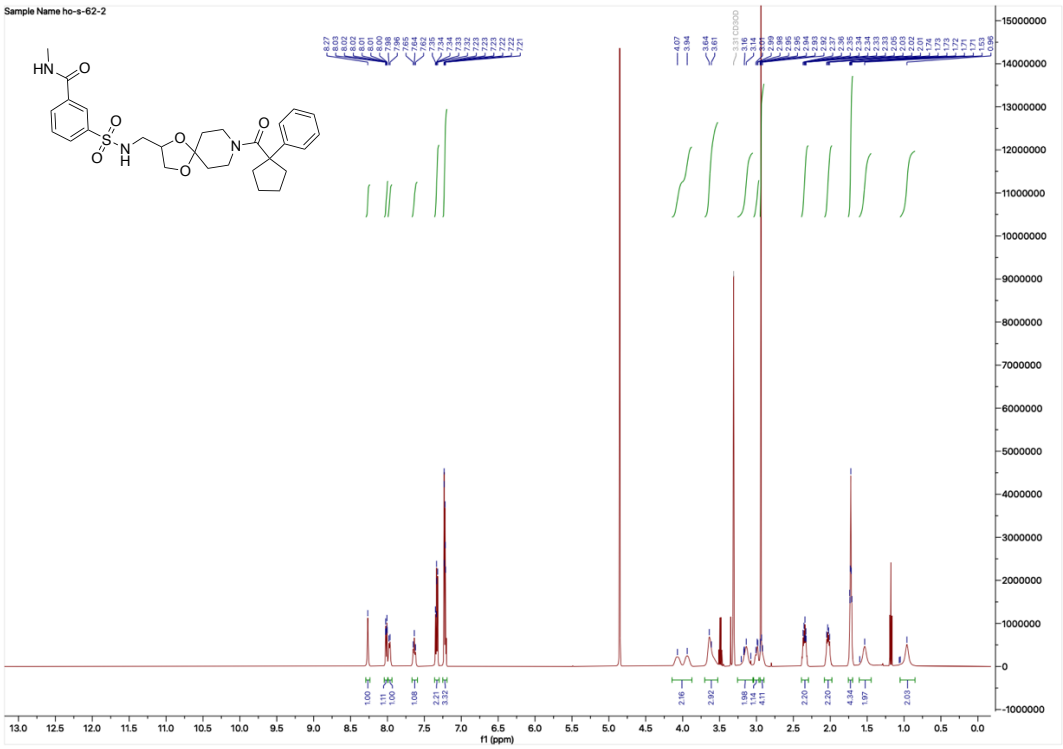


Figure S41: ^{13}C NMR (126 MHz, CD_3OD) for **2f**

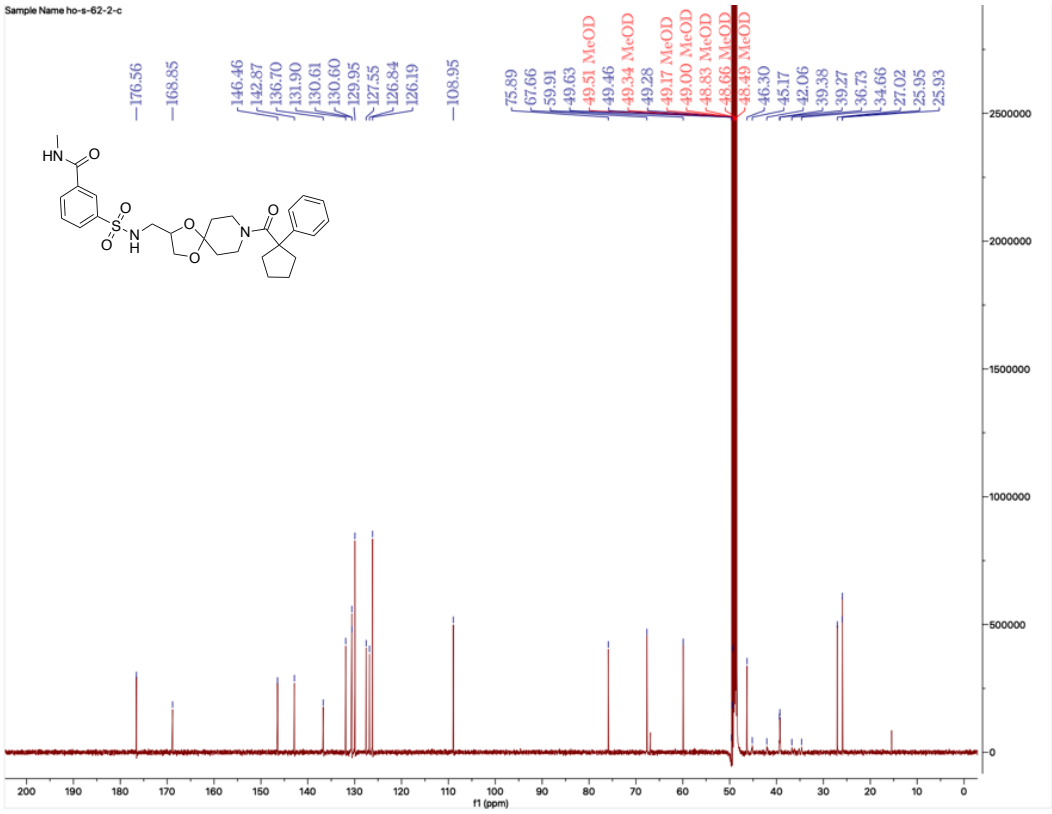


Figure S42: ^{1}H NMR (500 MHz, CD_3OD) for **2g**

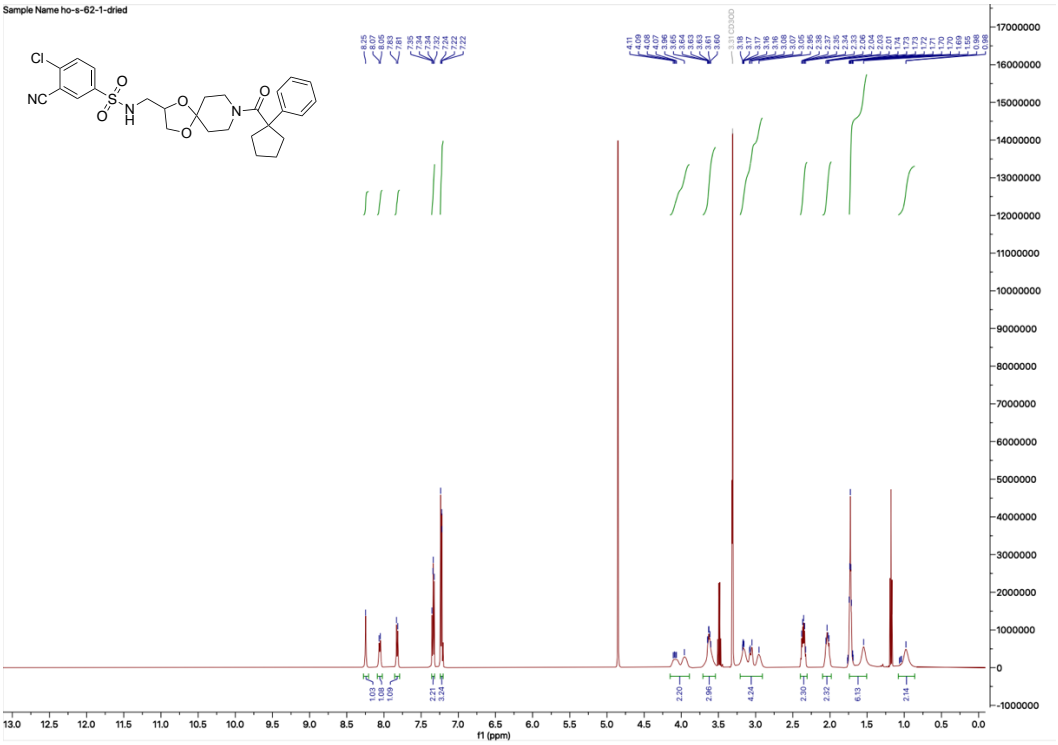


Figure S43: ^{13}C NMR (126 MHz, CD_3OD) for **2g**

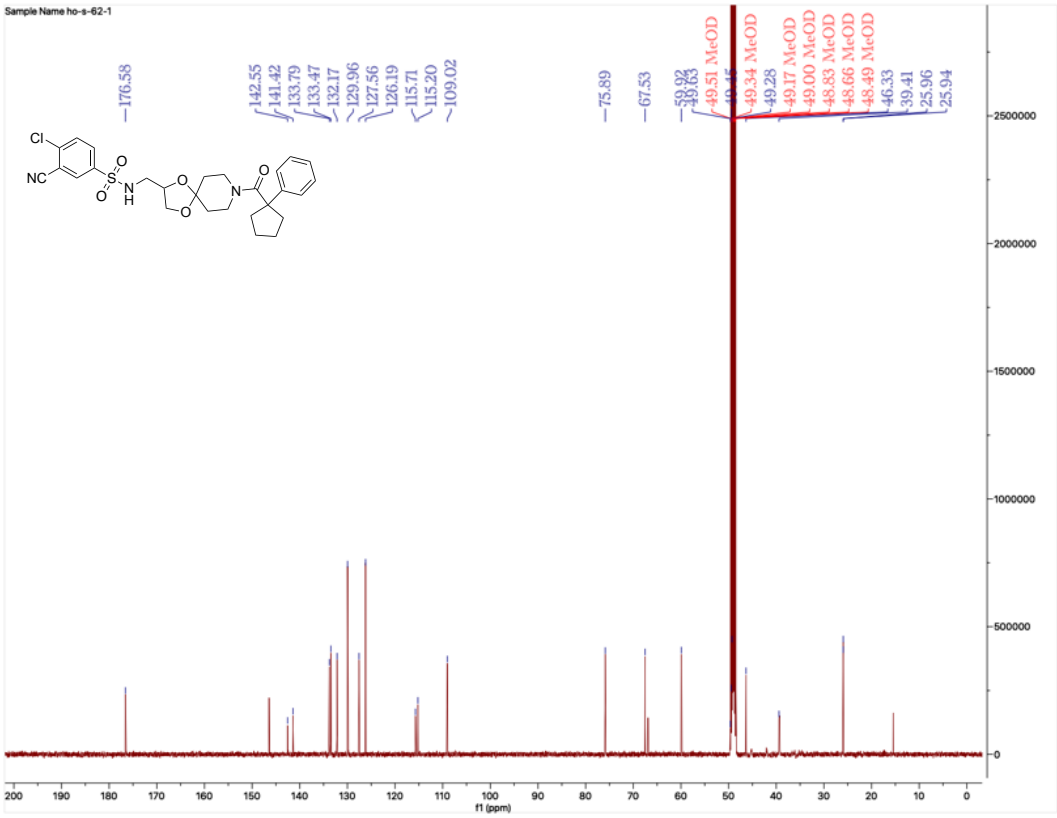


Figure S44: ^{1}H NMR (500 MHz, CD_3OD) for **2h**

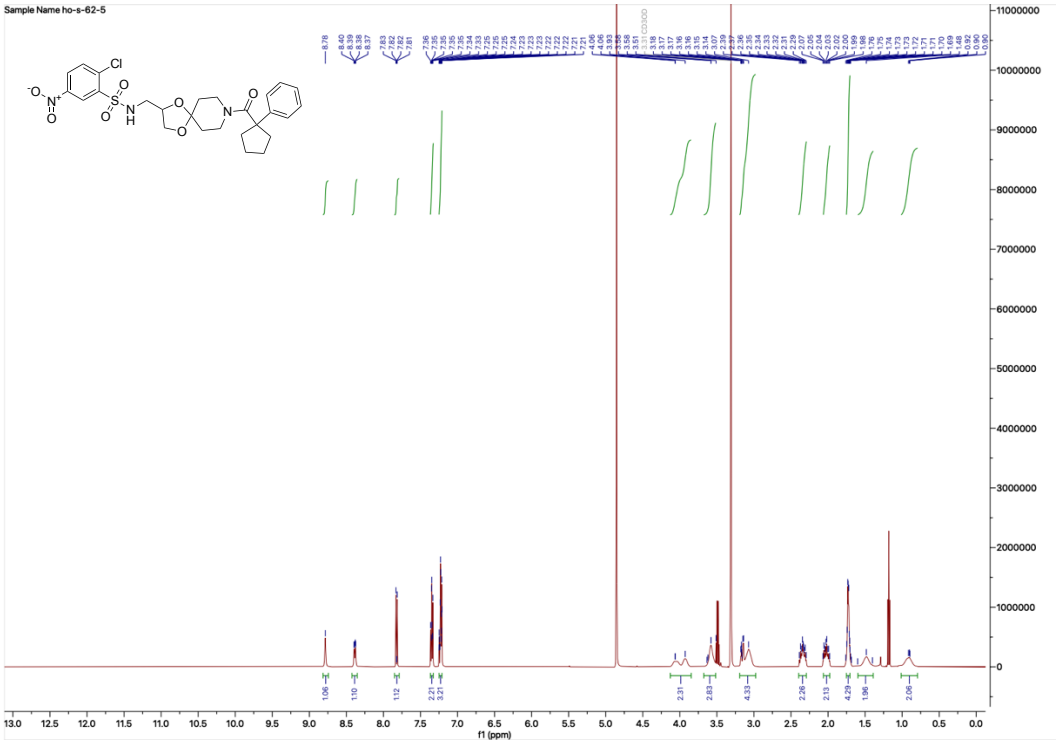


Figure S45: ^{13}C NMR (126 MHz, CD_3OD) for **2h**

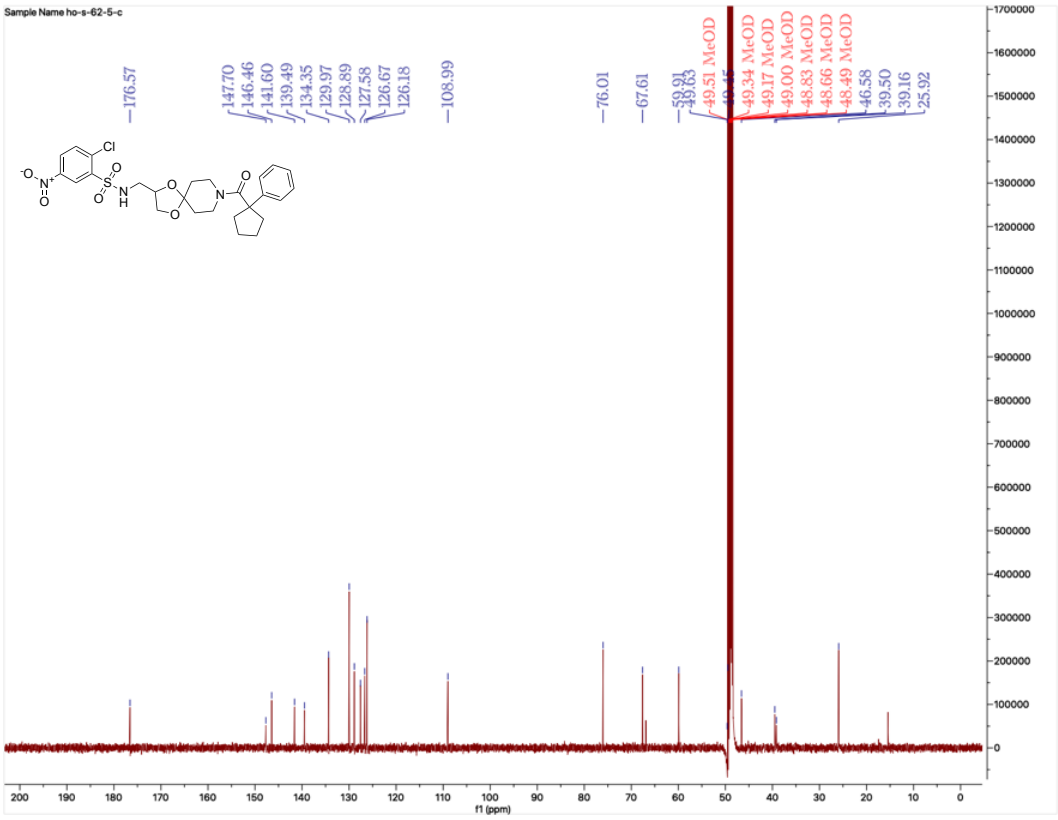


Figure S46: ^{1}H NMR (500 MHz, CD_3OD) for **2i**

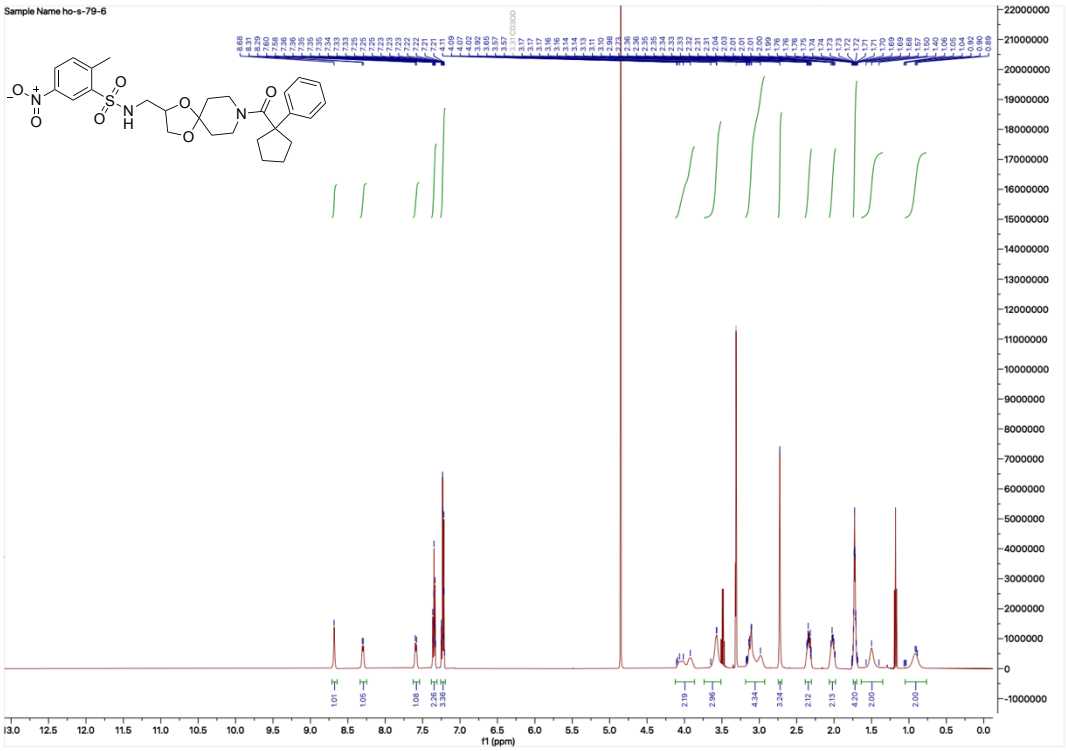


Figure S47: ^{13}C NMR (126 MHz, CD_3OD) for **2i**

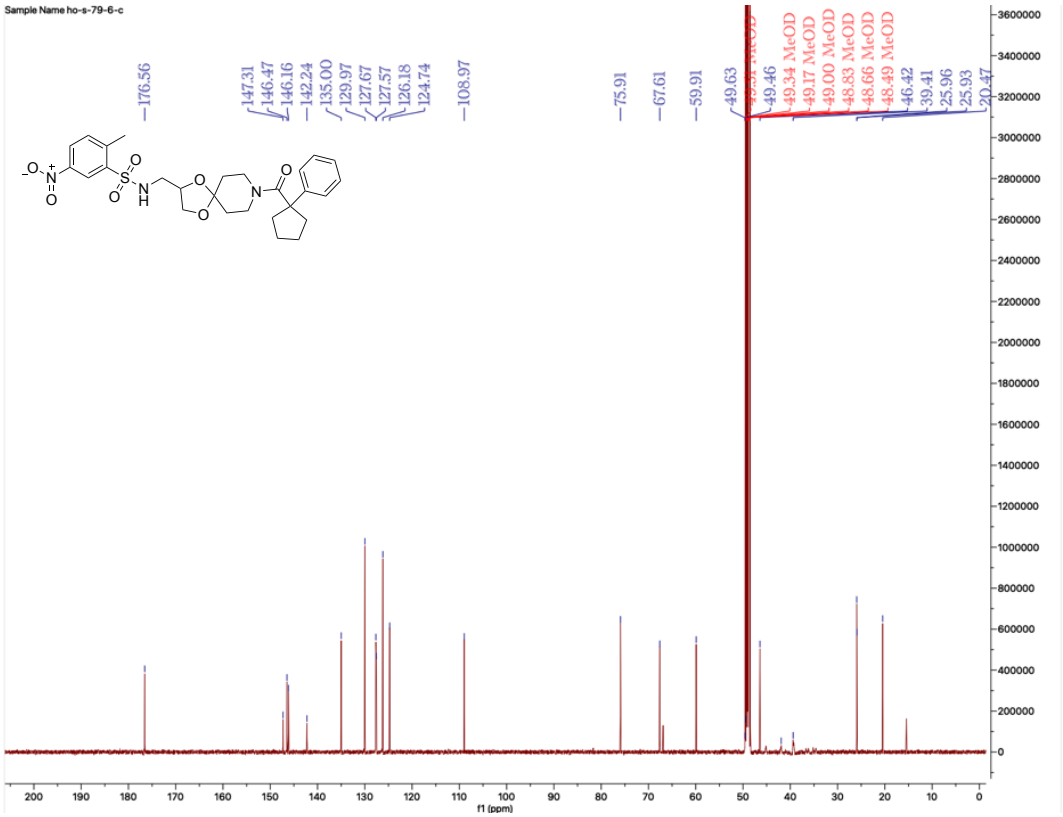


Figure S48: ^{1}H NMR (500 MHz, CD_3OD) for **2j**

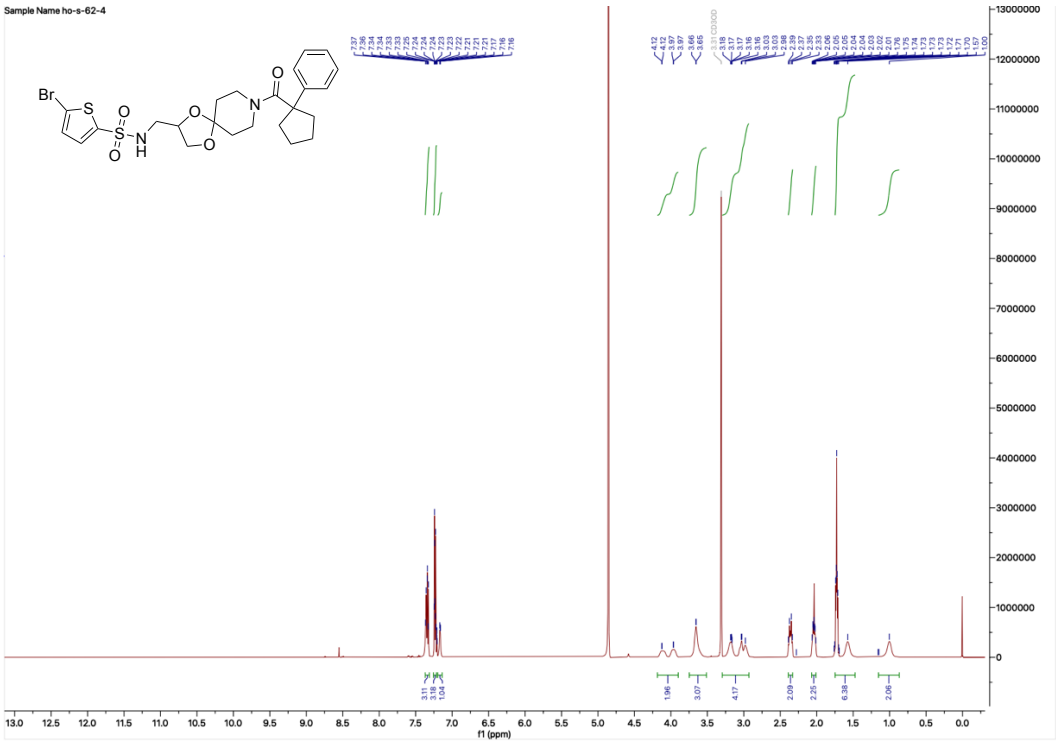


Figure S49: ^{13}C NMR (126 MHz, CD_3OD) for **2j**

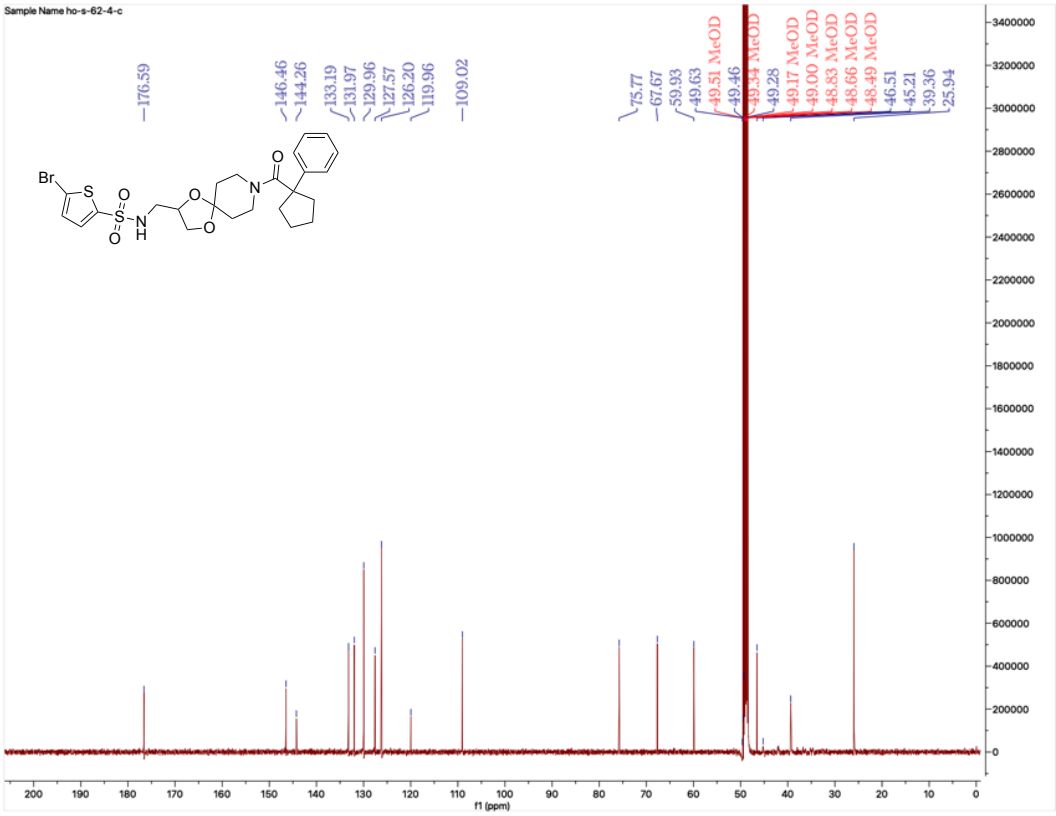


Figure S50: ^{1}H NMR (500 MHz, CD_3OD) for **3a**

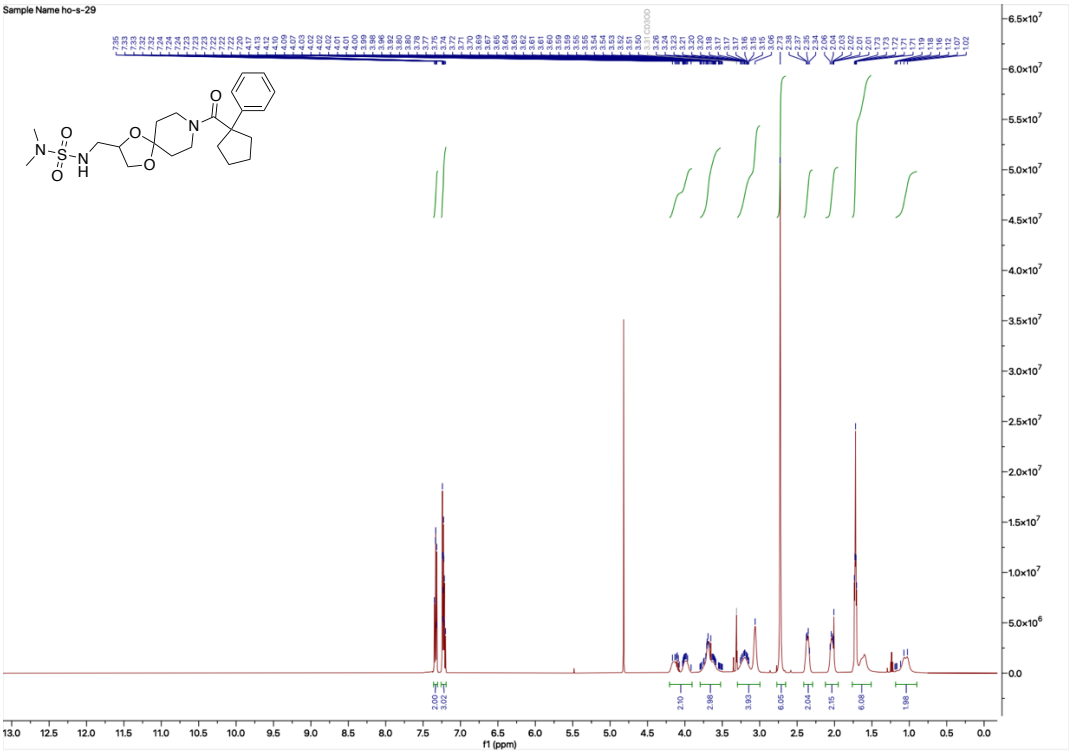


Figure S51: ^{13}C NMR (126 MHz, CD_3OD) for **3a**

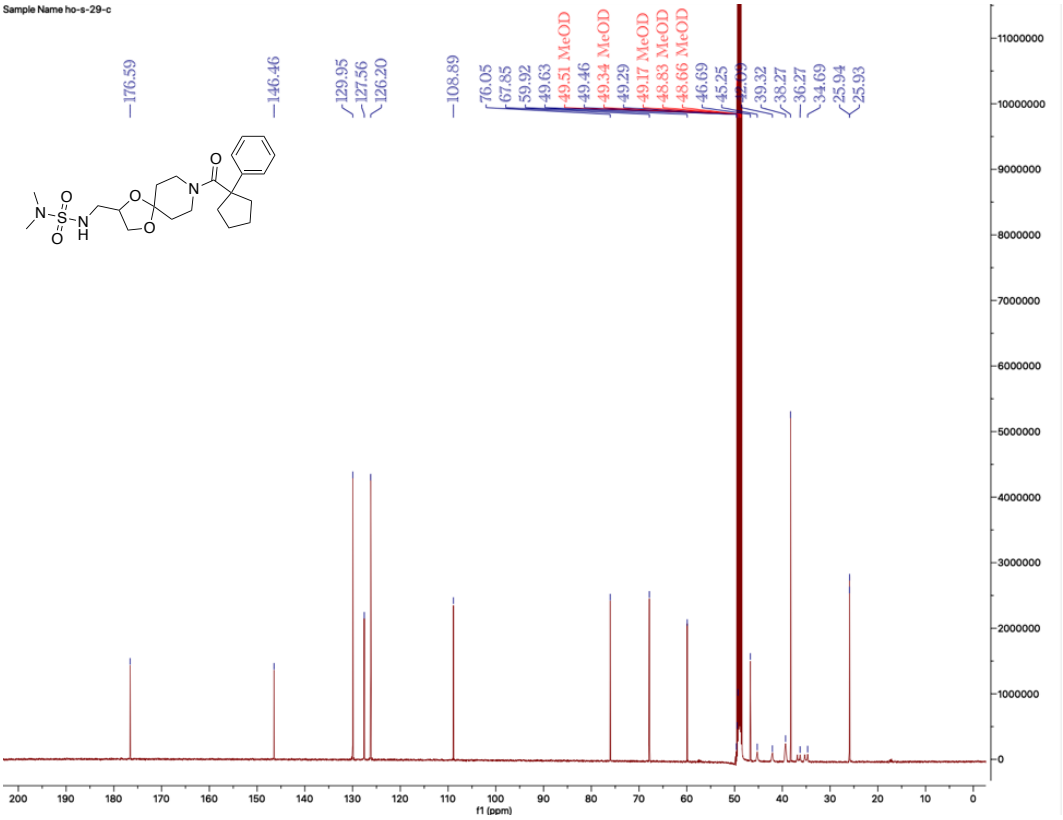


Figure S52: ^{1}H NMR (500 MHz, CD_3OD) for **3b**

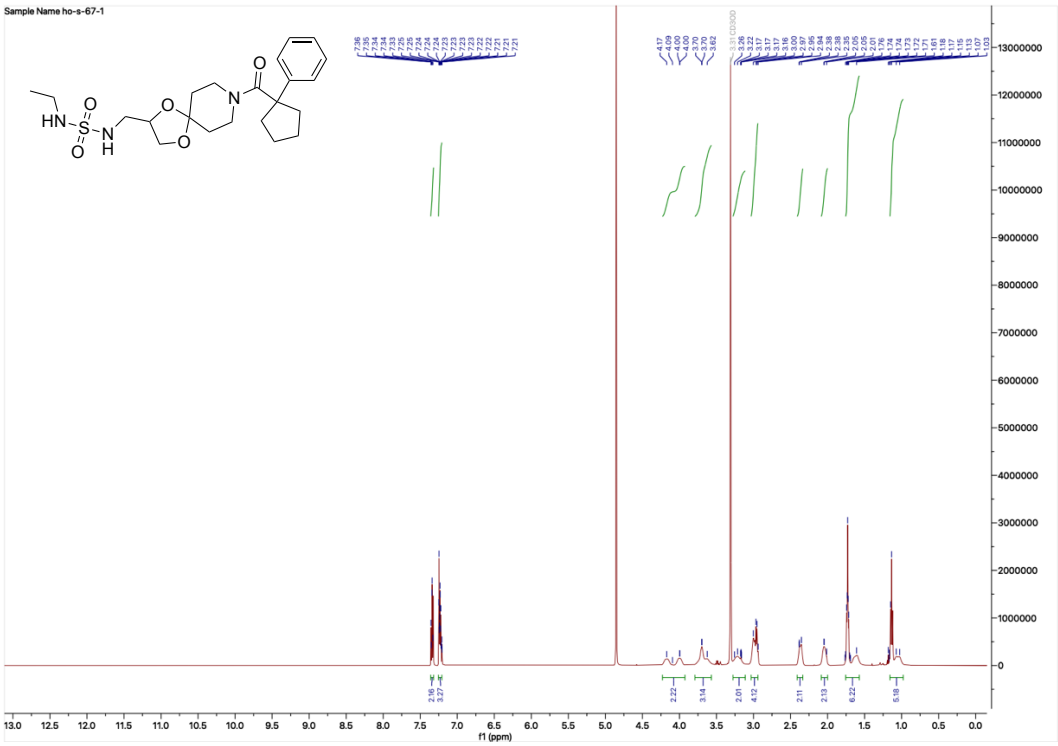


Figure S53: ^{13}C NMR (126 MHz, CD_3OD) for **3b**

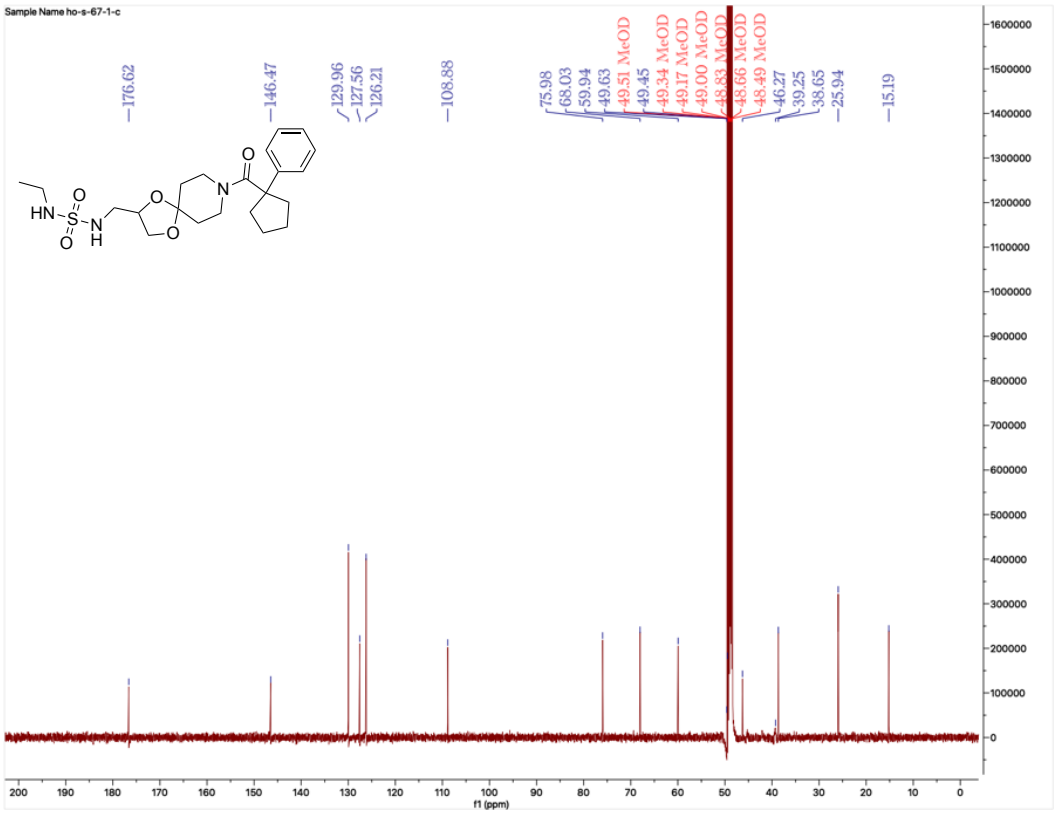


Figure S54: ^{1}H NMR (500 MHz, CD_3OD) for **3c**

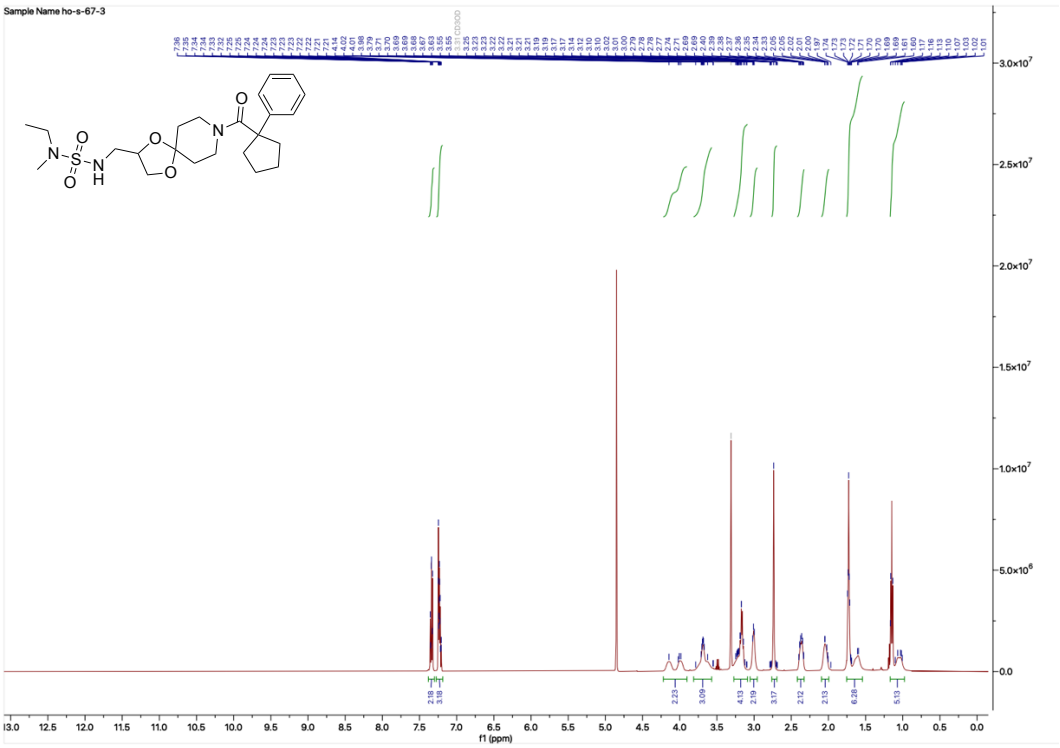


Figure S55: ^{13}C NMR (126 MHz, CD_3OD) for **3c**

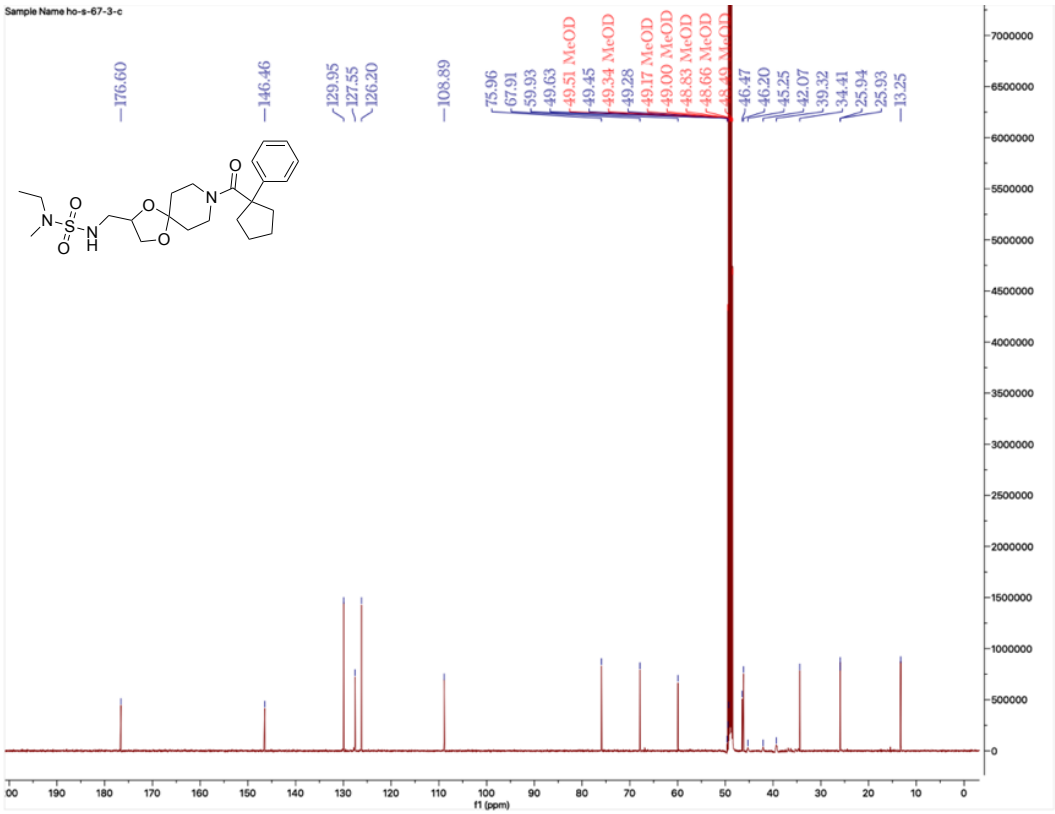


Figure S56: ^{1}H NMR (500 MHz, CD_3OD) for **3d**

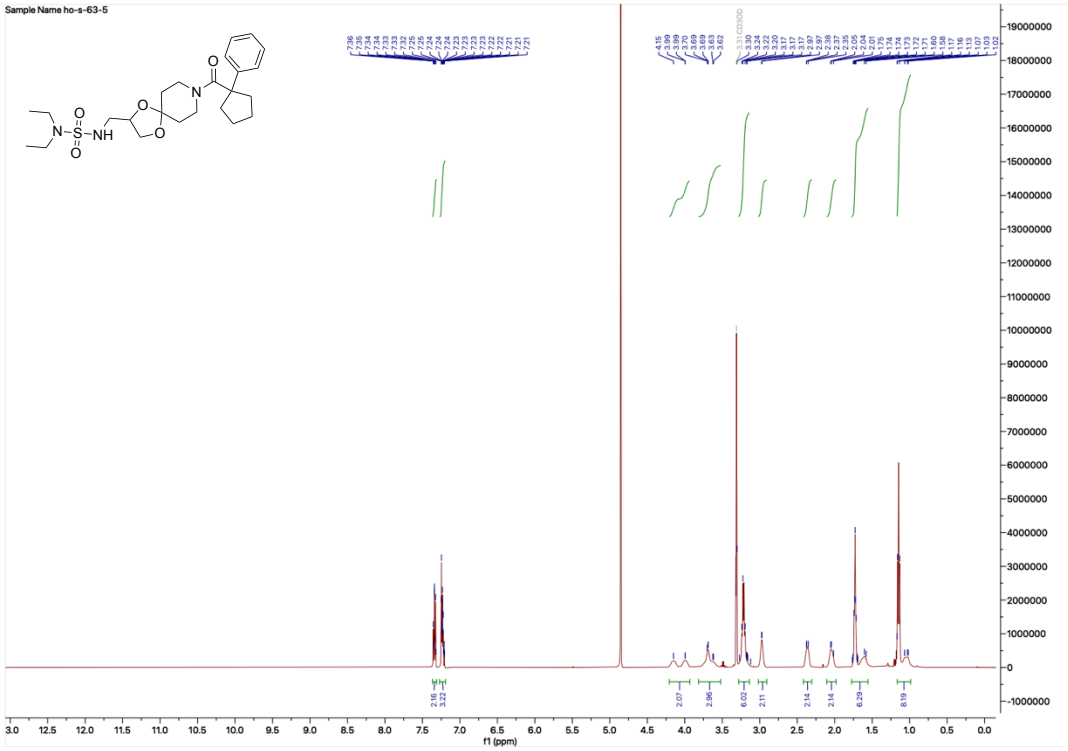


Figure S57: ^{13}C NMR (126 MHz, CD_3OD) for **3d**

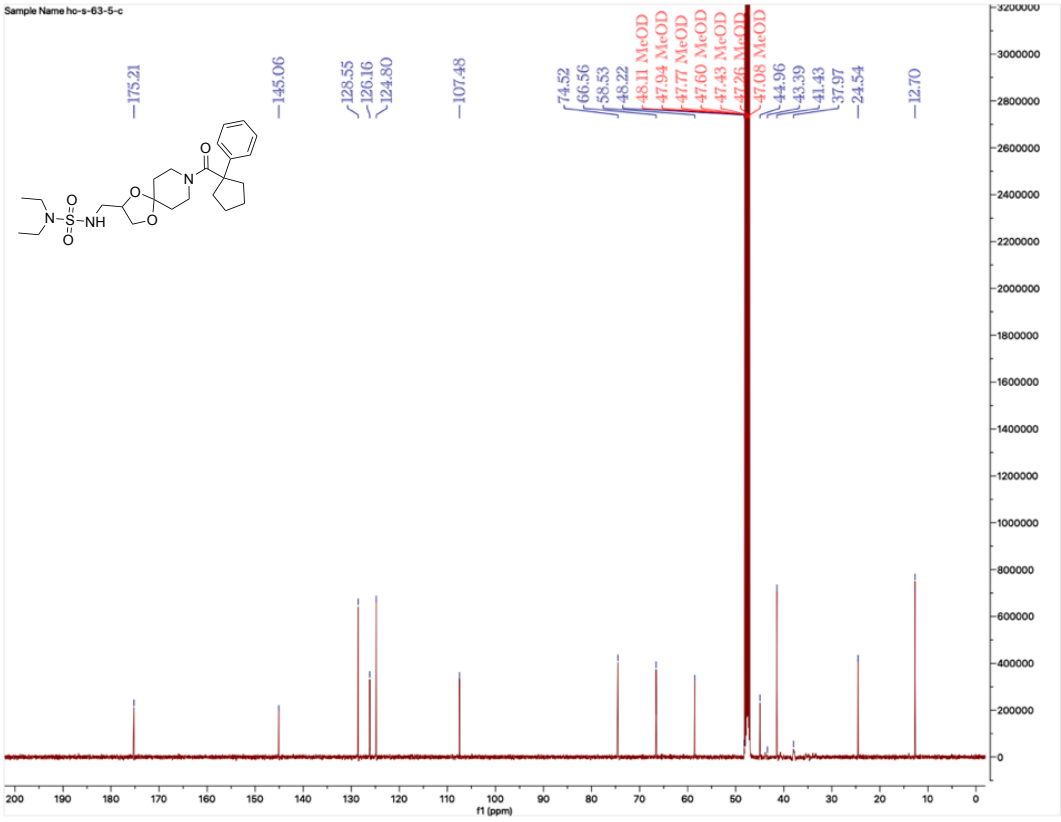


Figure S58: ^{1}H NMR (500 MHz, DMSO) for **3e**

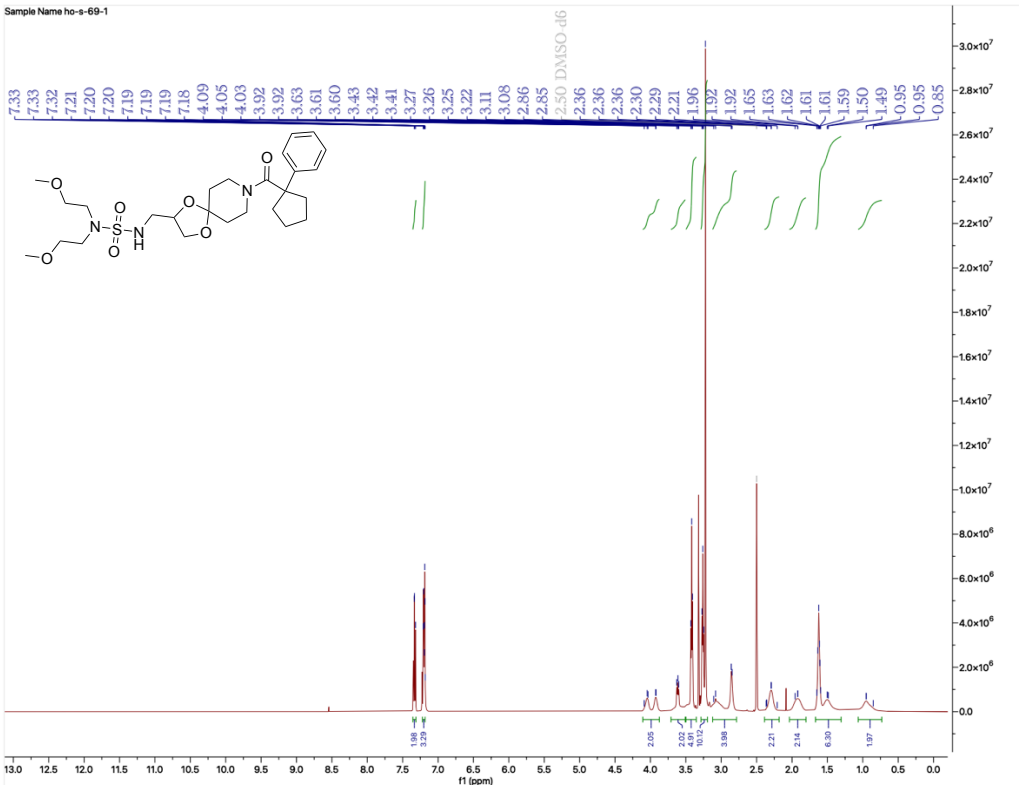


Figure S59: ^{13}C NMR (126 MHz, CD_3OD) for **3e**

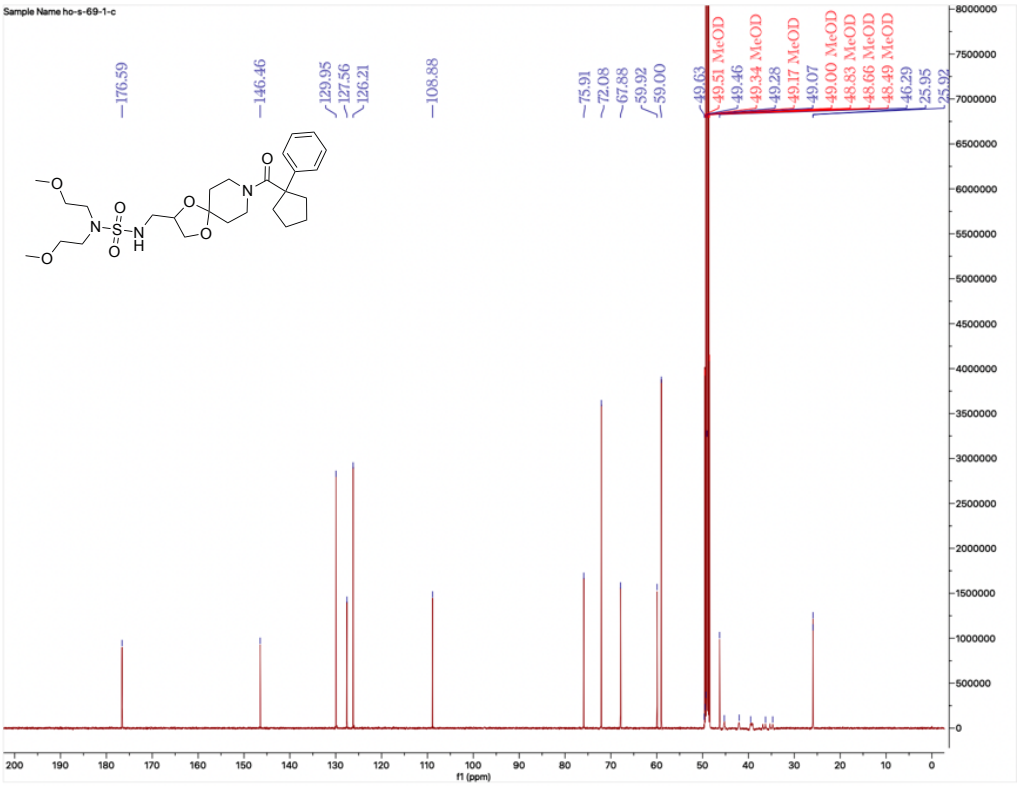


Figure S60: ^{1}H NMR (500 MHz, CD_3OD) for **3f**

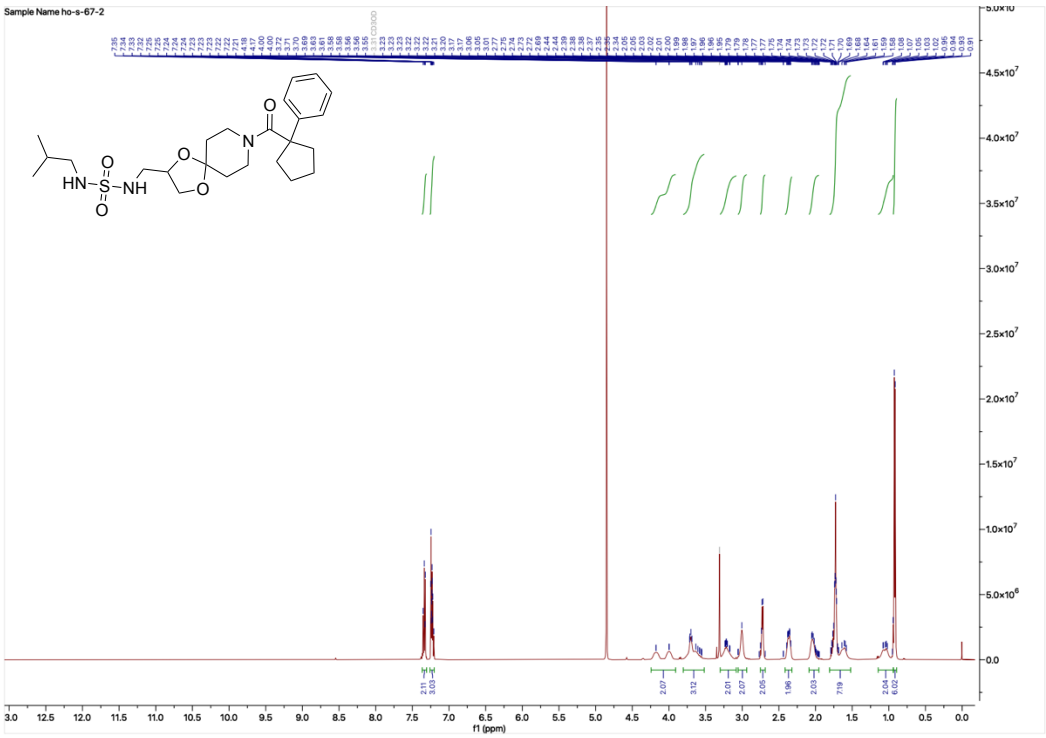


Figure S61: ^{13}C NMR (126 MHz, CD_3OD) for **3f**

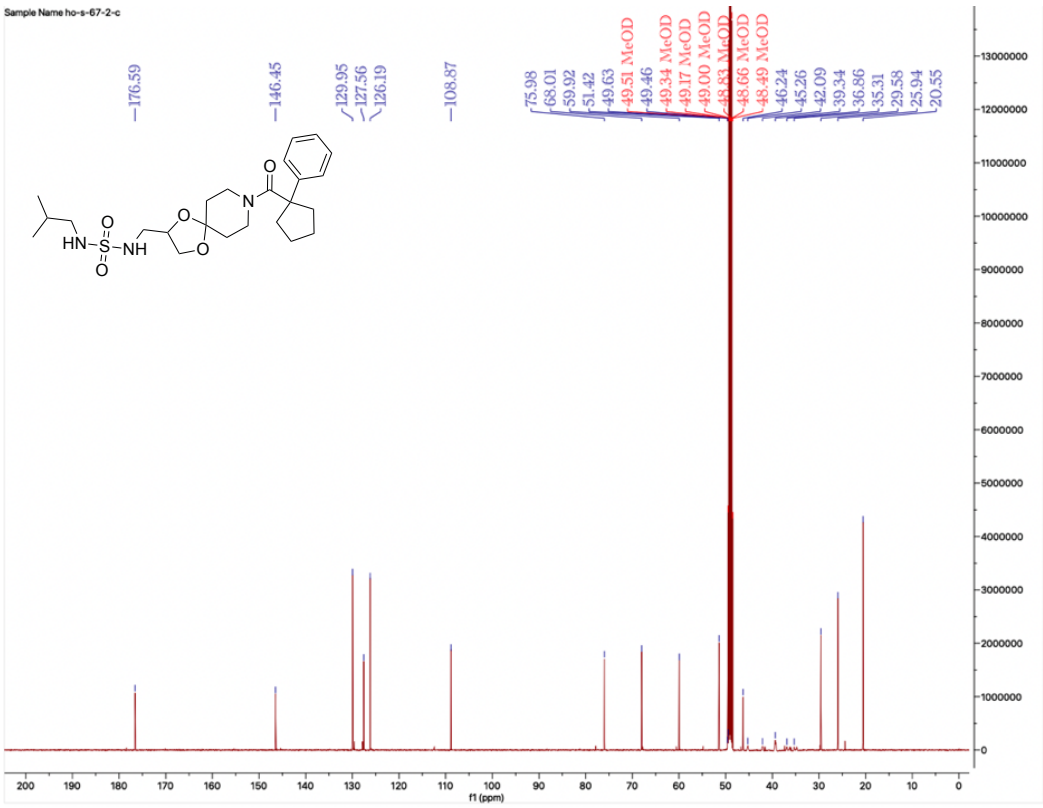


Figure S62: ^{1}H NMR (500 MHz, CD_3OD) for **3g**

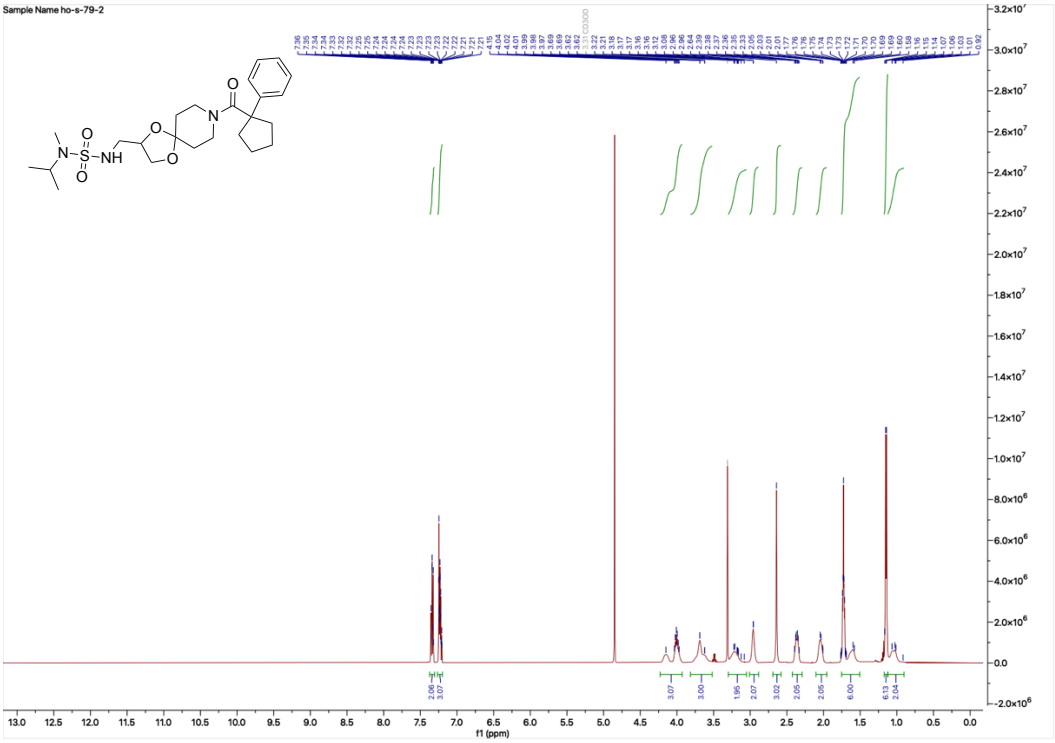


Figure S63: ^{13}C NMR (126 MHz, CD_3OD) for **3g**

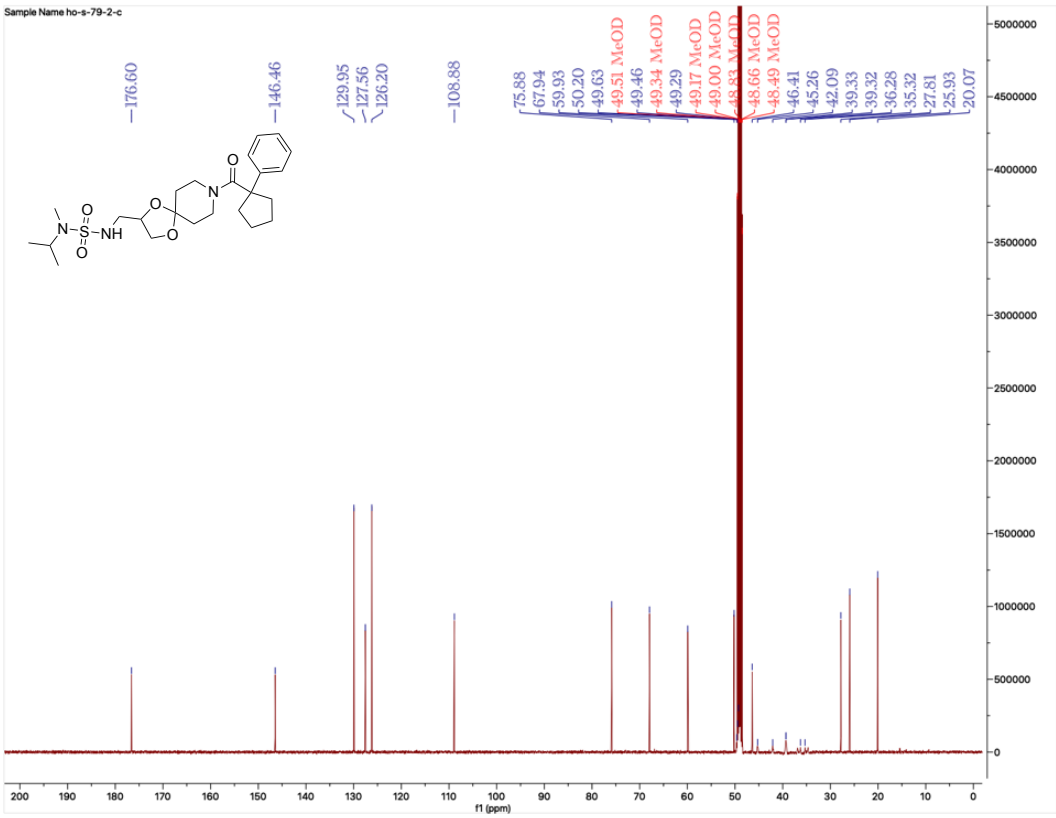


Figure S64: ^{1}H NMR (500 MHz, CD_3OD) for **3h**

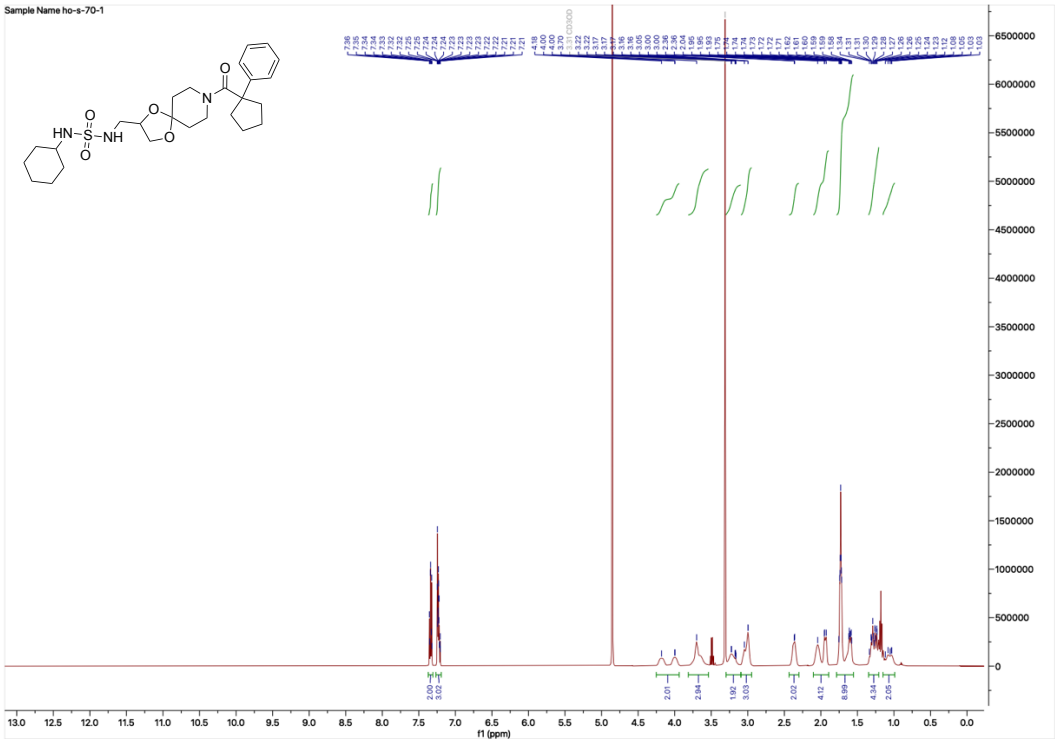


Figure S65: ^{13}C NMR (126 MHz, CD_3OD) for **3h**

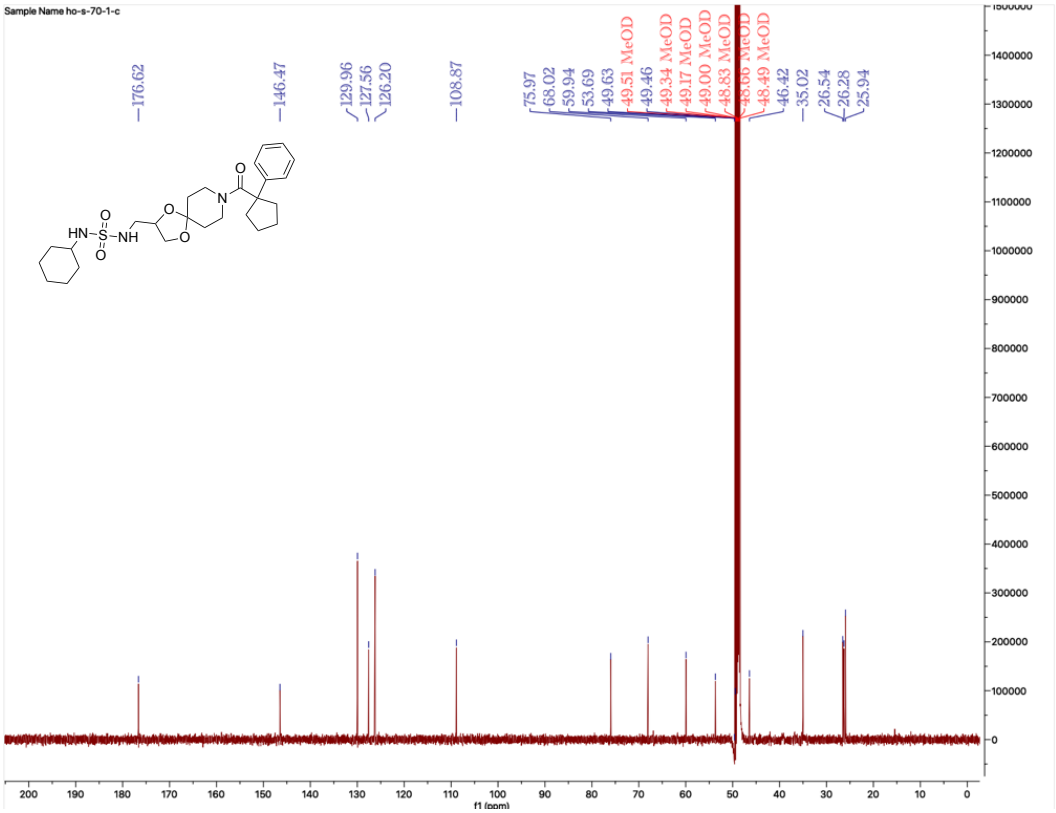


Figure S66: ^{1}H NMR (500 MHz, CD_3OD) for **3i**

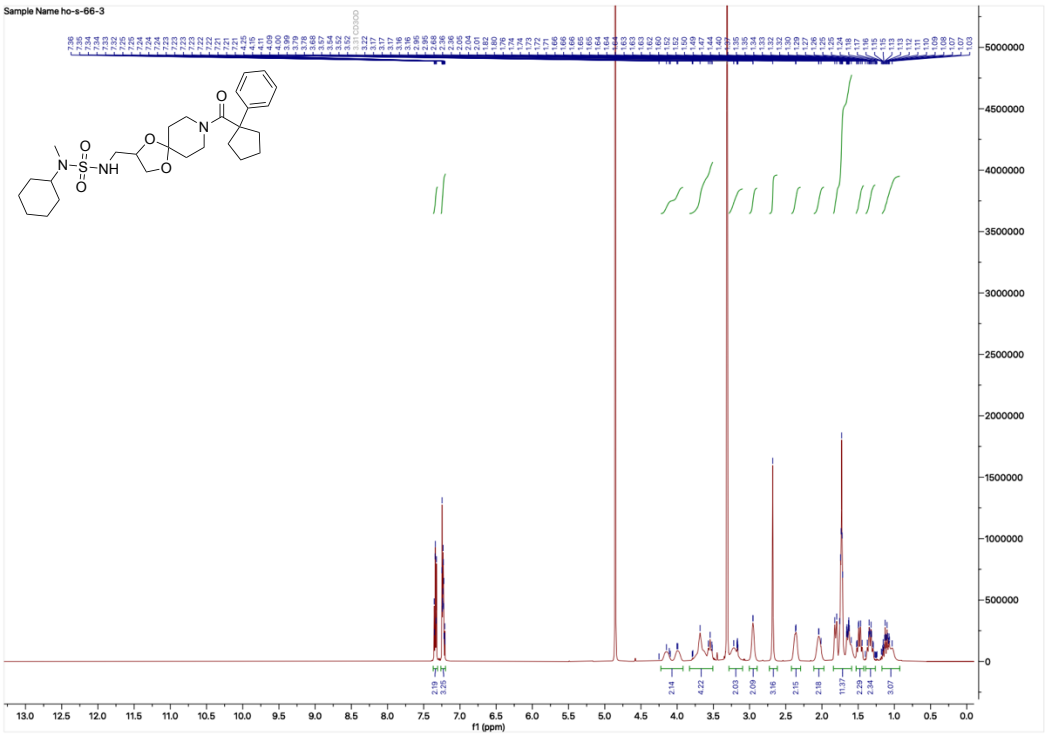


Figure S67: ^{13}C NMR (126 MHz, CD_3OD) for **3i**

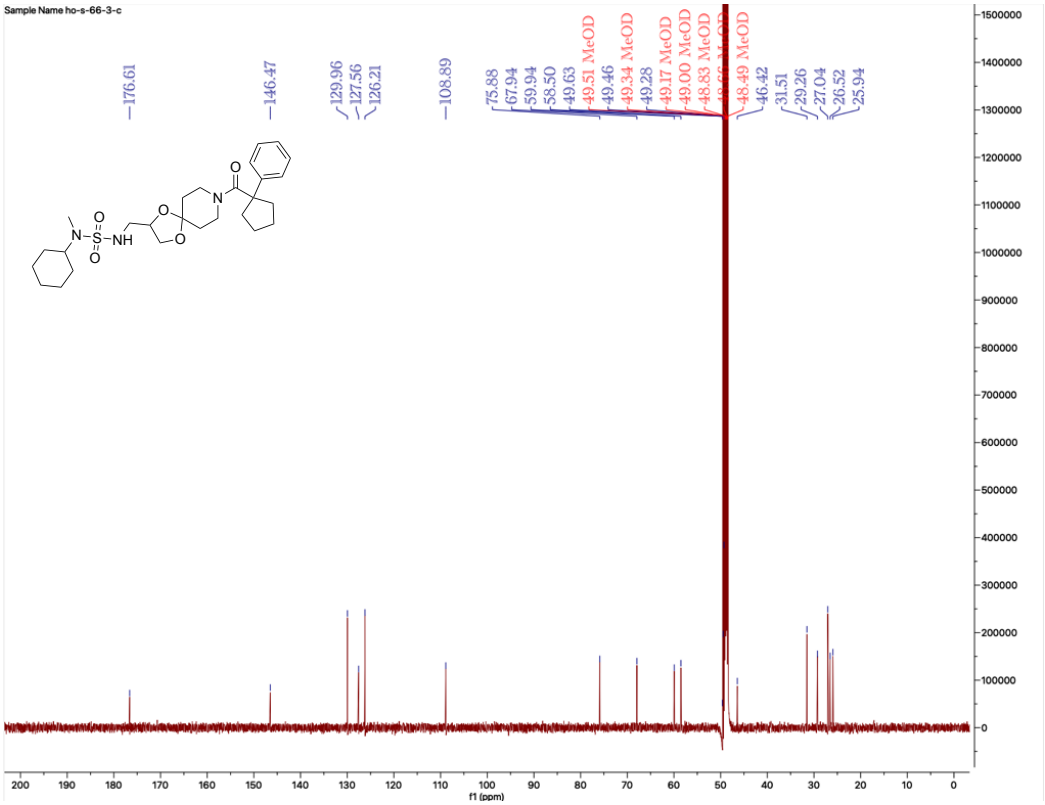


Figure S68: ^{1}H NMR (500 MHz, CD_3OD) for **3j**

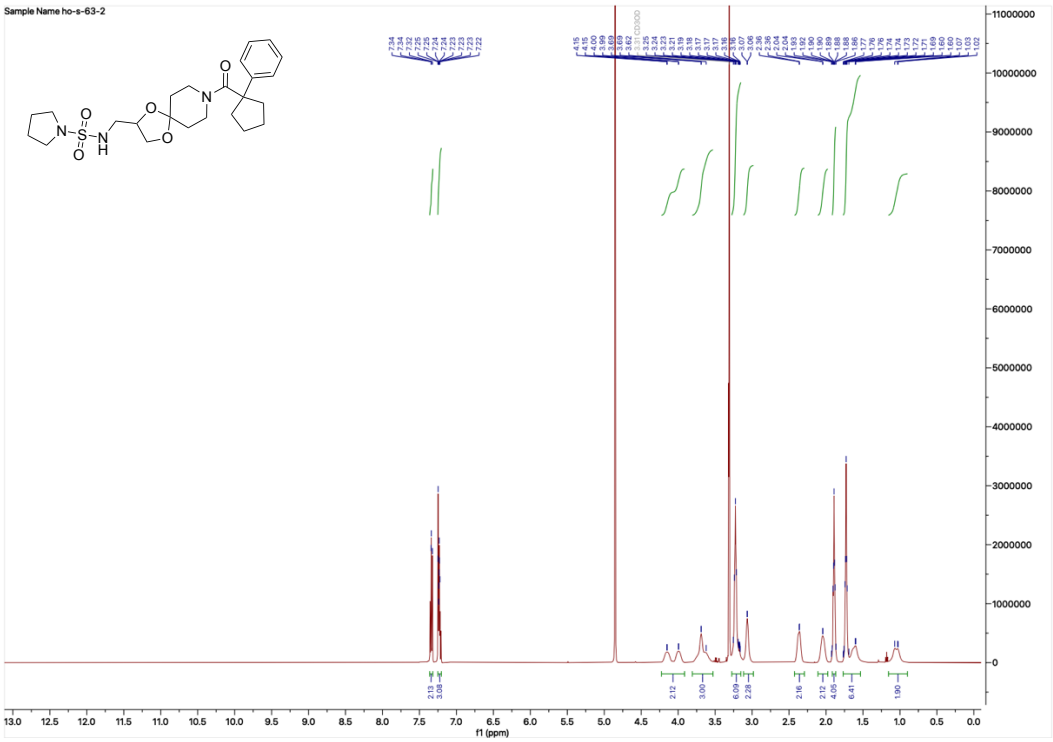


Figure S69: ^{13}C NMR (126 MHz, CD_3OD) for **3j**

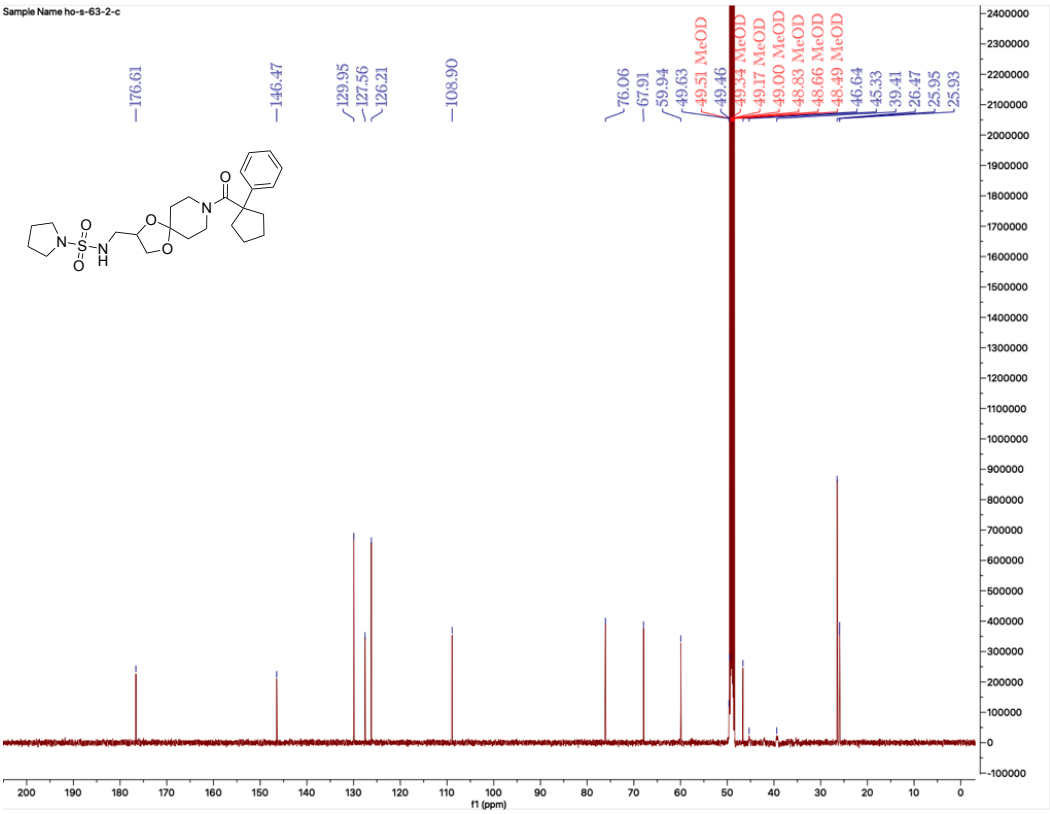


Figure S70: ^{1}H NMR (500 MHz, CD_3OD) for **3k**

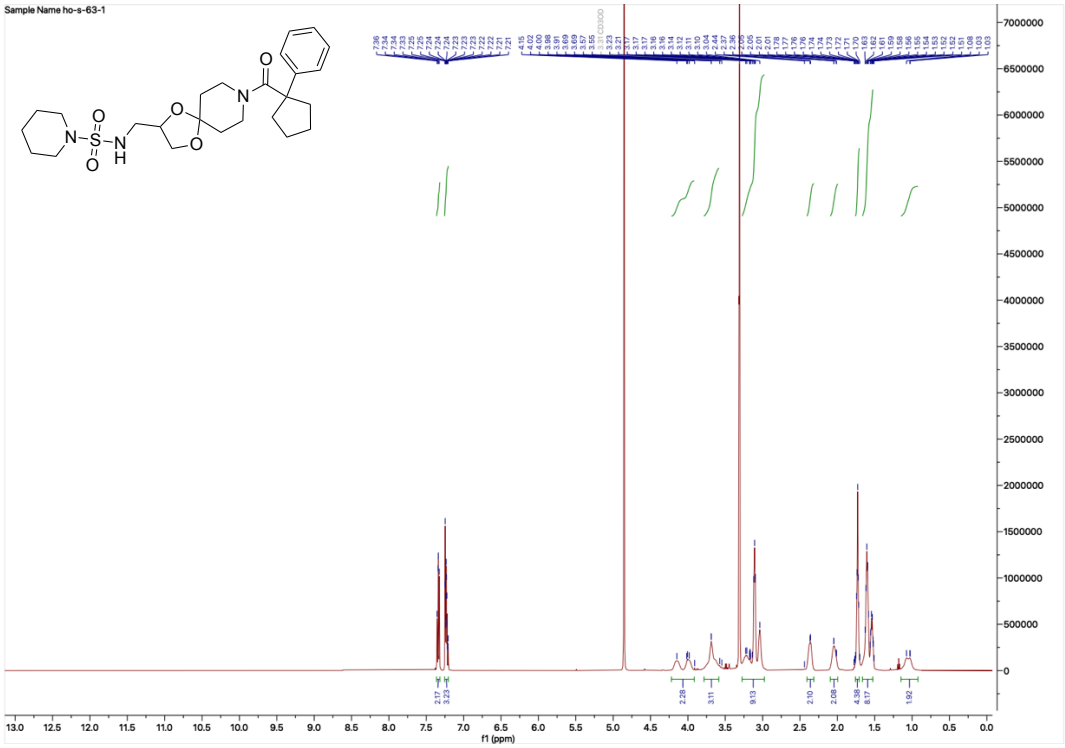


Figure S71: ^{13}C NMR (126 MHz, CD_3OD) for **3k**

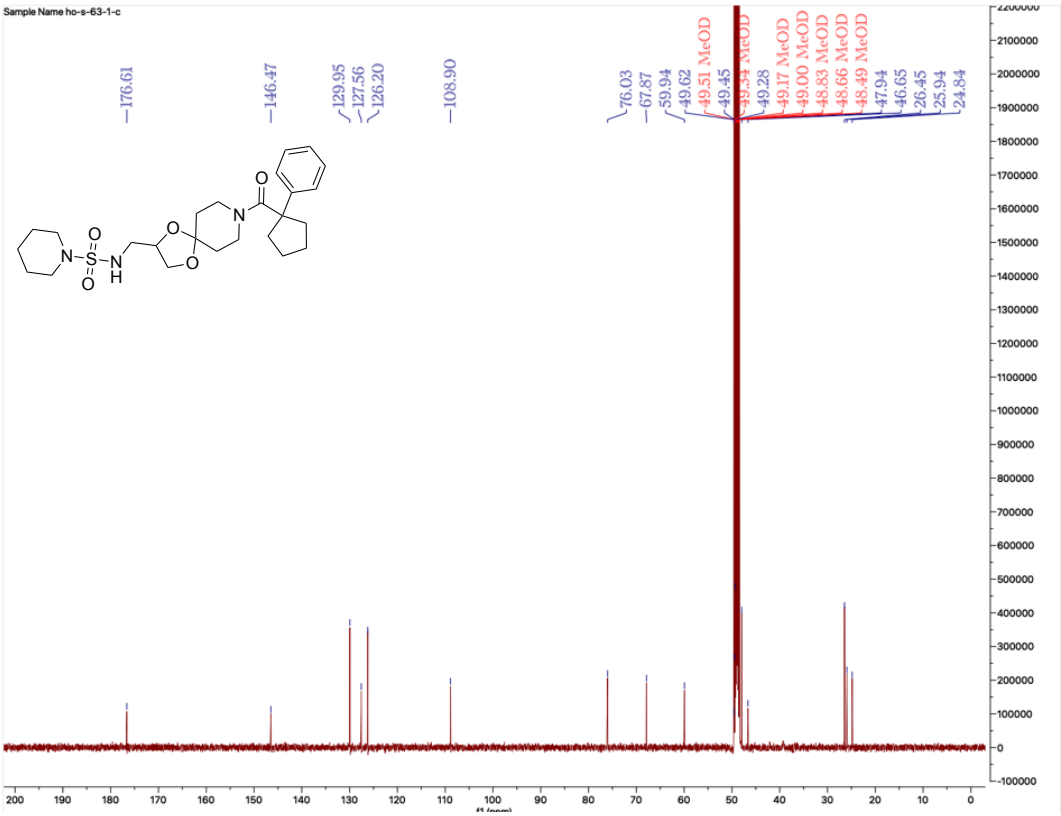


Figure S72: ^{1}H NMR (500 MHz, CD_3OD) for **3l**

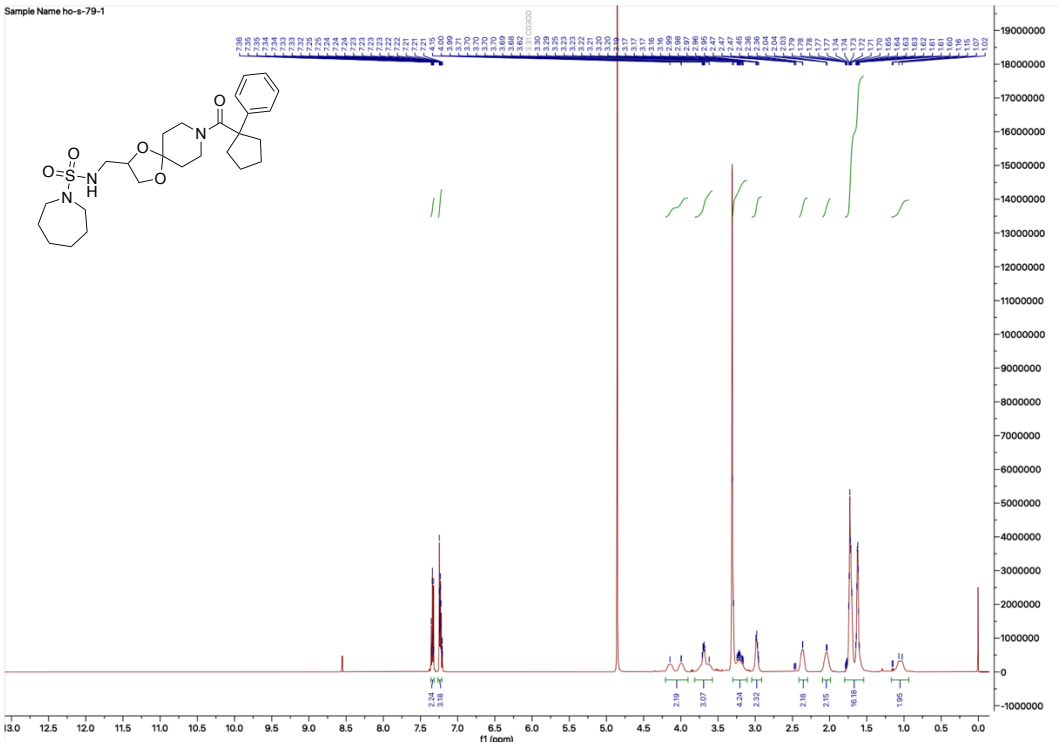


Figure S73: ^{13}C NMR (126 MHz, CD_3OD) for **3l**

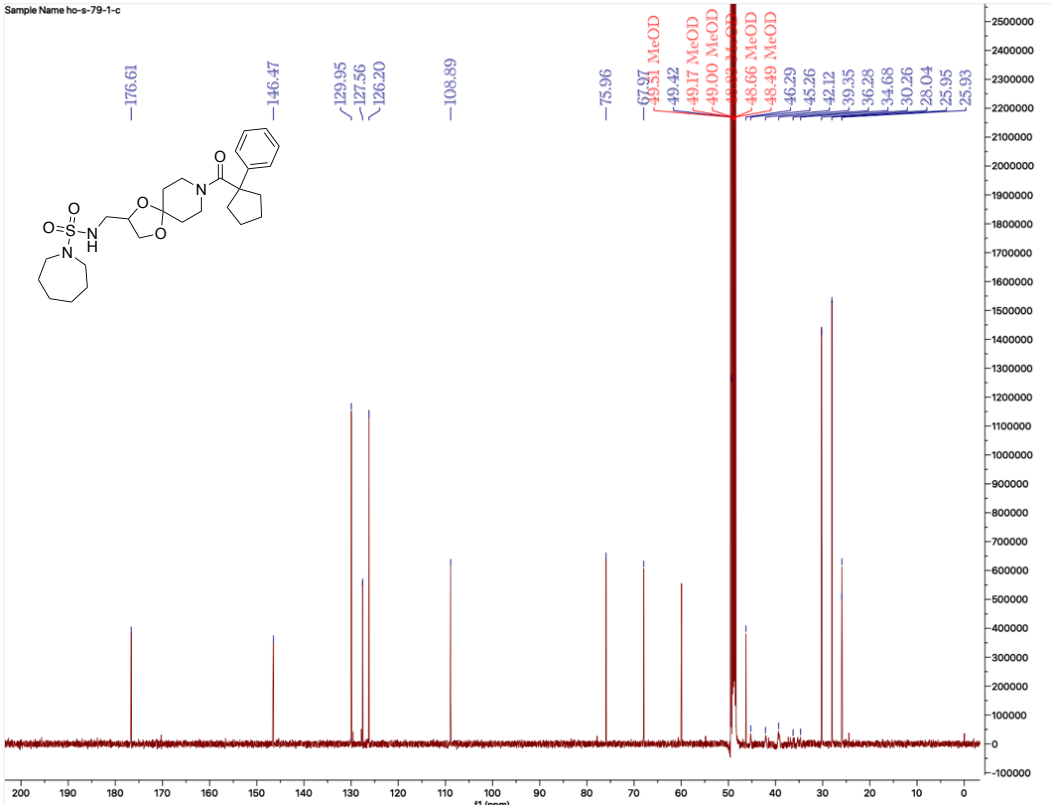


Figure S74: ^{1}H NMR (500 MHz, CD_3OD) for **3m**

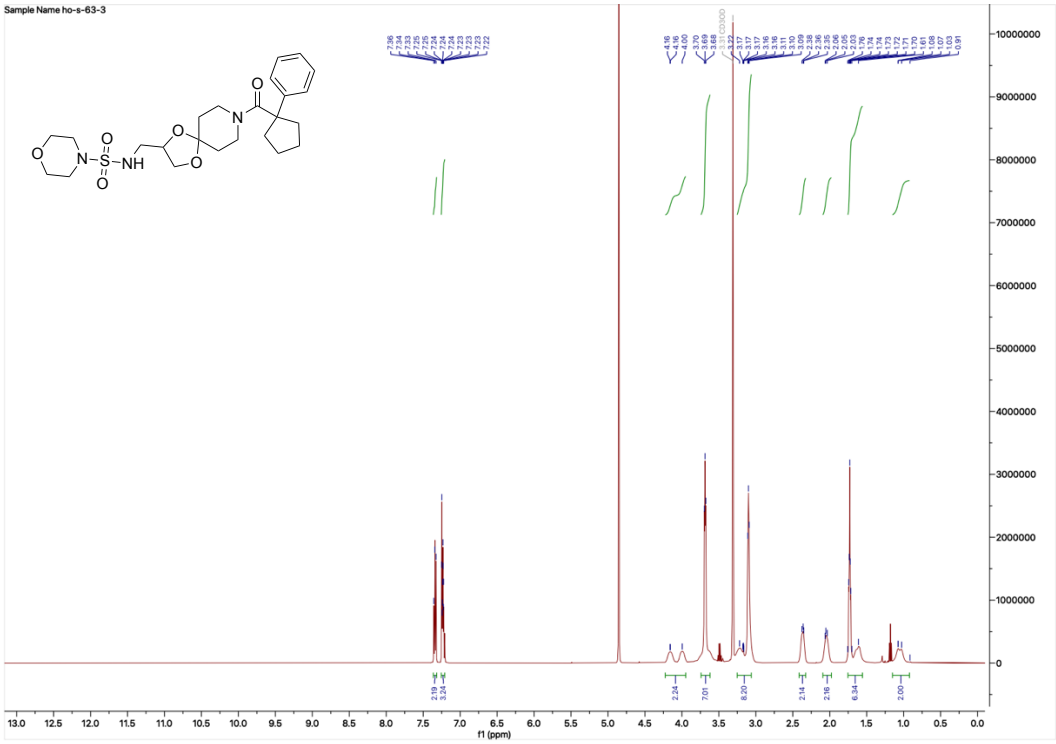


Figure S75: ^{13}C NMR (126 MHz, CD_3OD) for **3m**

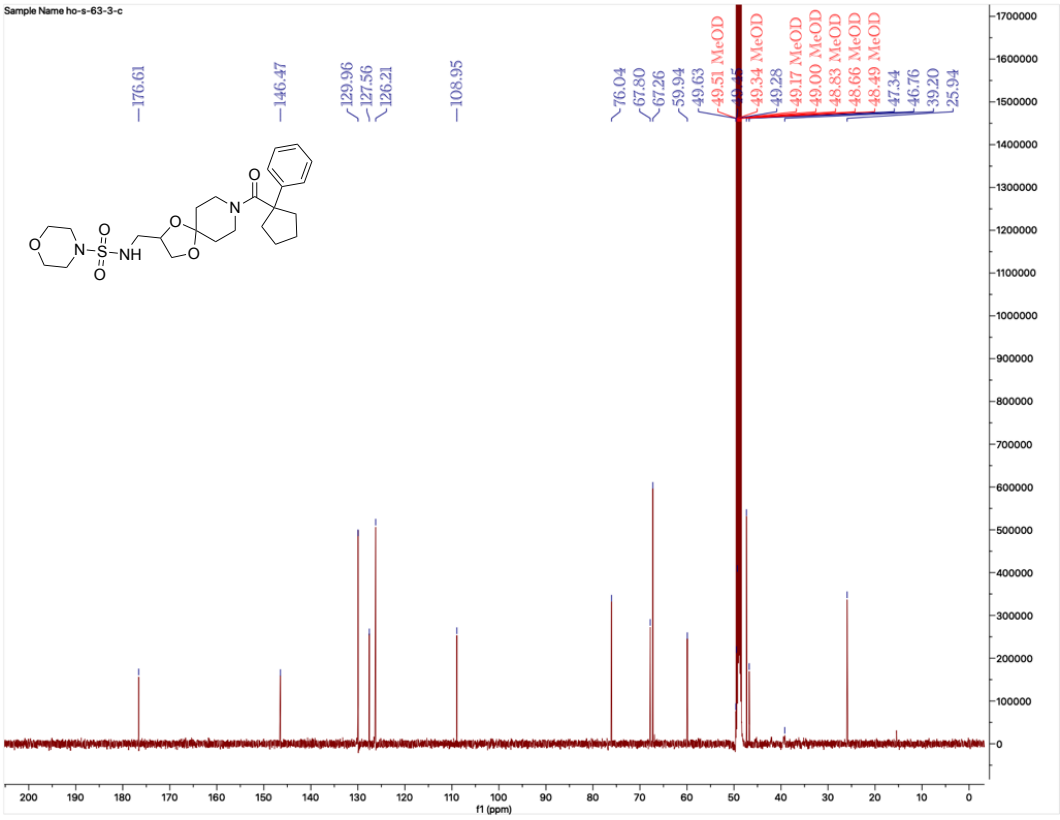


Figure S76: ^{1}H NMR (500 MHz, CD_3OD) for **3n**

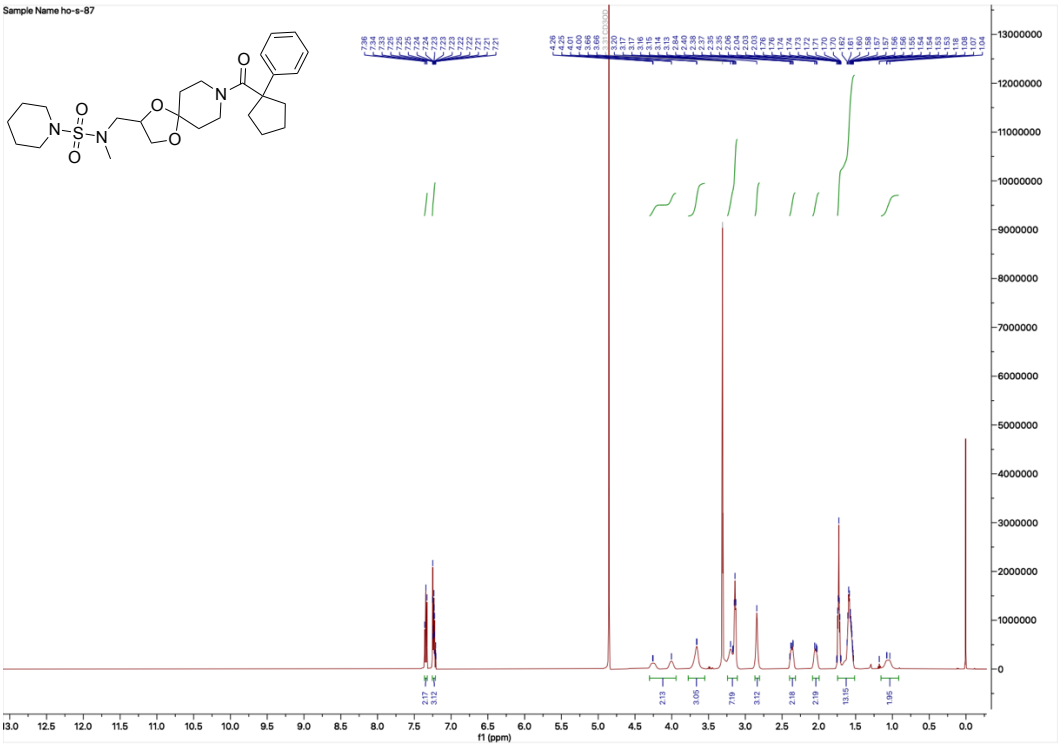


Figure S77: ^{13}C NMR (126 MHz, CD_3OD) for **3n**

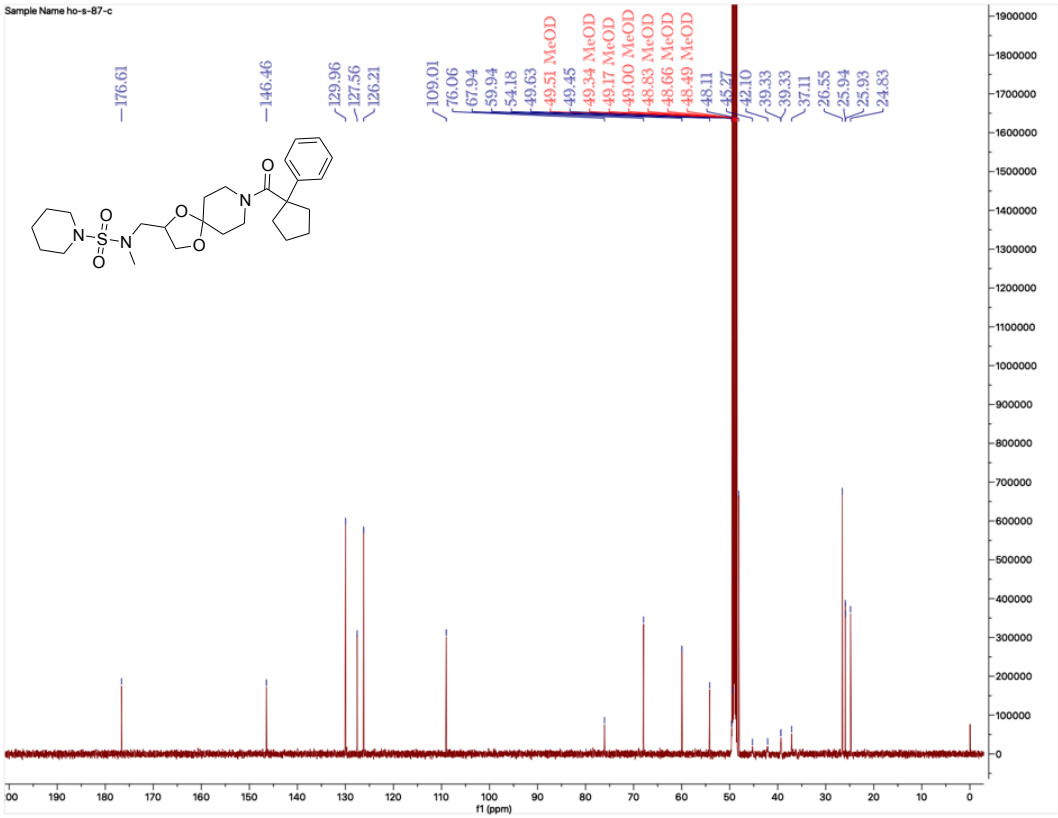


Figure S78: ^{1}H NMR (500 MHz, CD_3OD) for **3o**

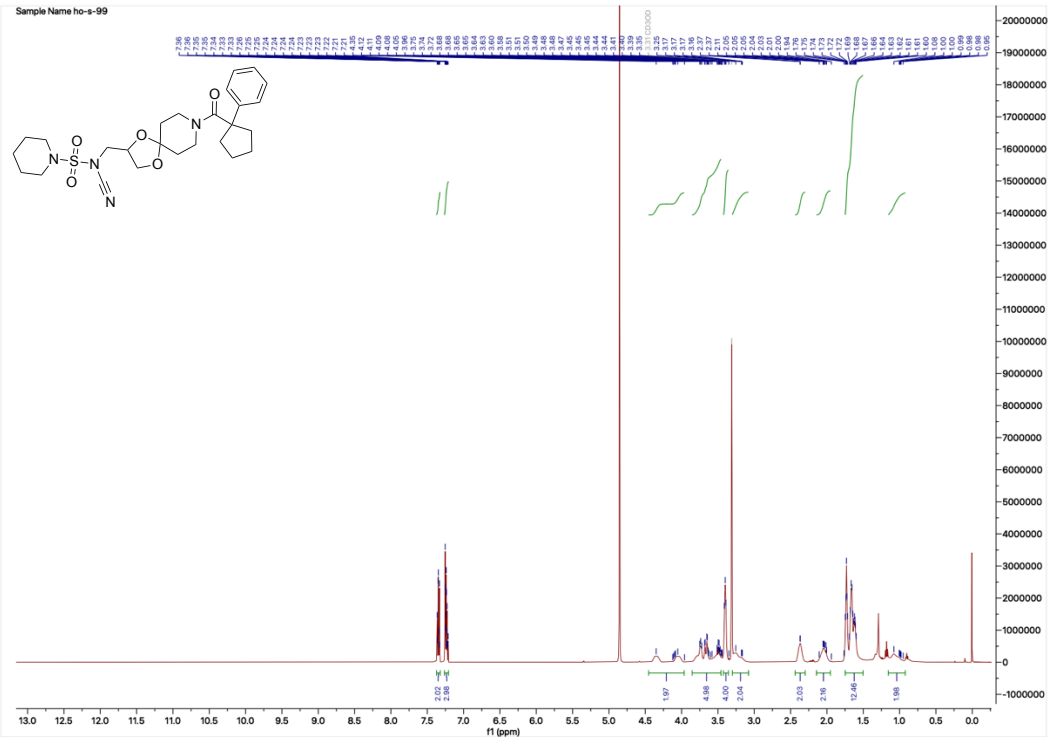


Figure S79: ^{13}C NMR (126 MHz, CD_3OD) for **3o**

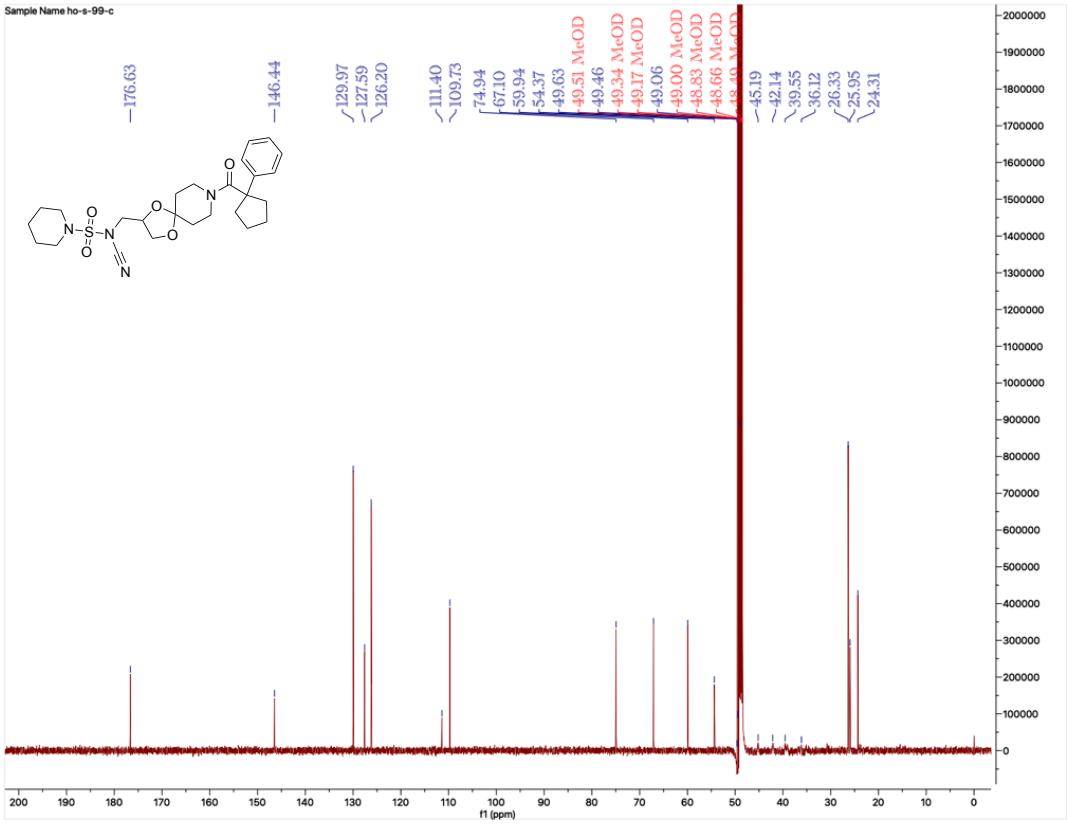


Figure S80: ^{1}H NMR (500 MHz, CD_3OD) for **3p**

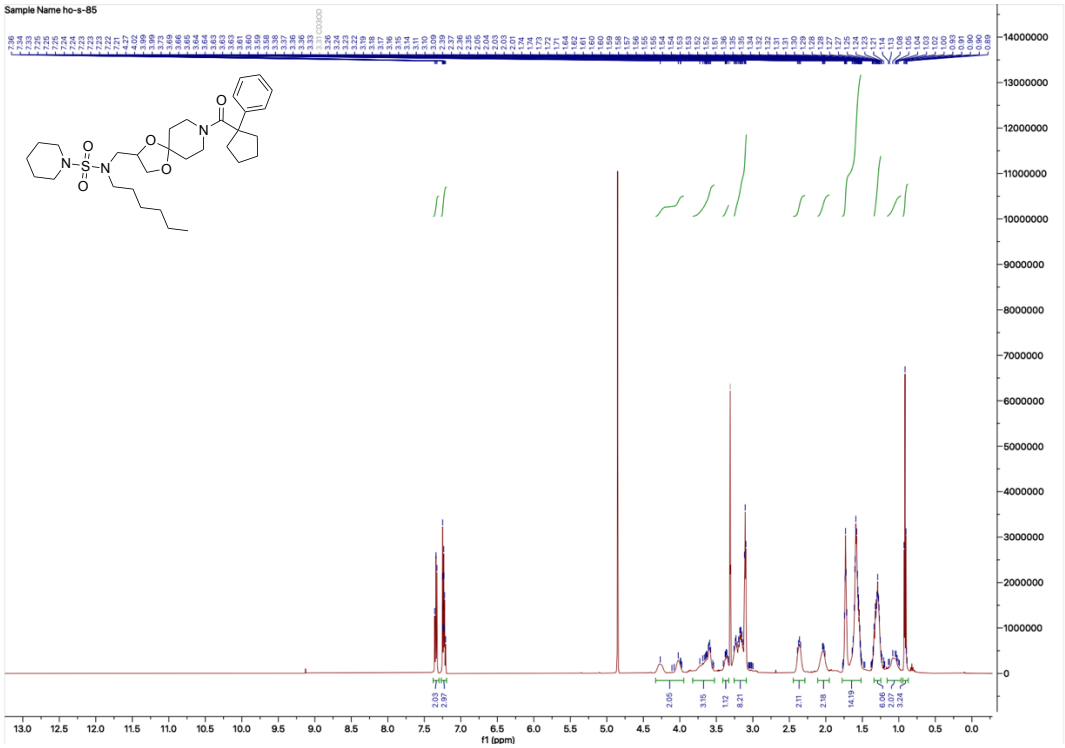


Figure S81: ^{13}C NMR (126 MHz, CD_3OD) for **3p**

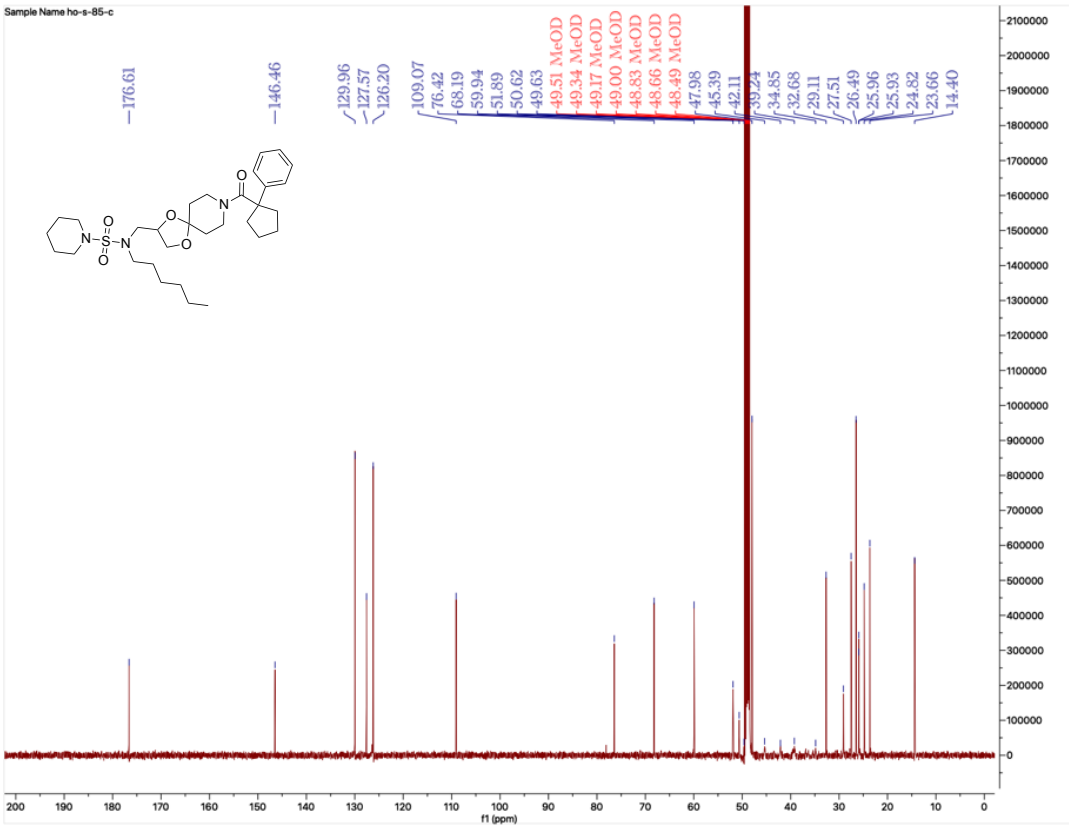


Figure S82: ^{1}H NMR (500 MHz, CD_3OD) for **3q**

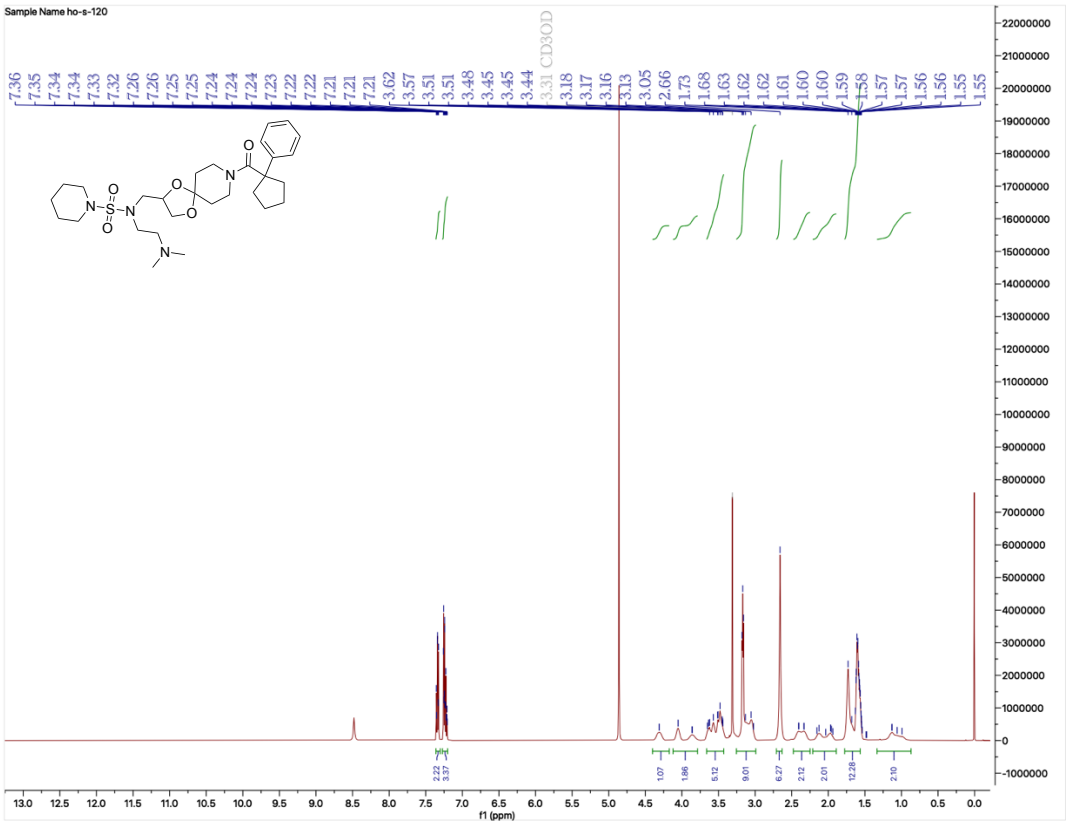


Figure S83: ^{13}C NMR (126 MHz, CD_3OD) for **3q**

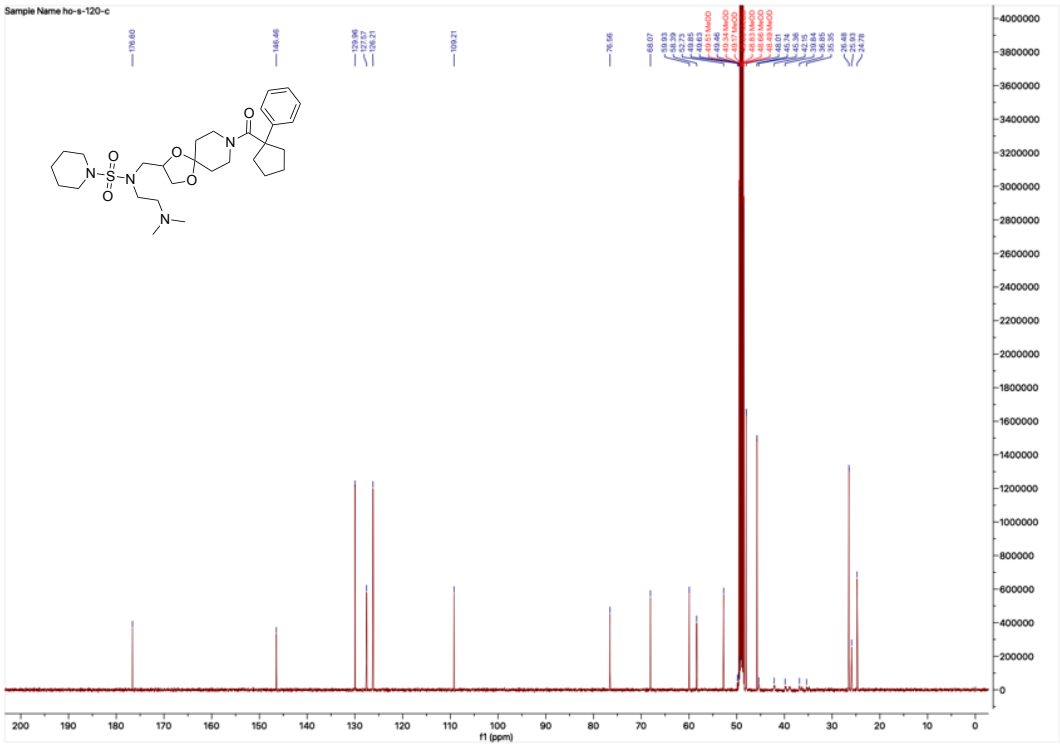


Figure S84: ^{1}H NMR (500 MHz, CD_3OD) for **3r**

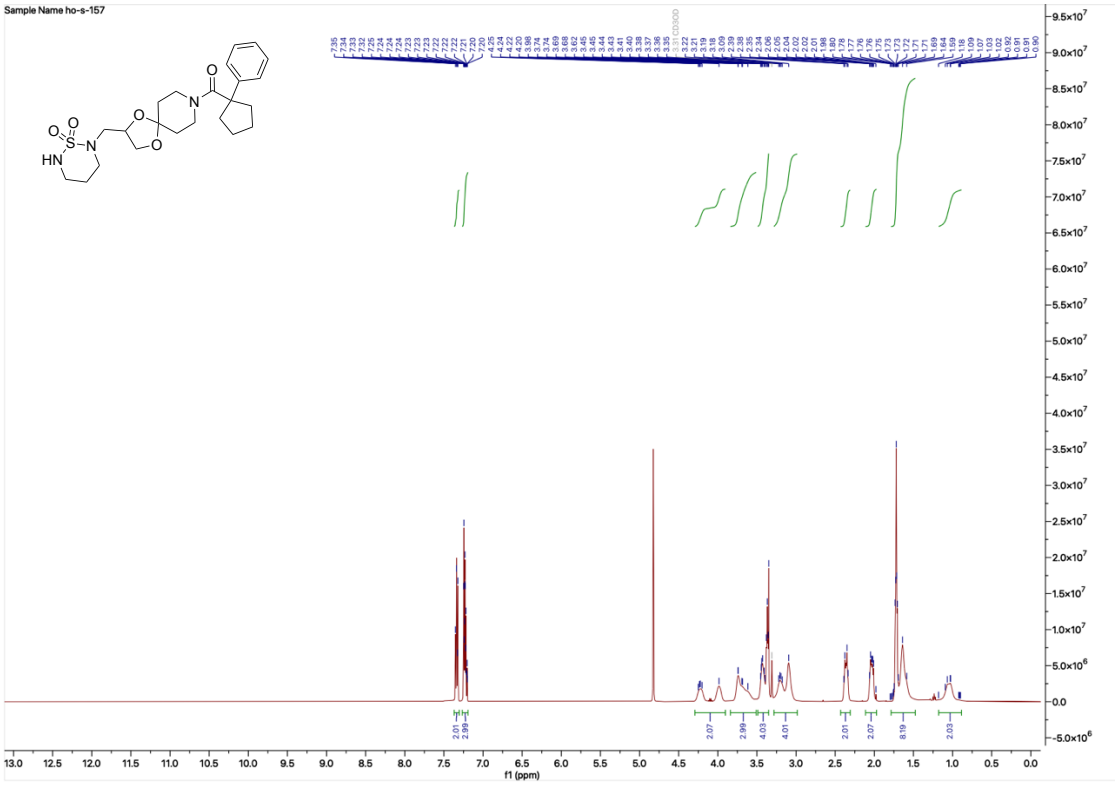


Figure S85: ^{13}C NMR (126 MHz, CD_3OD) for **3r**

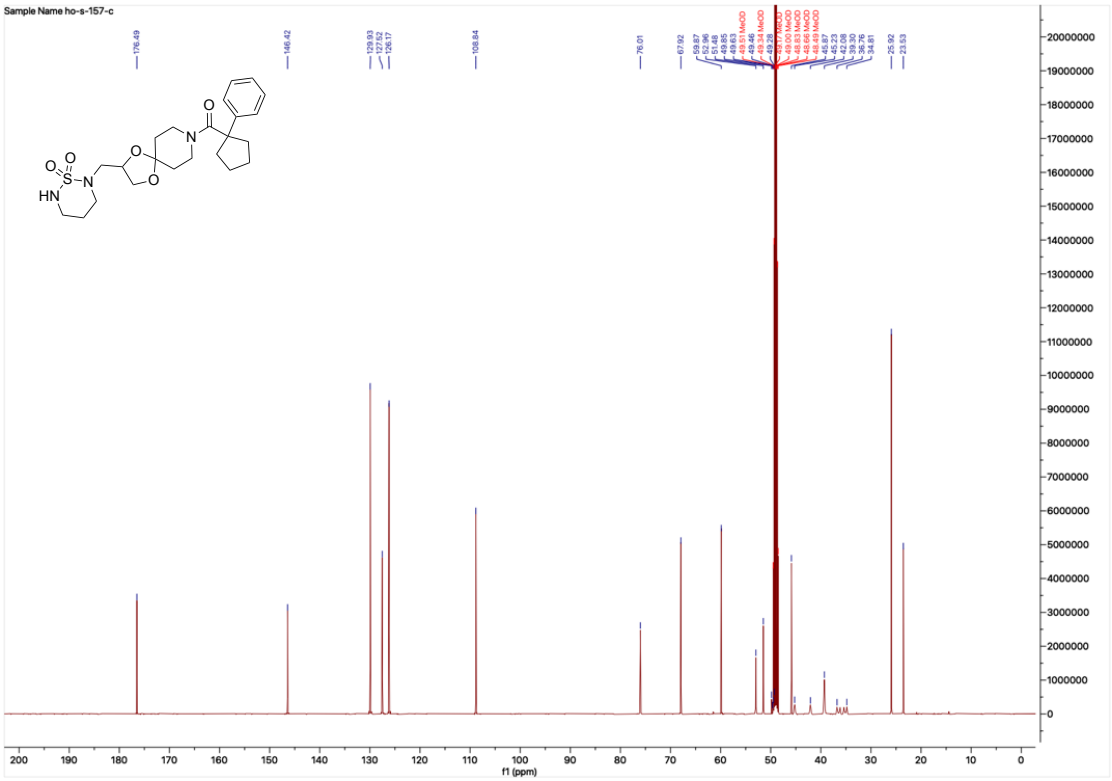


Figure S86: ^{1}H NMR (500 MHz, CD_3OD) for **3s**

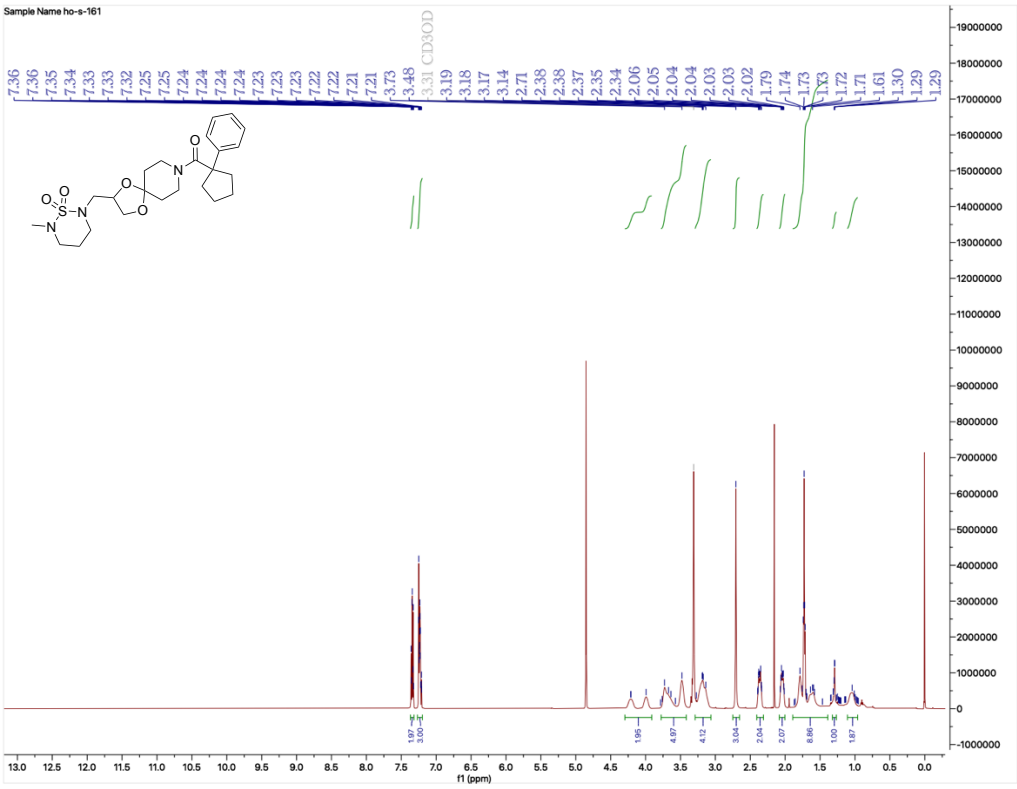


Figure S87: ^{13}C NMR (126 MHz, CD_3OD) for **3s**

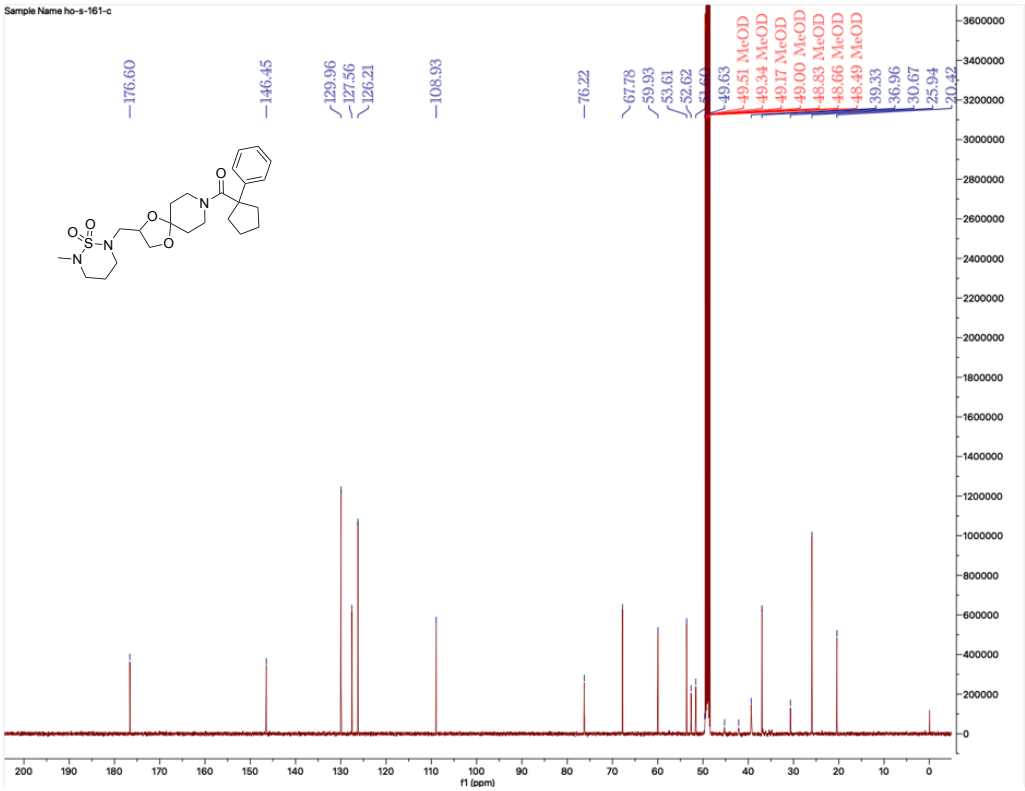


Figure S88: ^{1}H NMR (500 MHz, CD_3OD) for **3t**

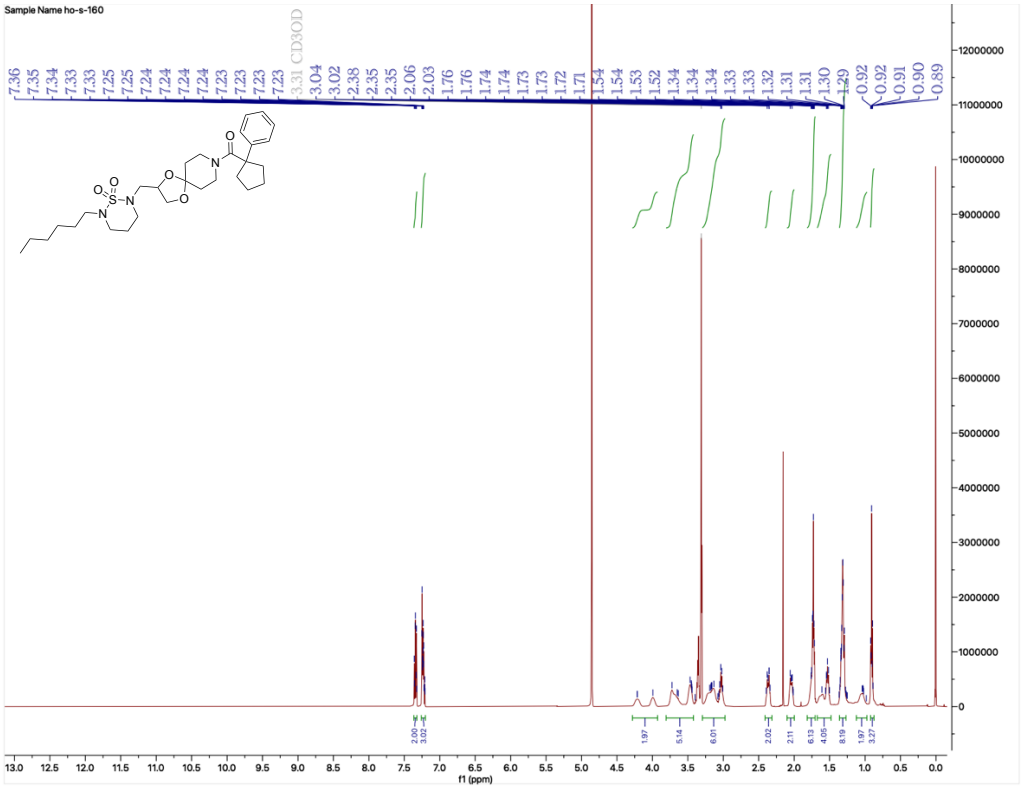


Figure S89: ^{13}C NMR (126 MHz, CD_3OD) for **3t**

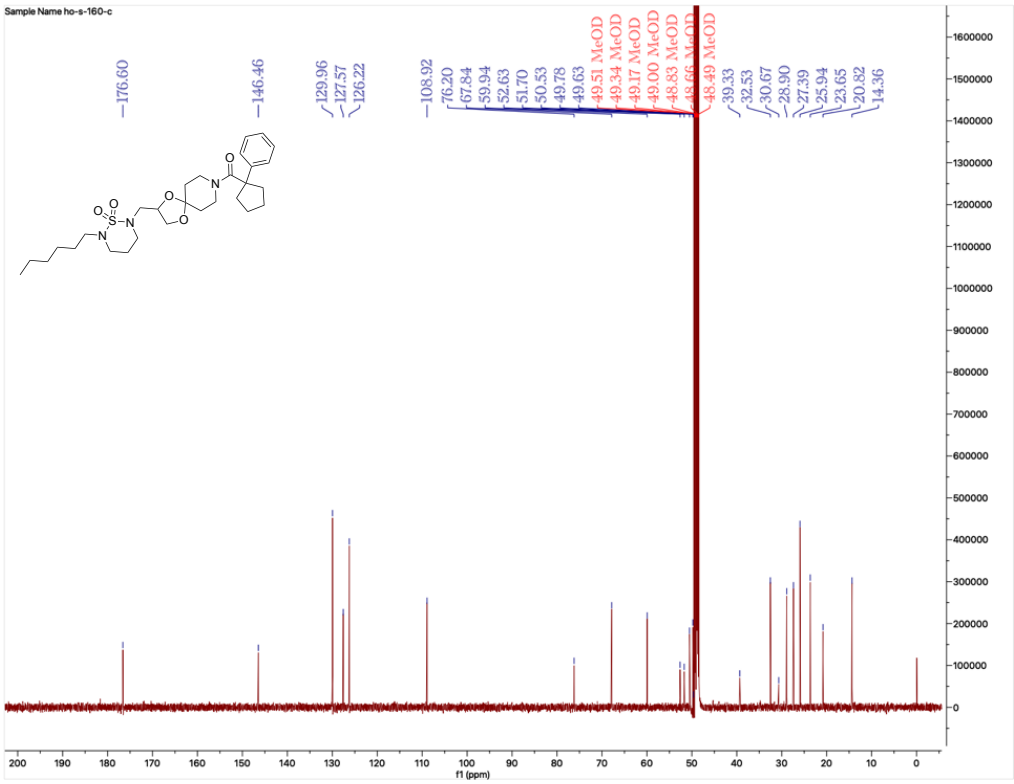


Figure S90: ^{1}H NMR (500 MHz, CD_3OD) for **4a**

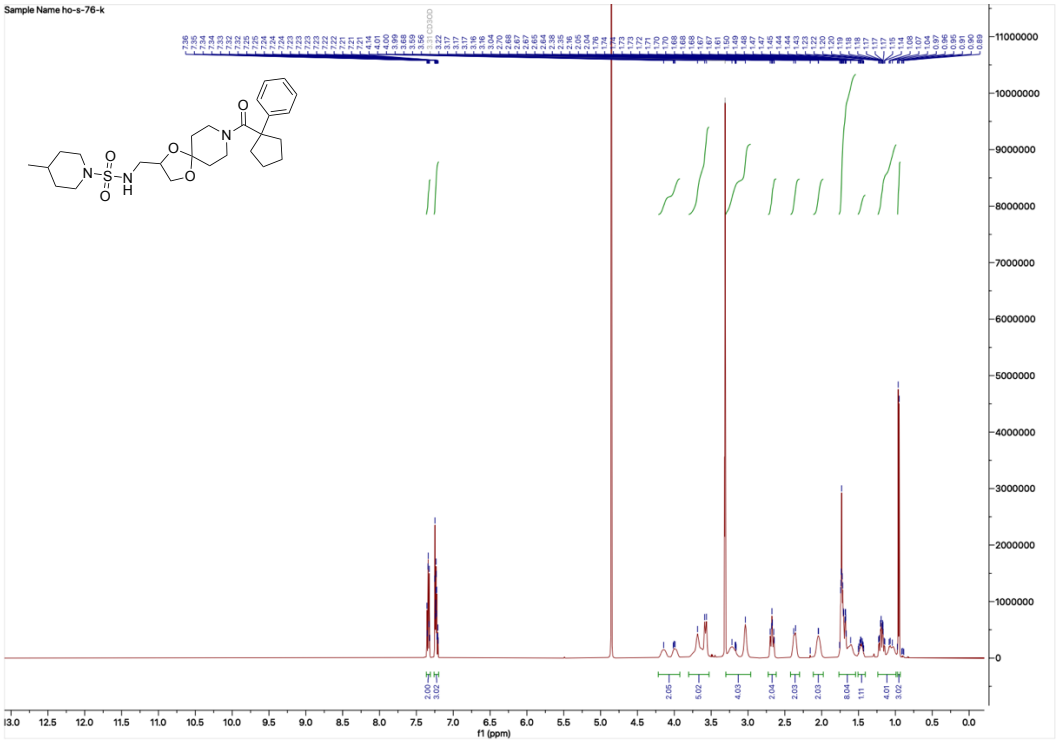


Figure S91: ^{13}C NMR (126 MHz, CD_3OD) for **4a**

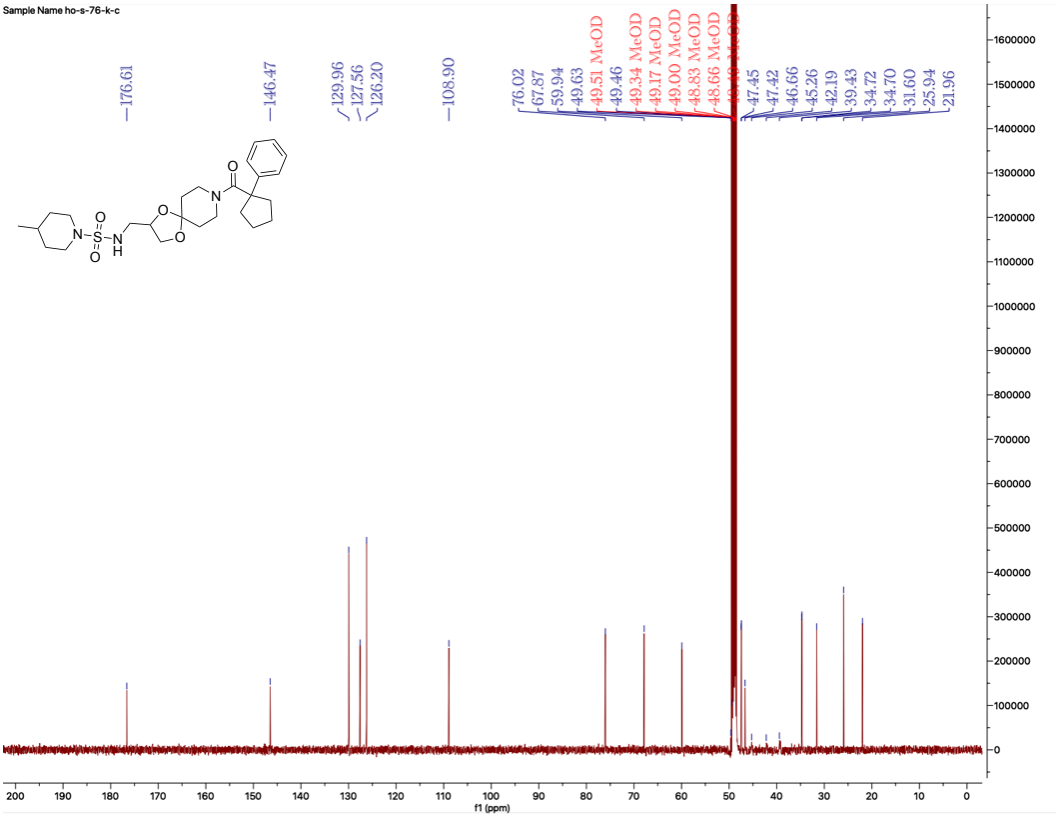


Figure S92: ^{1}H NMR (500 MHz, CD_3OD) for **4b**

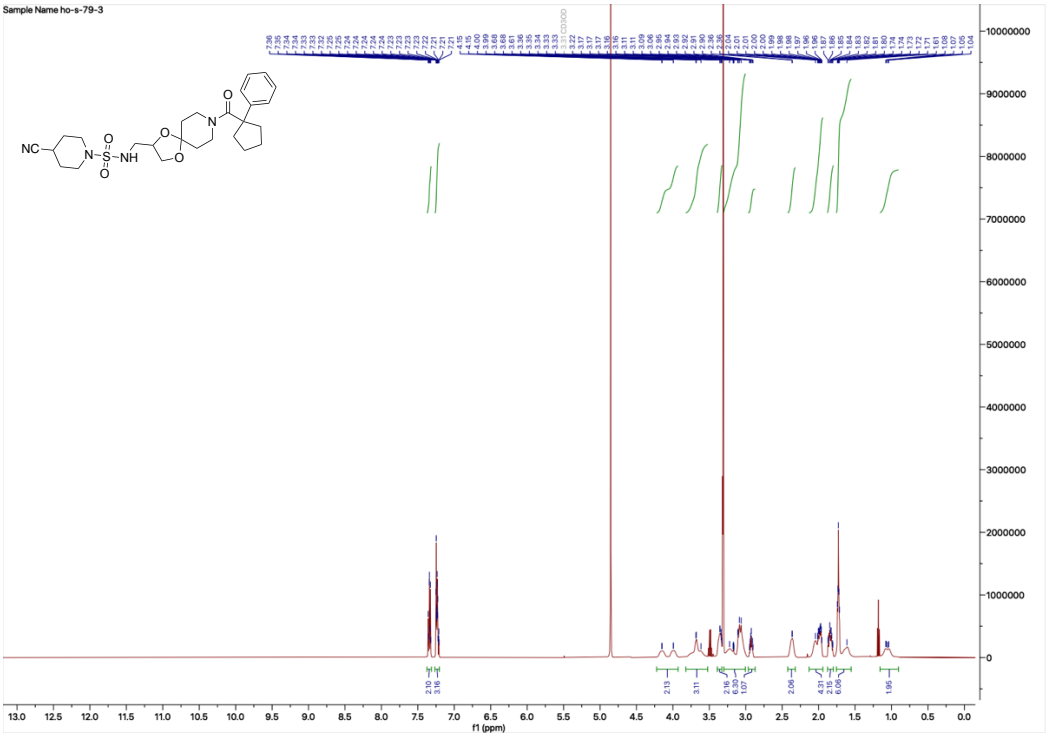


Figure S93: ^{13}C NMR (126 MHz, CD_3OD) for **4b**

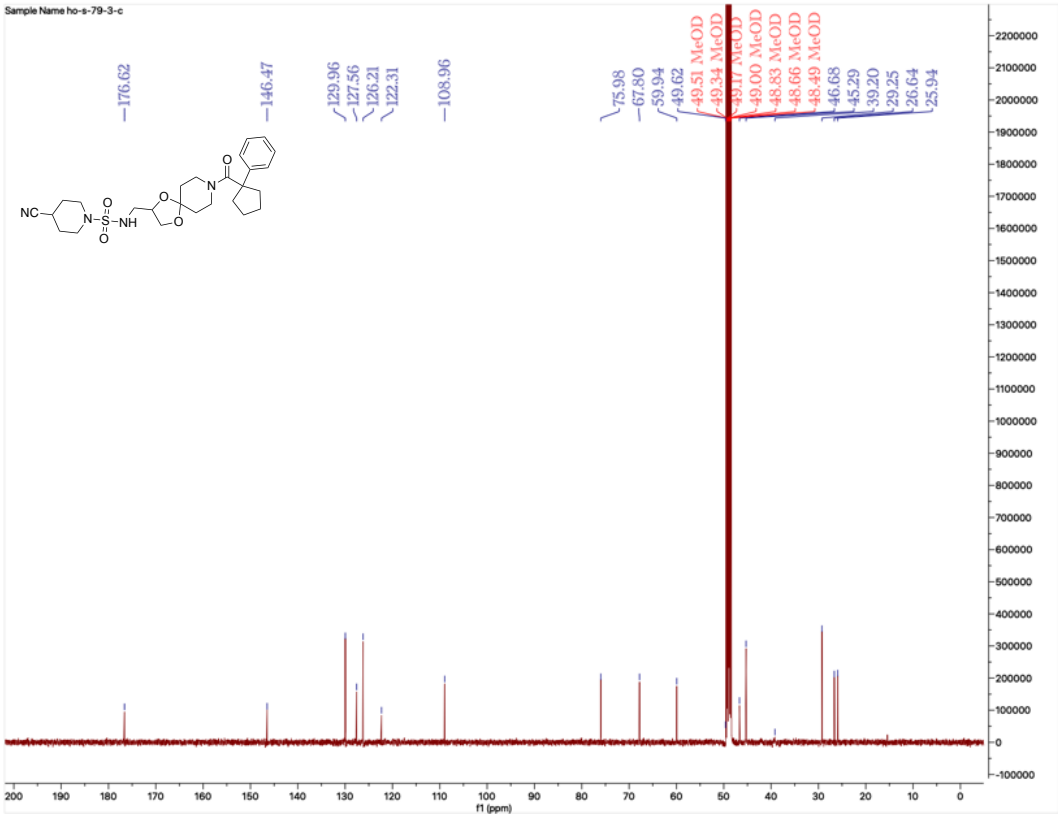


Figure S94: ^{1}H NMR (400 MHz, DMSO) for **4c**

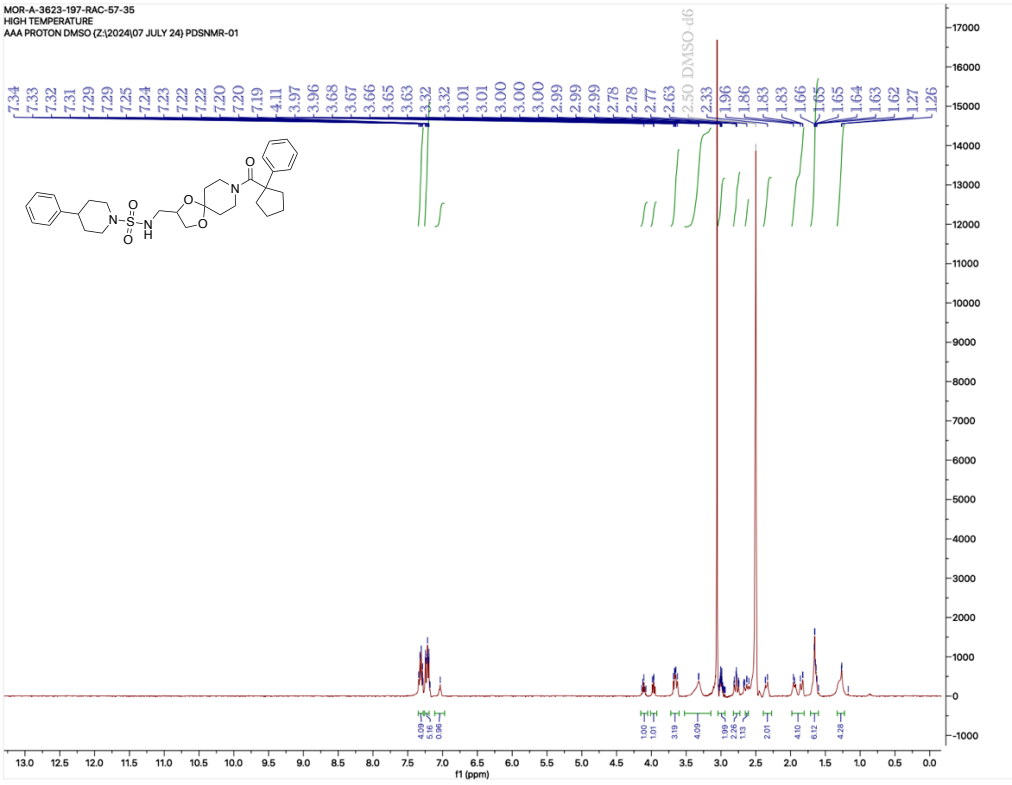


Figure S95: ^{13}C NMR (101 MHz, DMSO) for **4c**

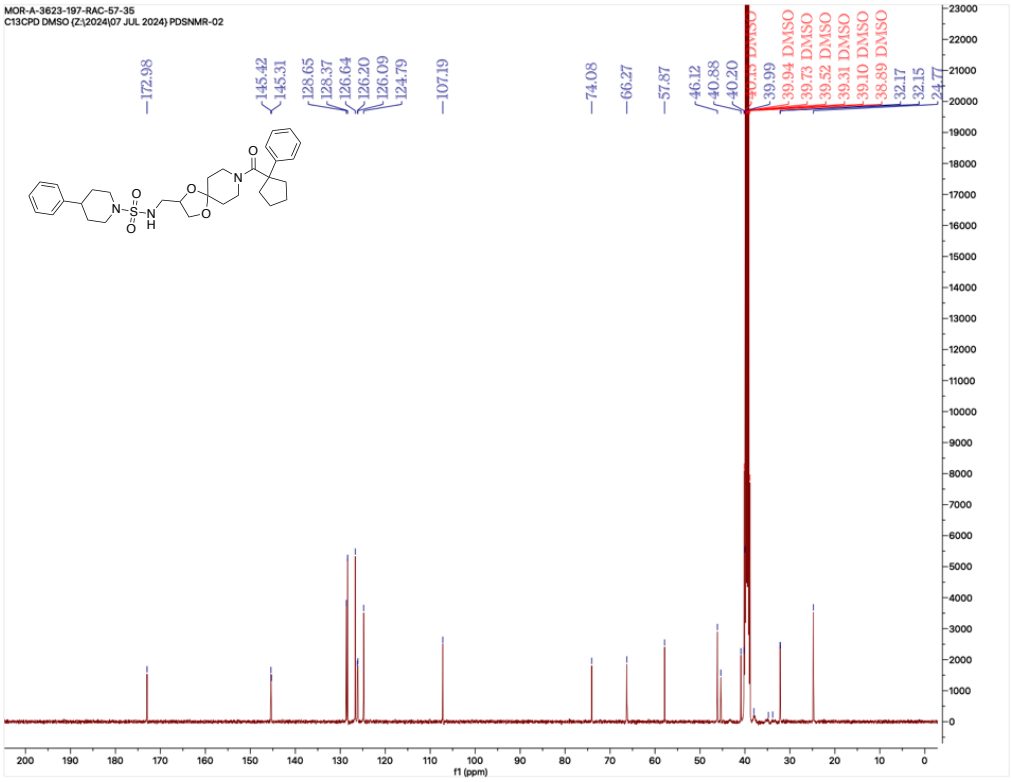


Figure S96: ^{1}H NMR (500 MHz, CD_3OD) for **4d**

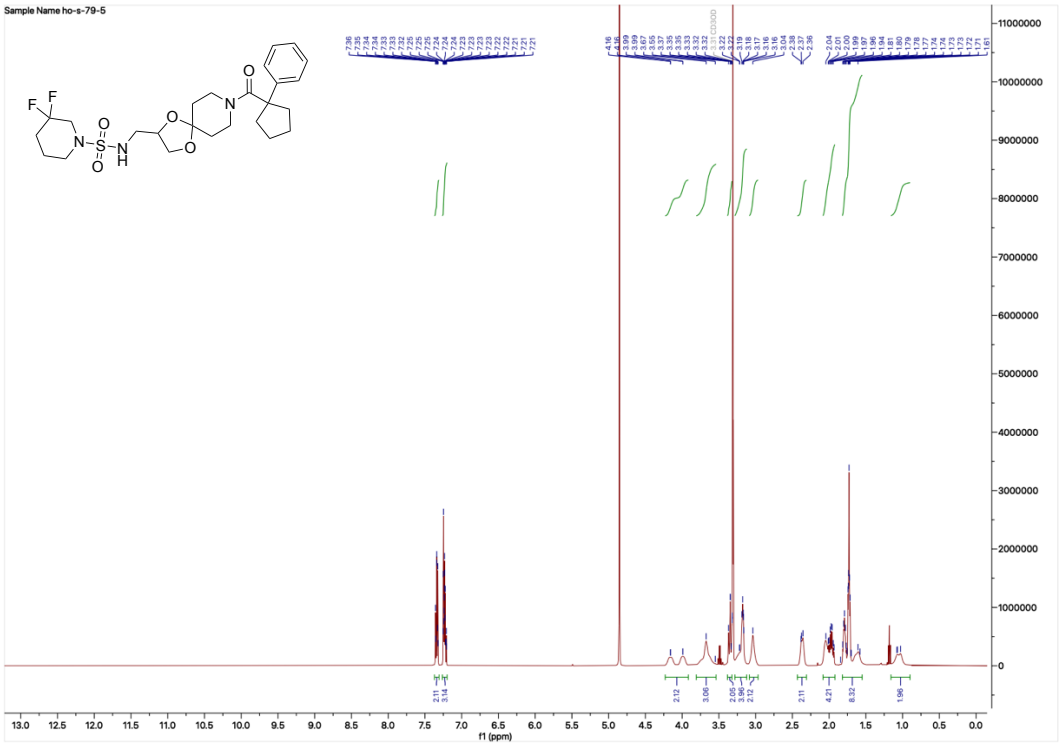


Figure S97: ^{13}C NMR (126 MHz, CD_3OD) for **4d**

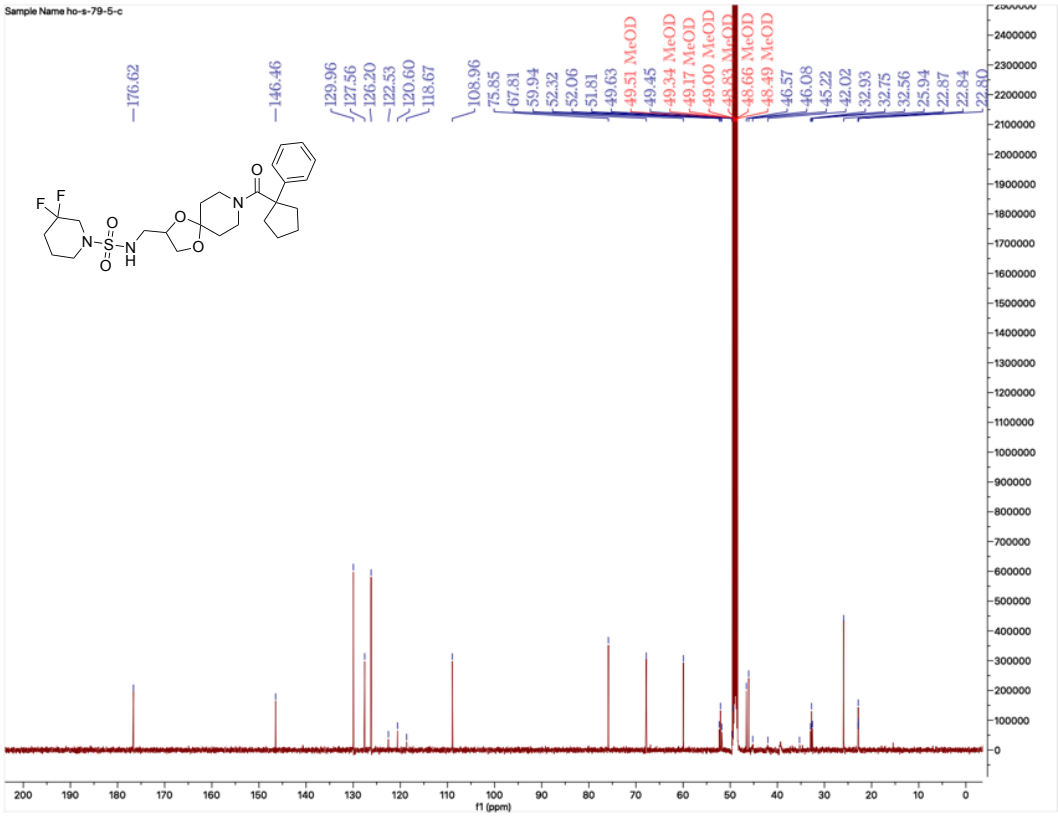


Figure S98: ^{1}H NMR (500 MHz, CD_3OD) for **5a**

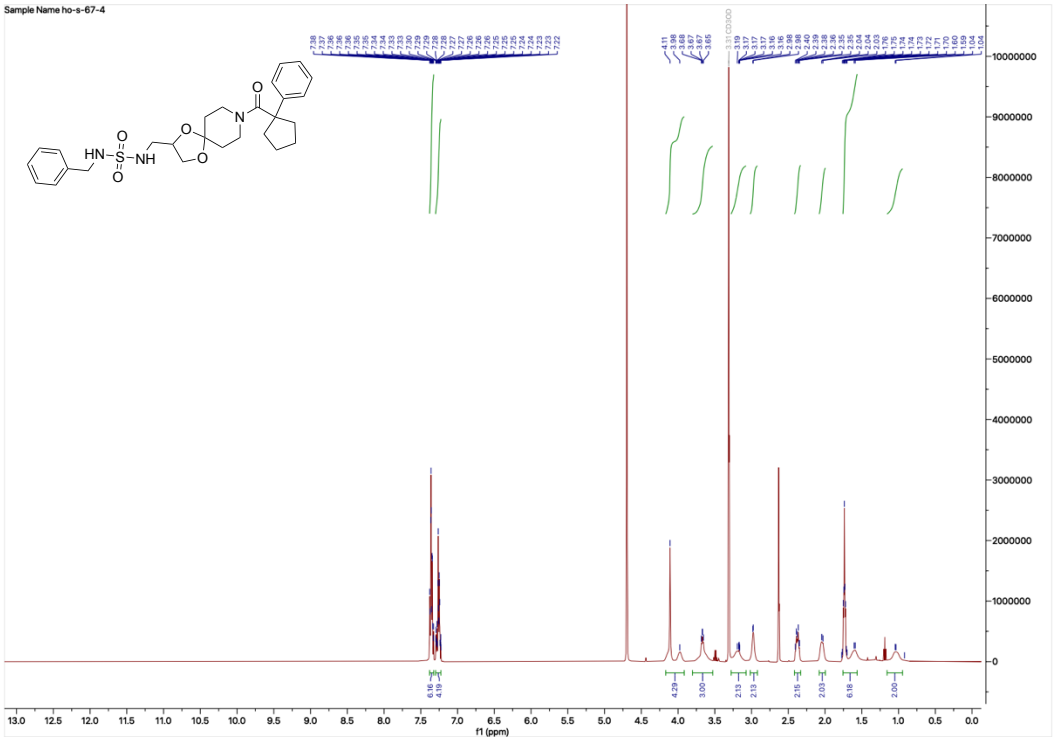


Figure S99: ^{13}C NMR (126 MHz, DMSO) for **5a**

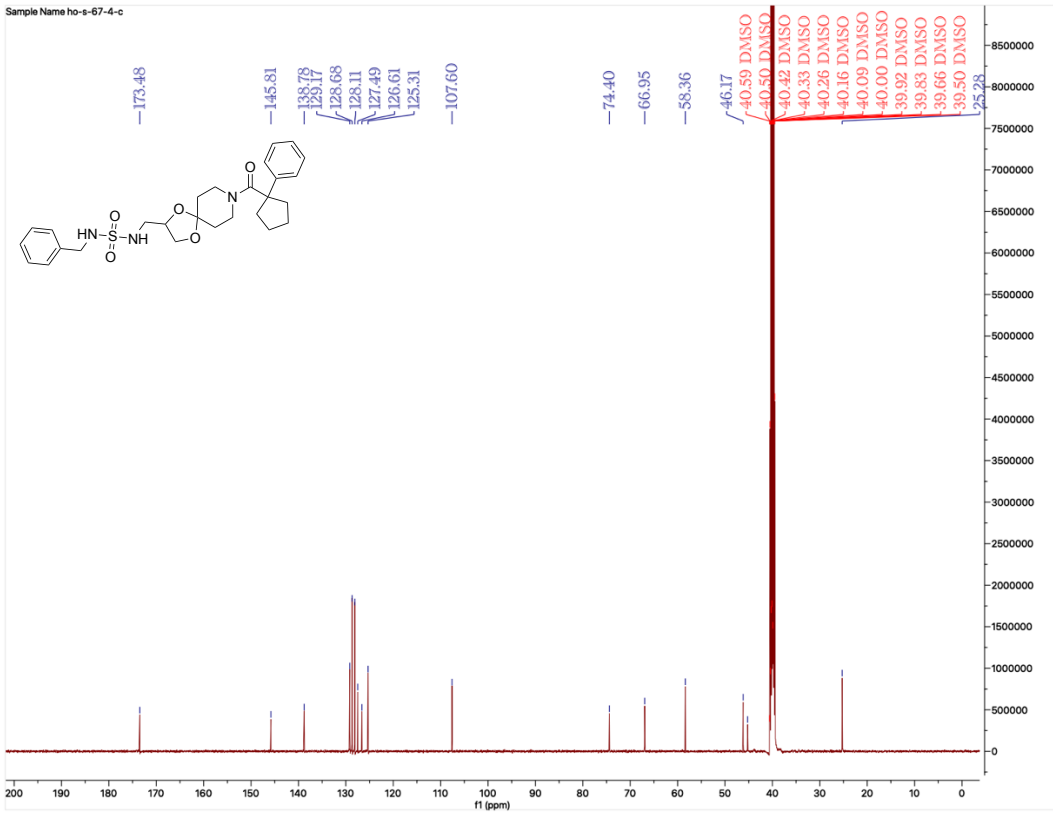


Figure S100: ^{1}H NMR (500 MHz, CD_3OD) for **5b**

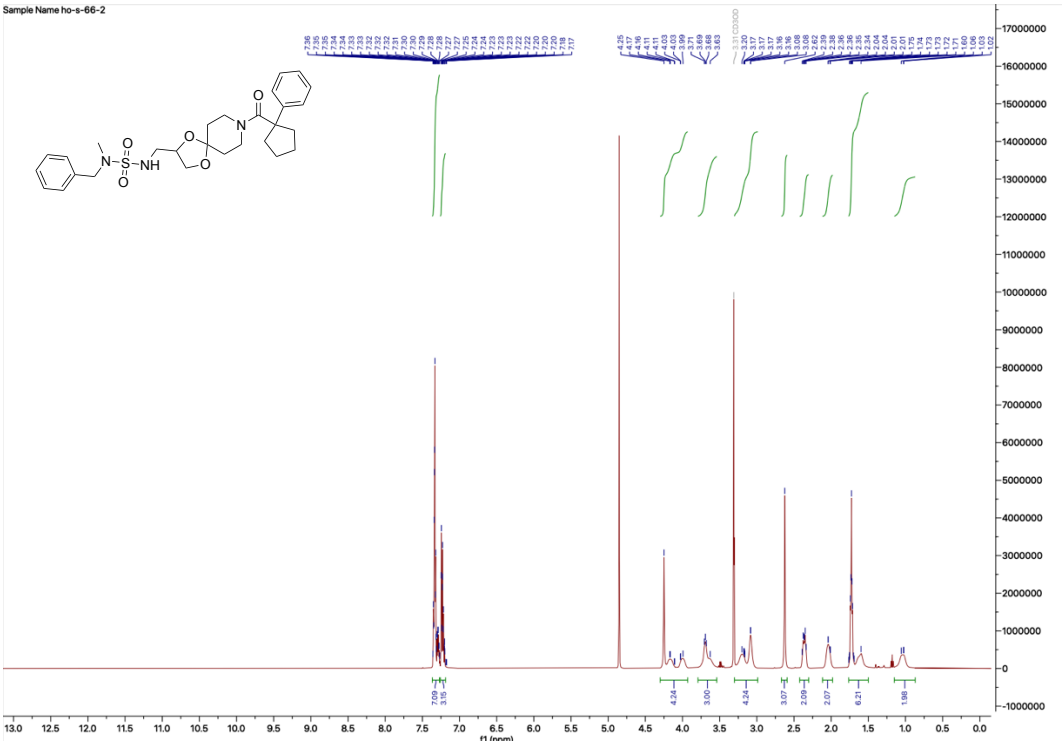


Figure S101: ^{13}C NMR (126 MHz, CD_3OD) for **5b**

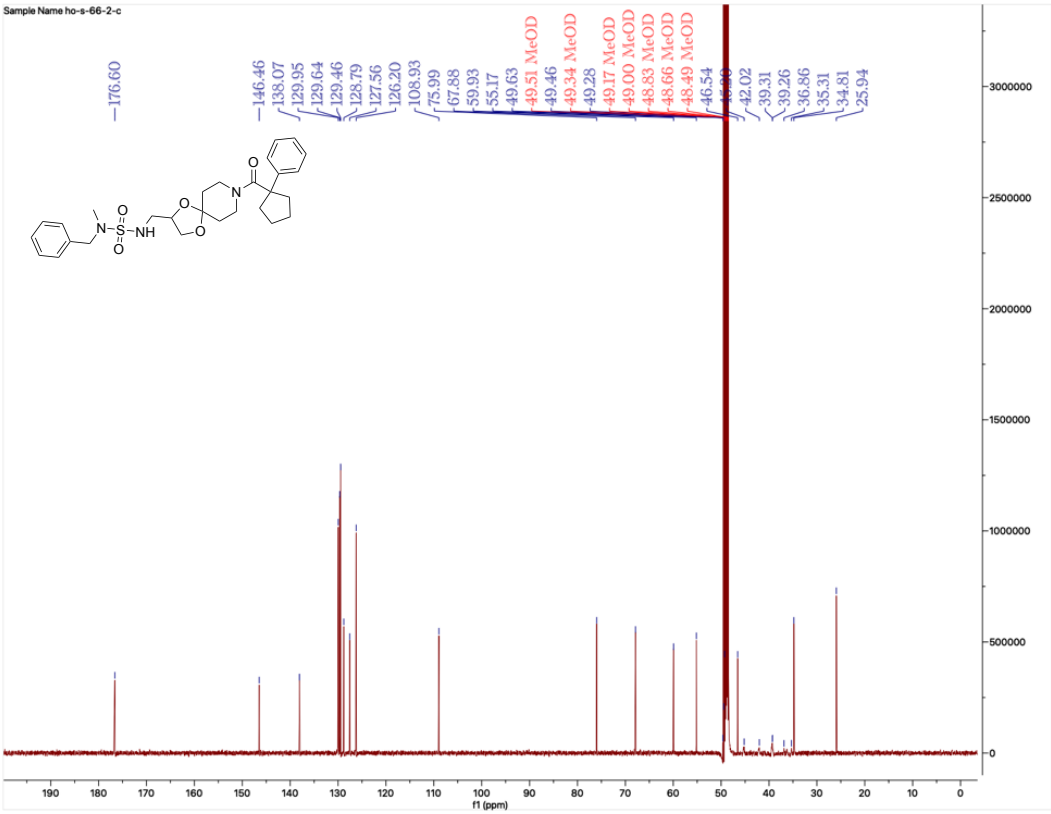


Figure S102: ^{1}H NMR (400 MHz, DMSO) for **5c**

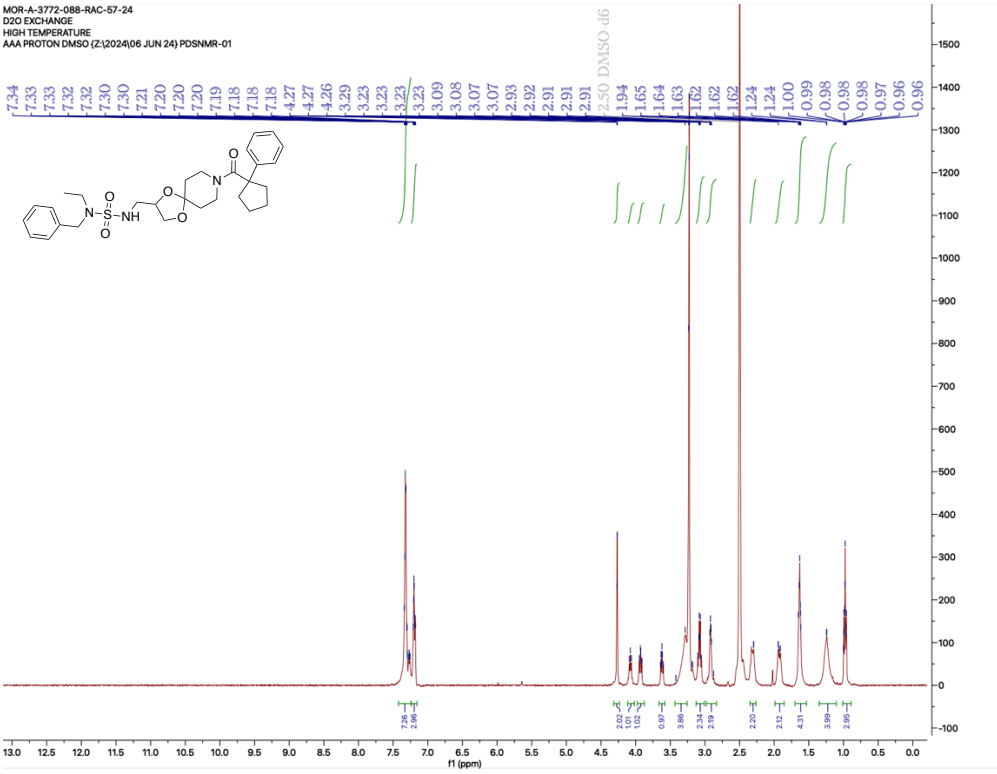


Figure S103: ^{13}C NMR (101 MHz, DMSO) for **5c**

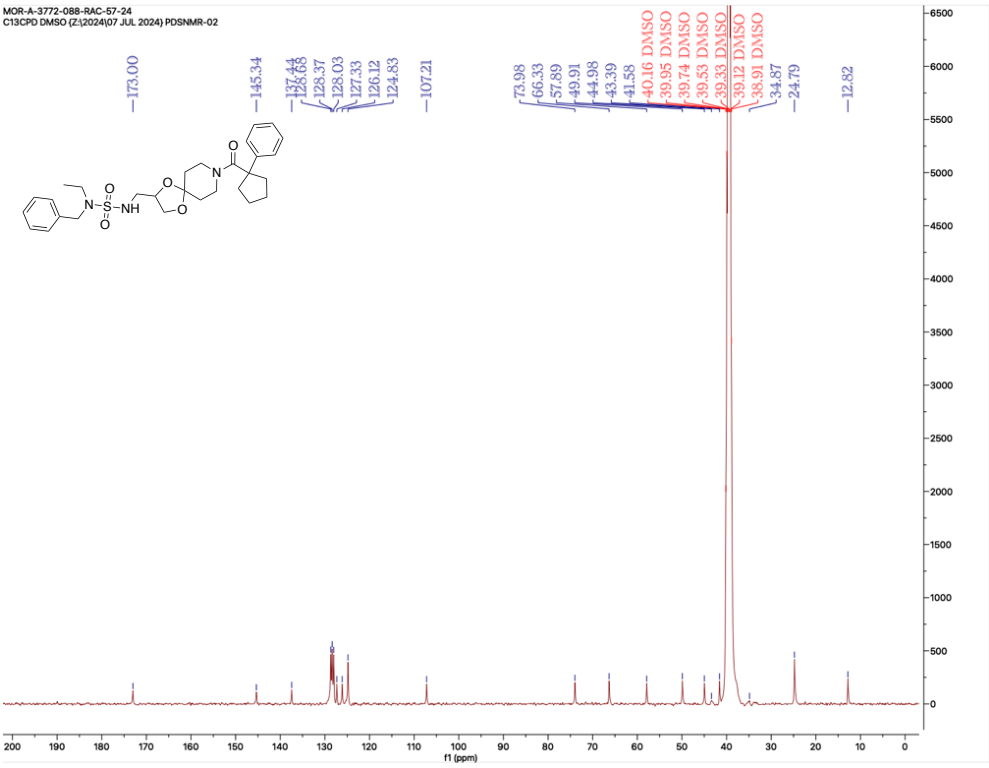


Figure S104: ^{1}H NMR (400 MHz, DMSO) for **5d**

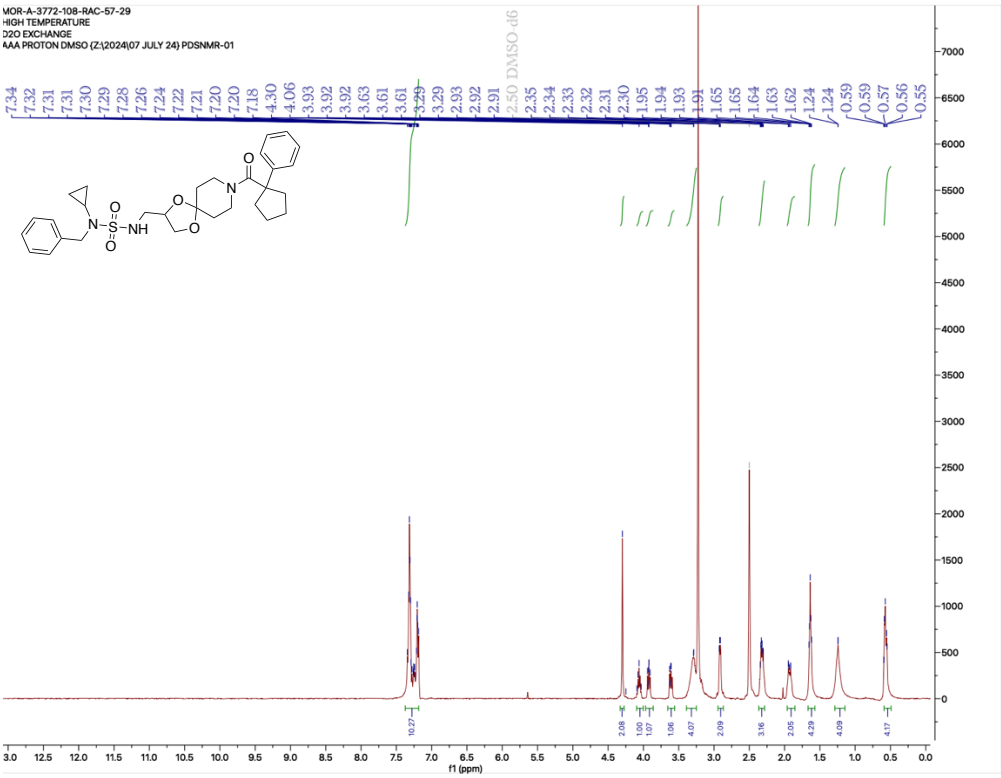


Figure S105: ^{13}C NMR (101 MHz, DMSO) for **5d**

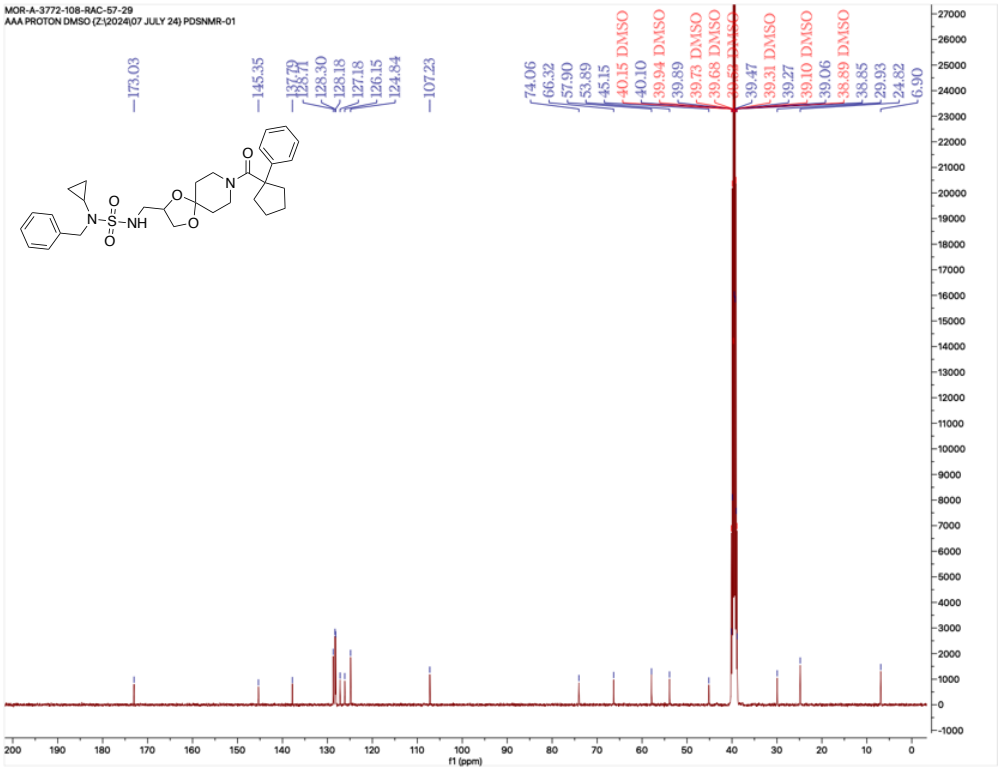


Figure S106: ^{1}H NMR (500 MHz, CD_3OD) for **5e**

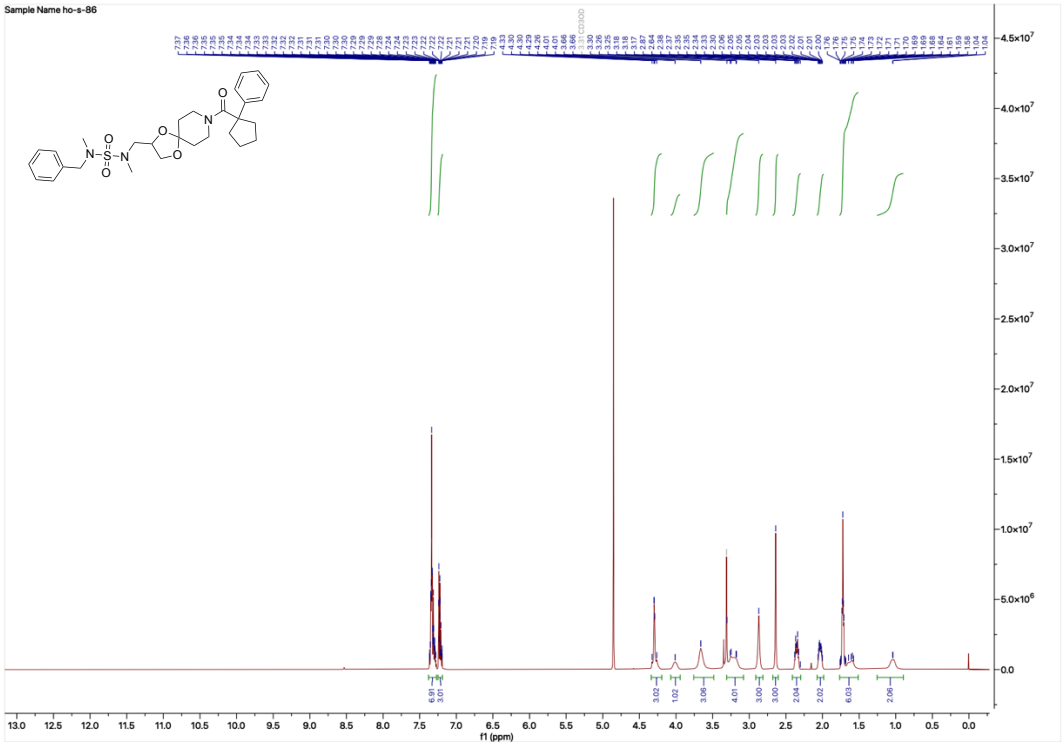


Figure S107: ^{13}C NMR (126 MHz, CD_3OD) for **5e**

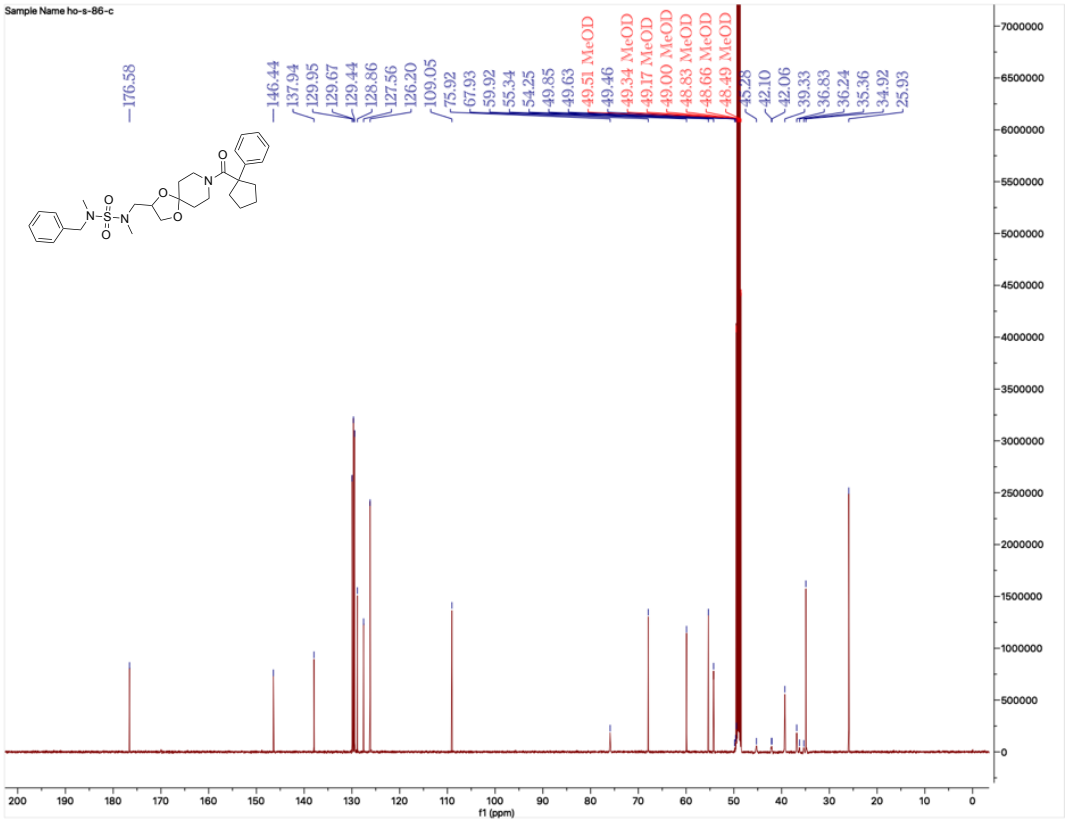


Figure S108: ^{1}H NMR (500 MHz, CD_3OD) for **5f**

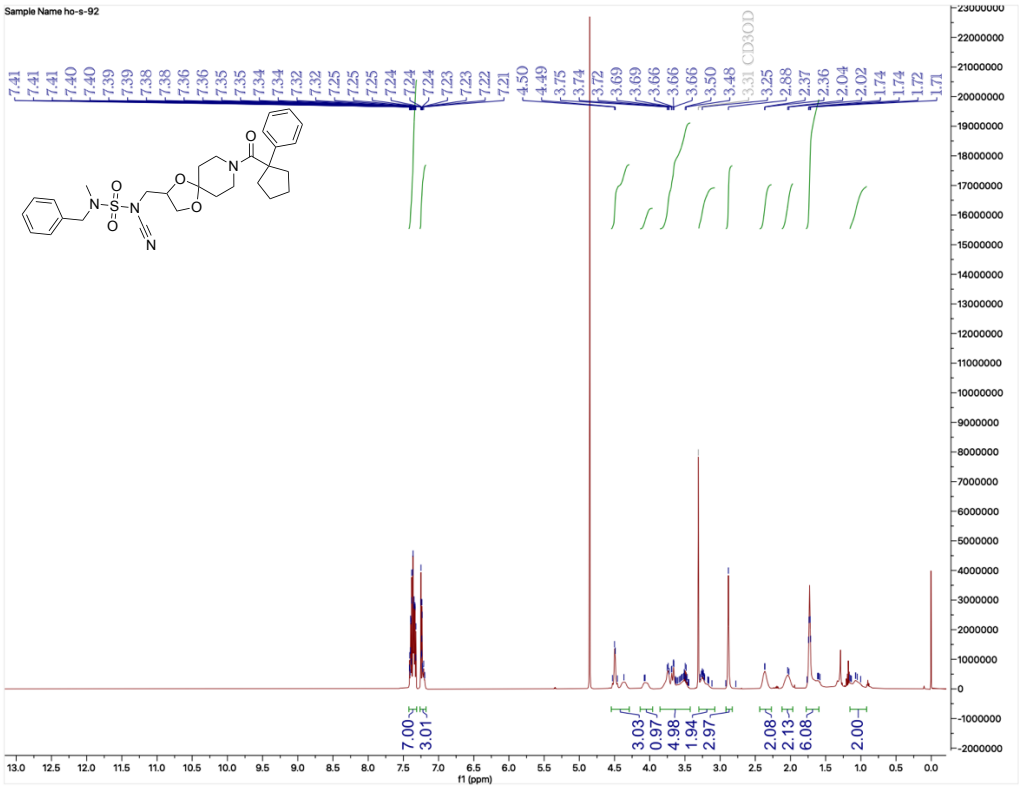


Figure S109: ^{13}C NMR (126 MHz, CD_3OD) for **5f**

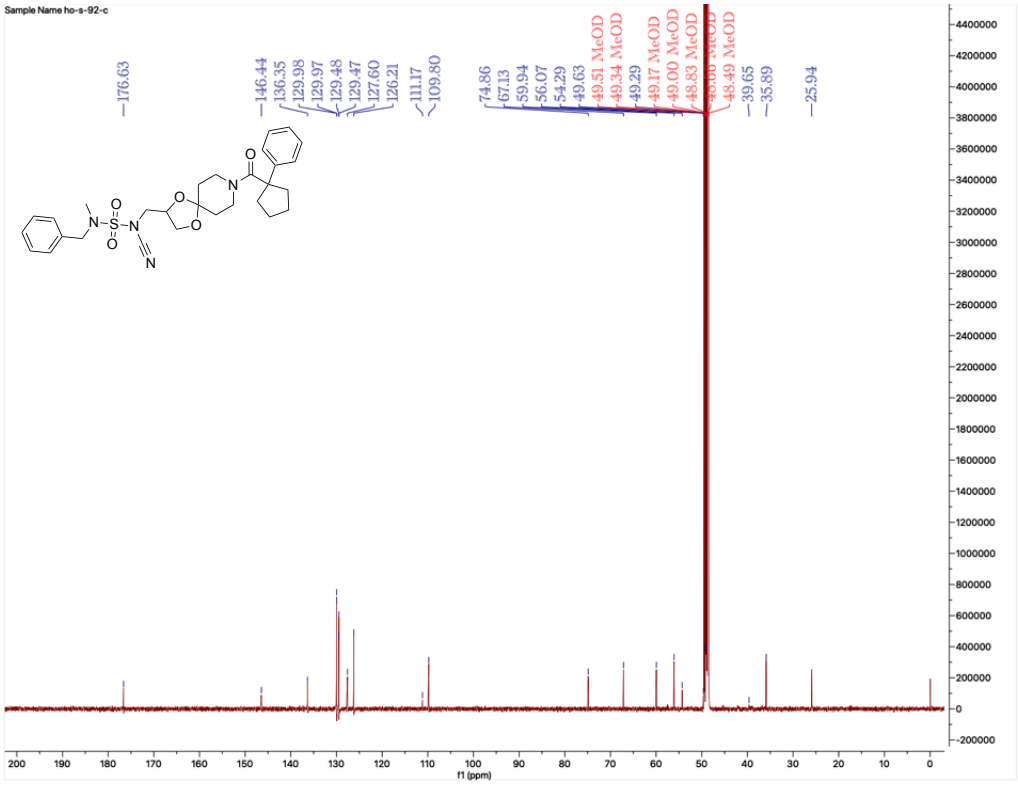


Figure S110: ^{1}H NMR (500 MHz, CD_3OD) for **5g**

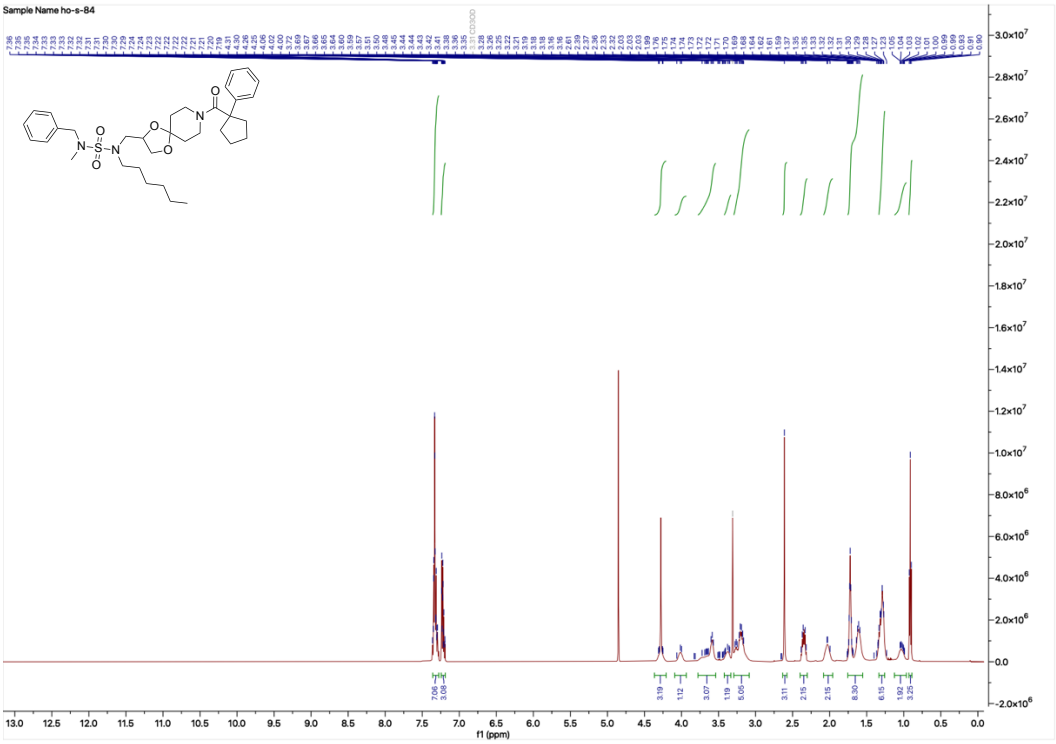


Figure S111: ^{13}C NMR (126 MHz, CD_3OD) for **5g**

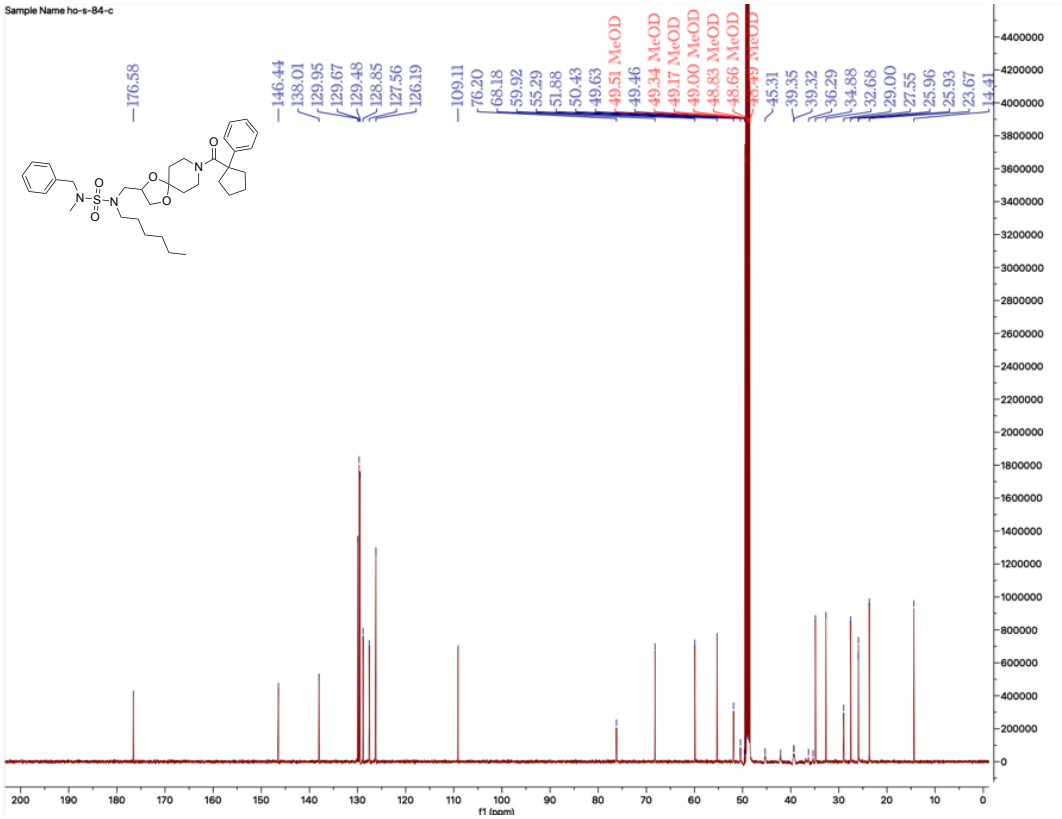


Figure S112: ^{1}H NMR (500 MHz, CD_3OD) for **5h**

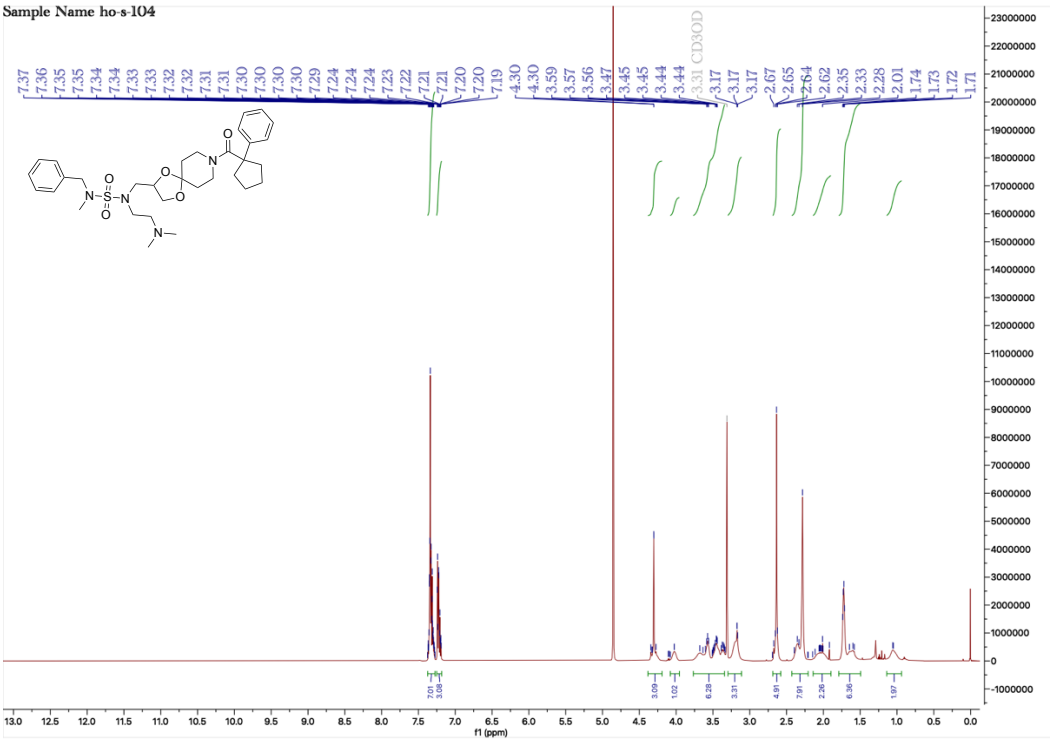


Figure S113: ^{13}C NMR (126 MHz, CD_3OD) for **5h**

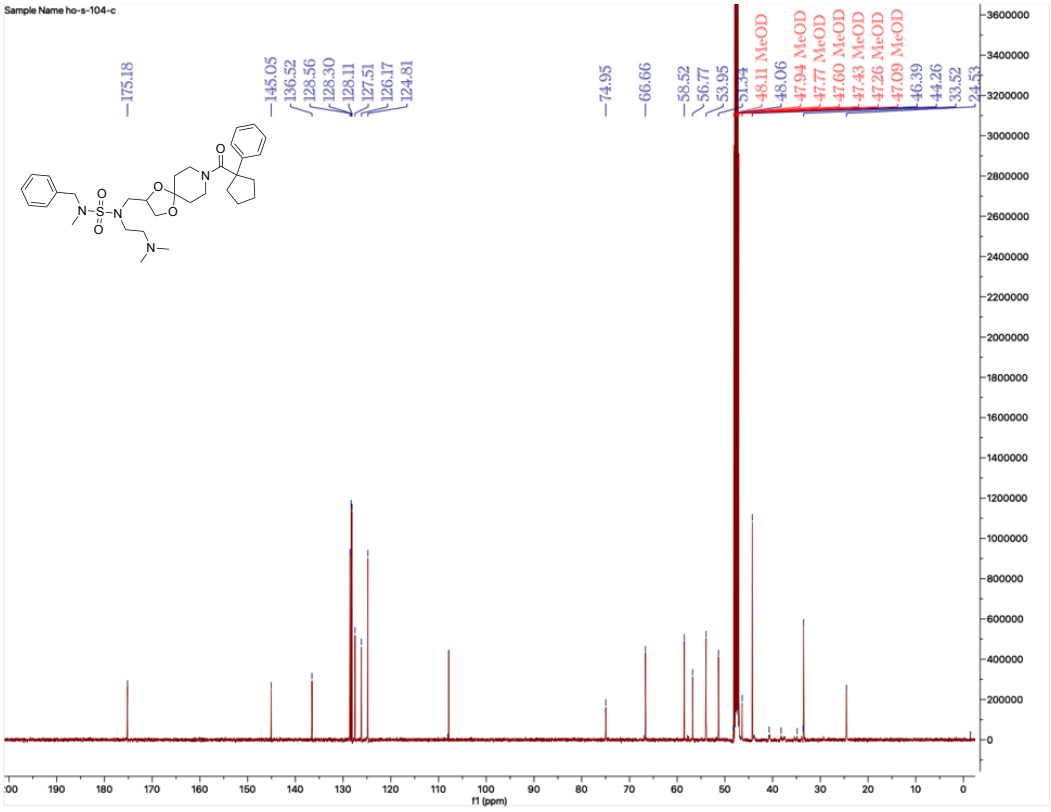


Figure S114: ^{1}H NMR (500 MHz, CD_3OD) for **5i**

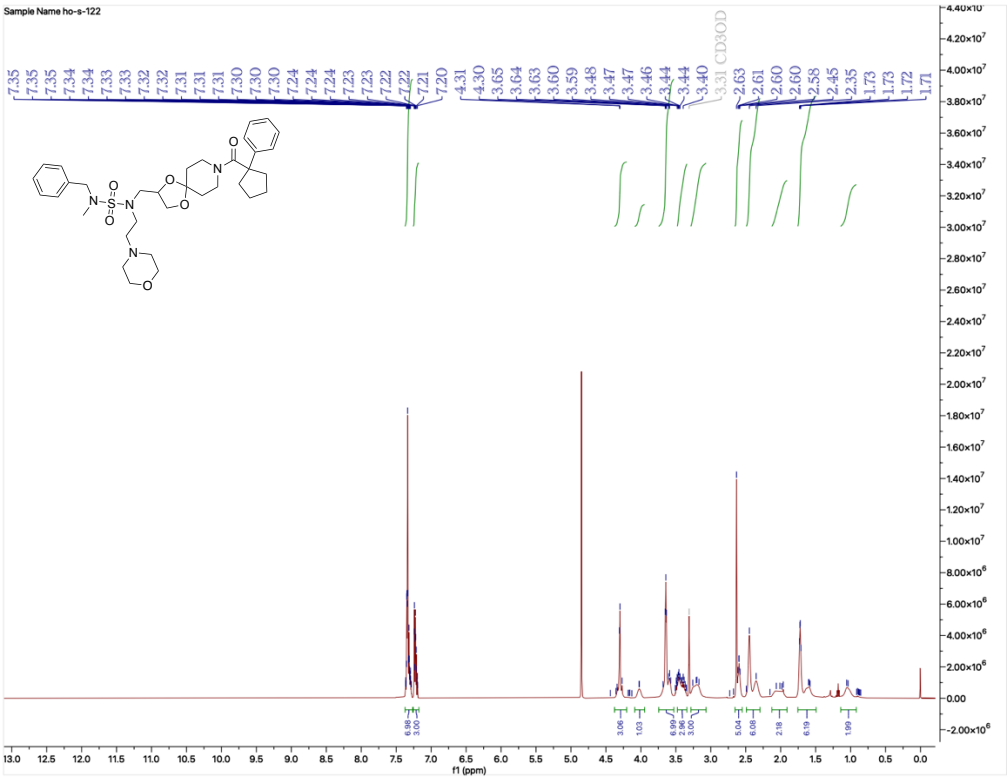


Figure S115: ^{13}C NMR (126 MHz, CD_3OD) for **5i**

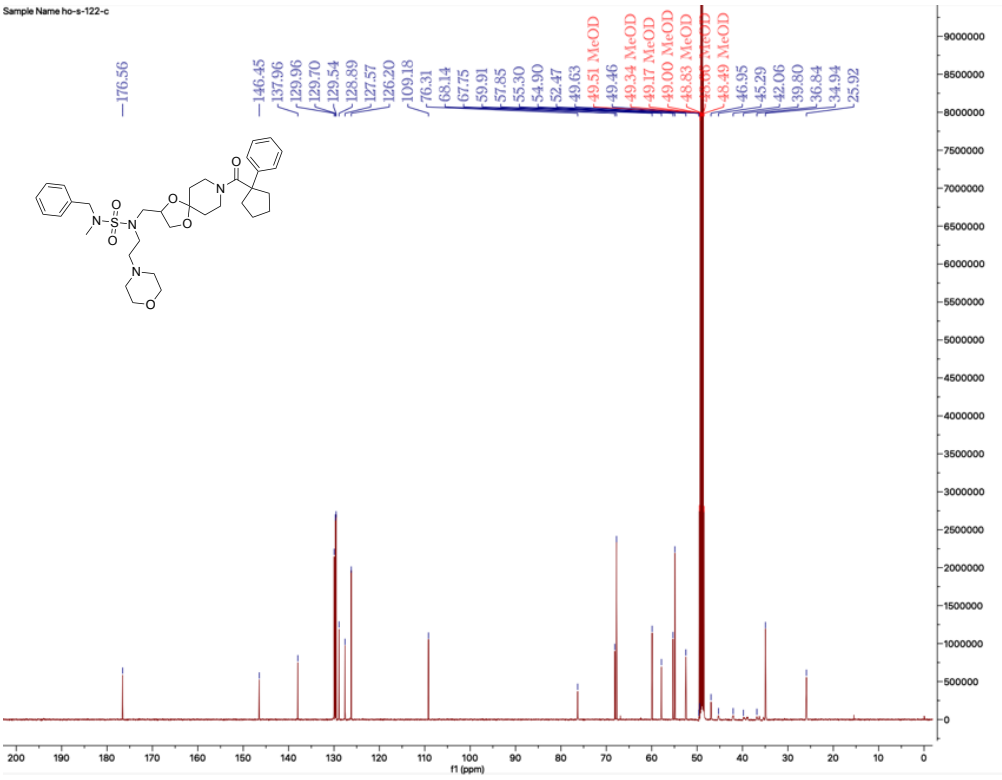


Figure S116: ^{1}H NMR (500 MHz, CD_3OD) for **5j**

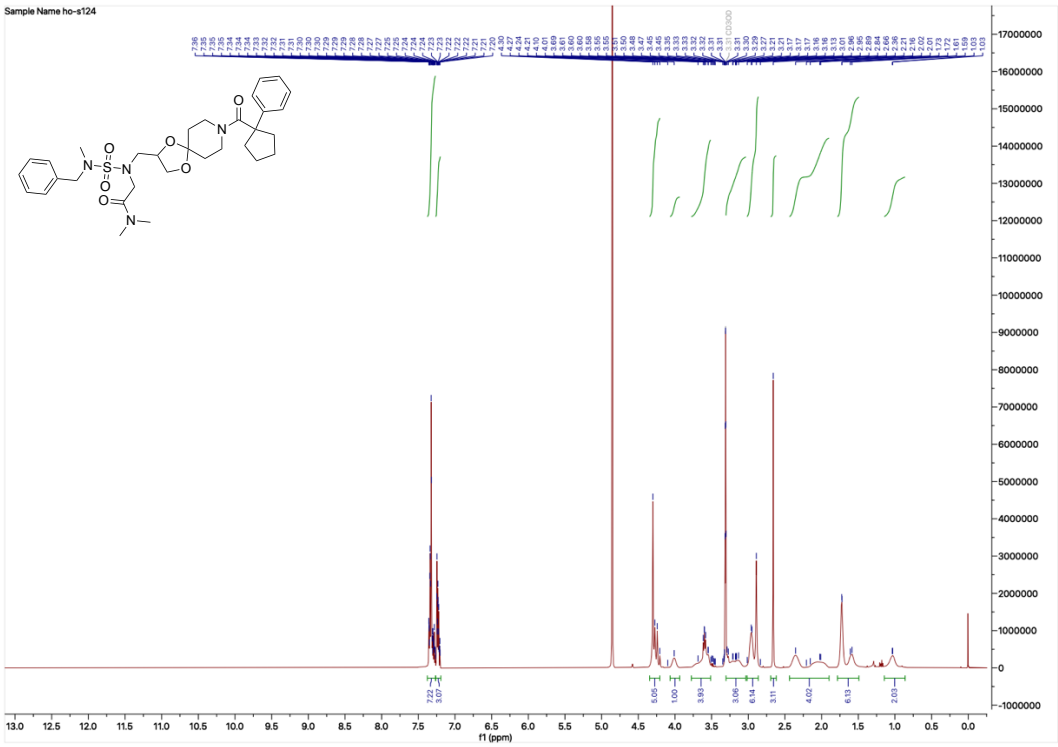


Figure S117: ^{13}C NMR (126 MHz, CD_3OD) for **5j**

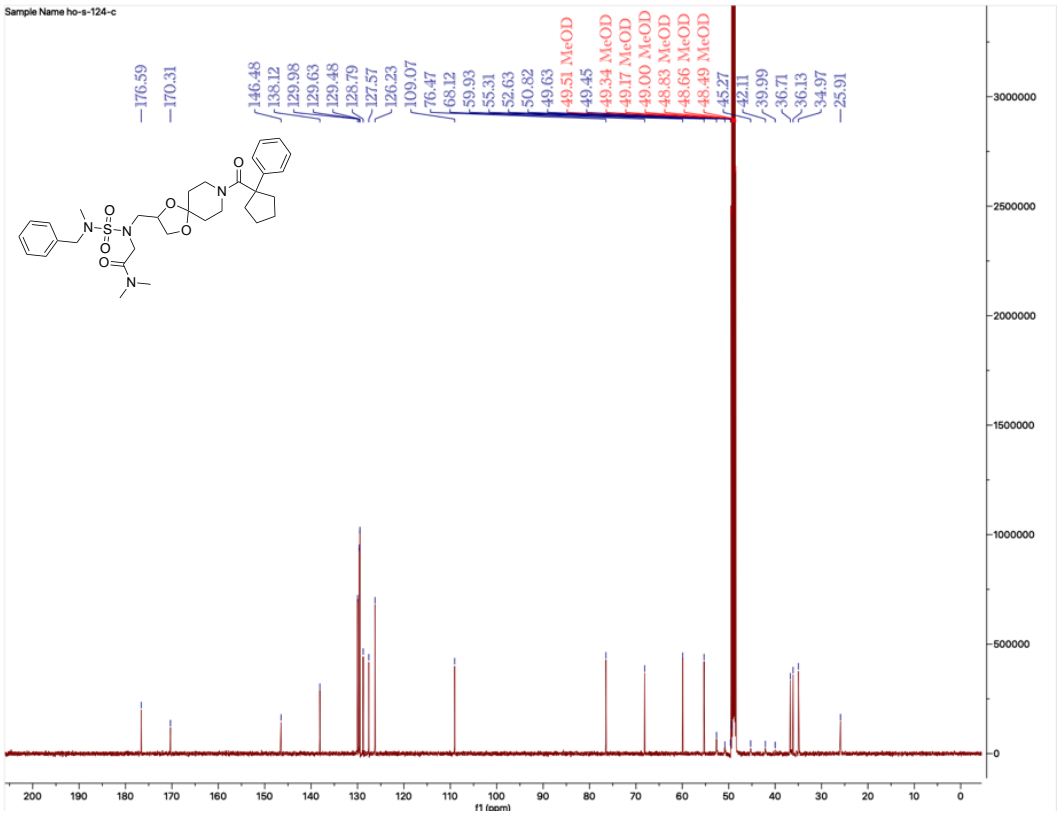


Figure S118: ^{1}H NMR (500 MHz, CD_3OD) for **5k**

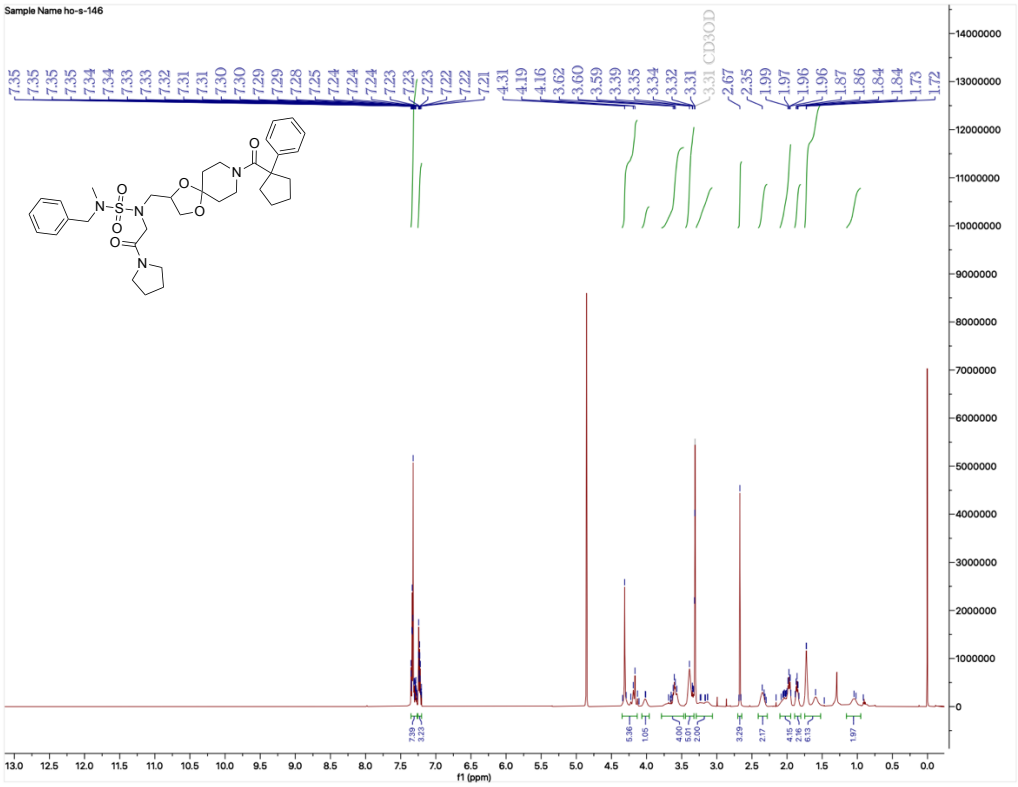


Figure S119: ^{13}C NMR (126 MHz, CD_3OD) for **5k**

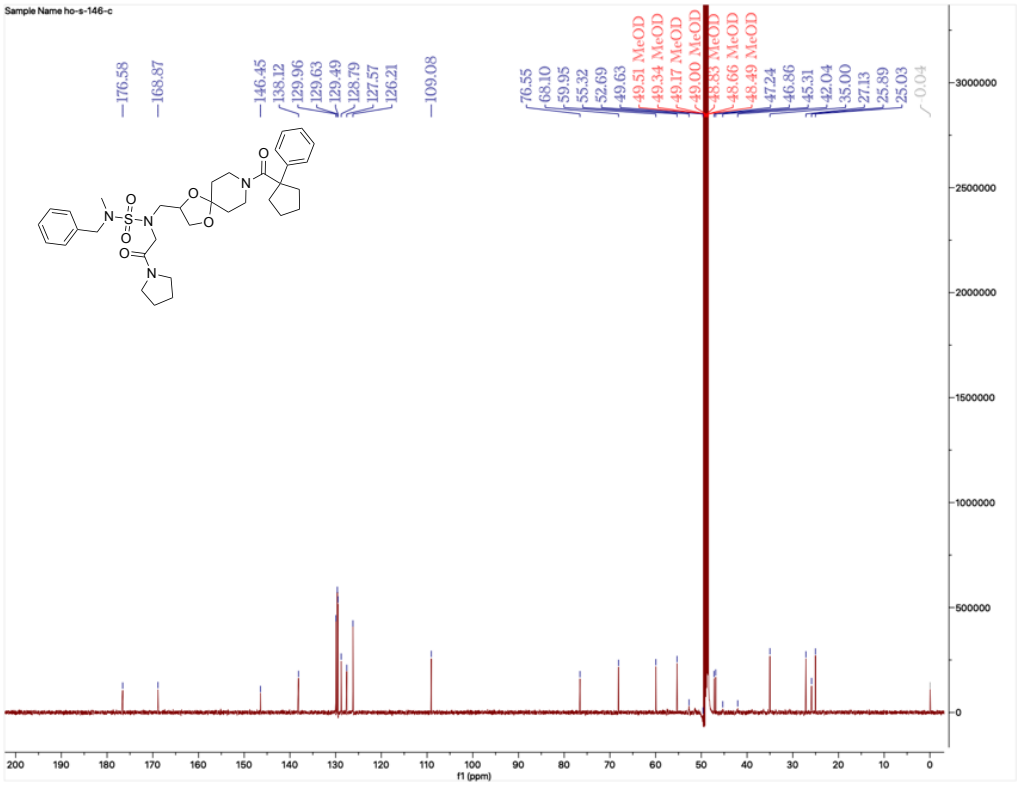


Figure S120: ^{1}H NMR (500 MHz, CD_3OD) for **5l**

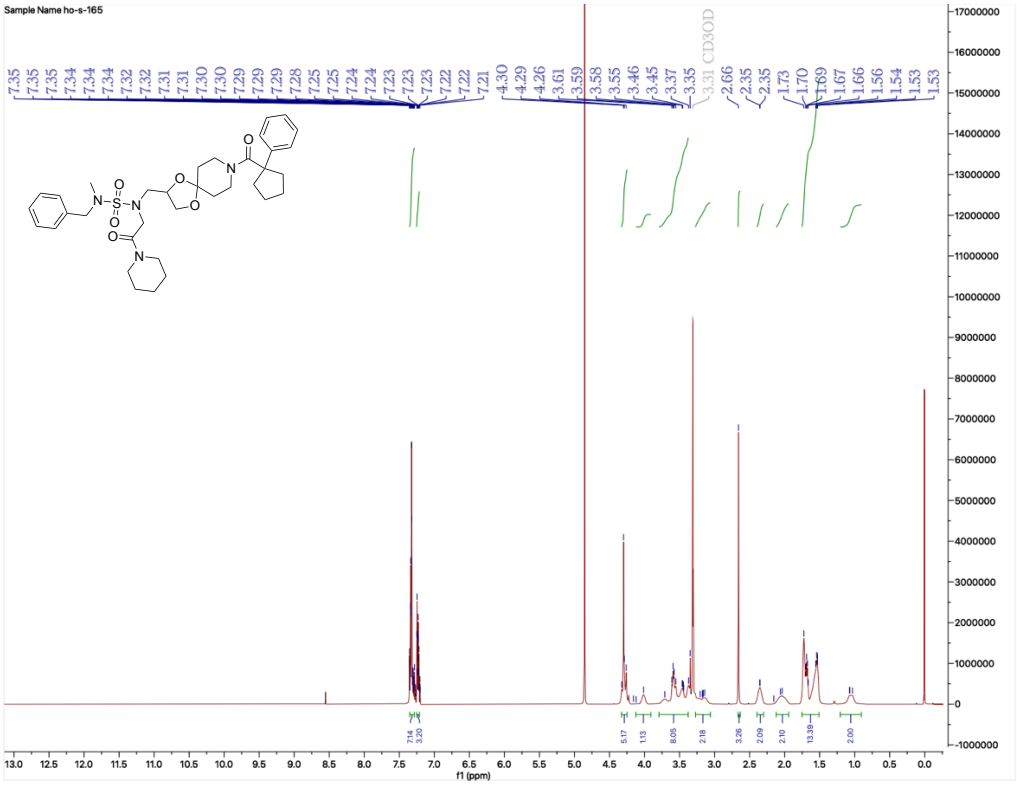


Figure S121: ^{13}C NMR (126 MHz, CD_3OD) for **5l**

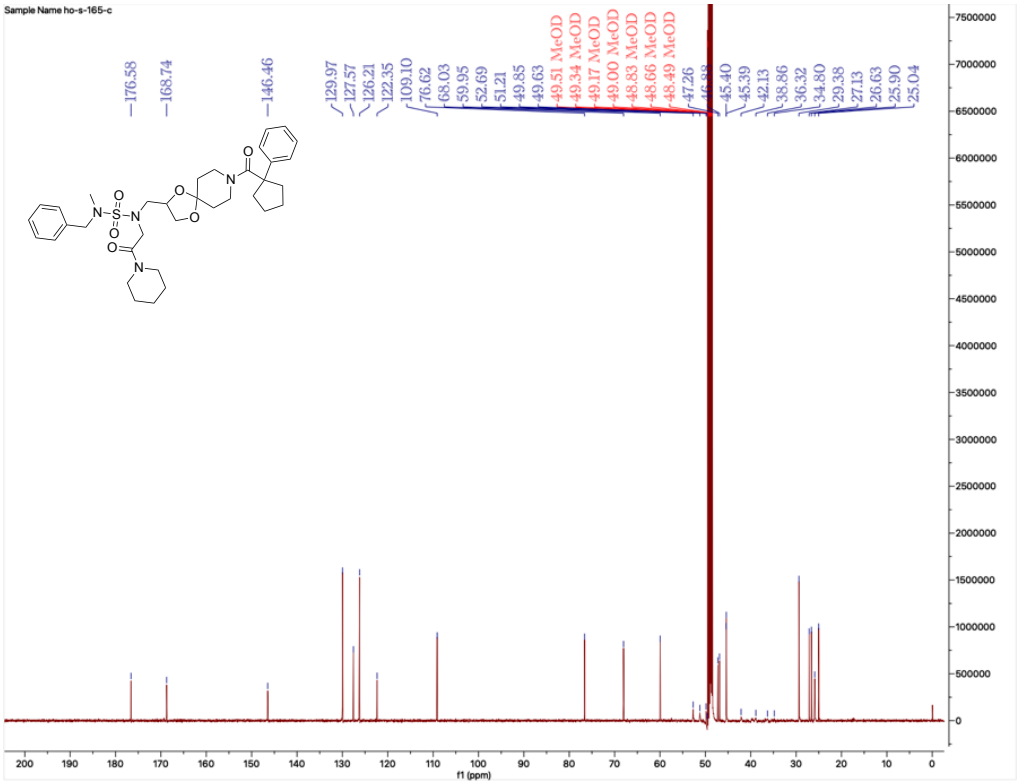


Figure S122: ^{1}H NMR (500 MHz, CD_3OD) for **5m**

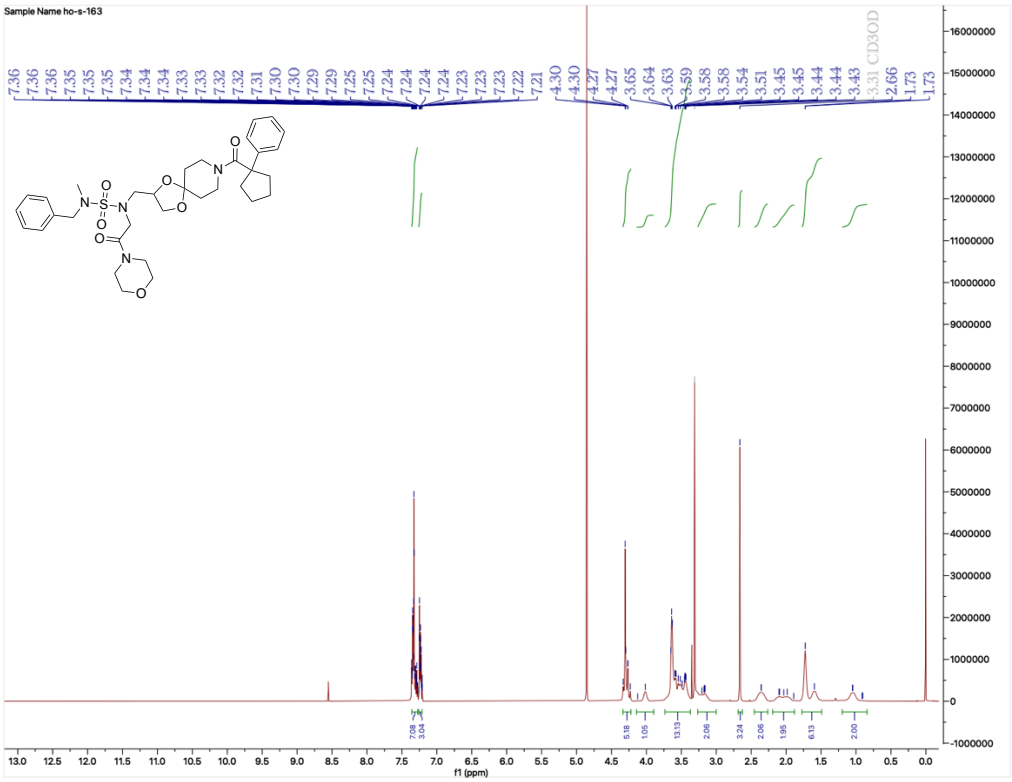


Figure S123: ^{13}C NMR (126 MHz, CD_3OD) for **5m**

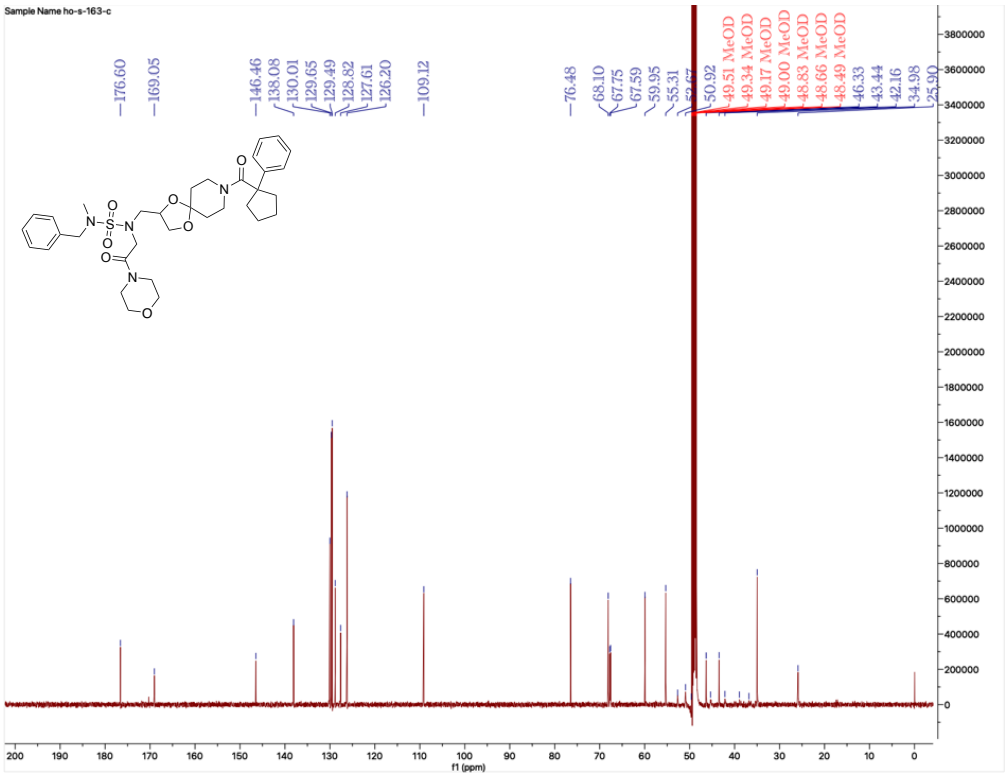


Figure S124: ^{1}H NMR (500 MHz, CD_3OD) for **6a**

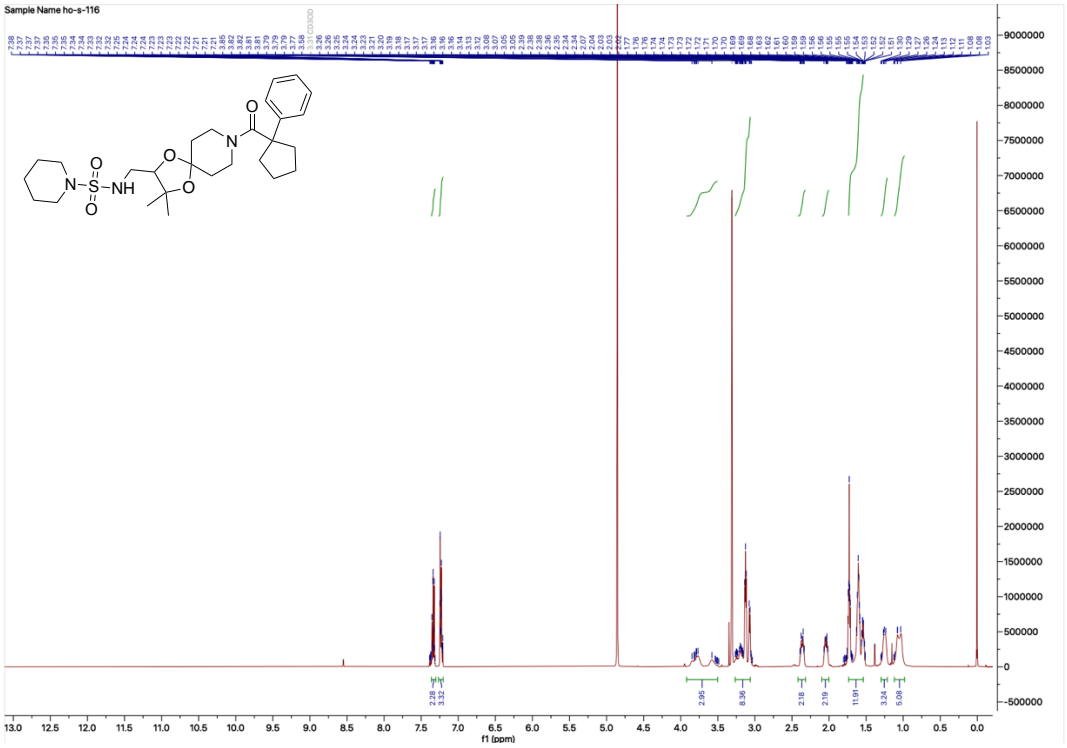


Figure S125: ^{13}C NMR (126 MHz, CD_3OD) for **6a**

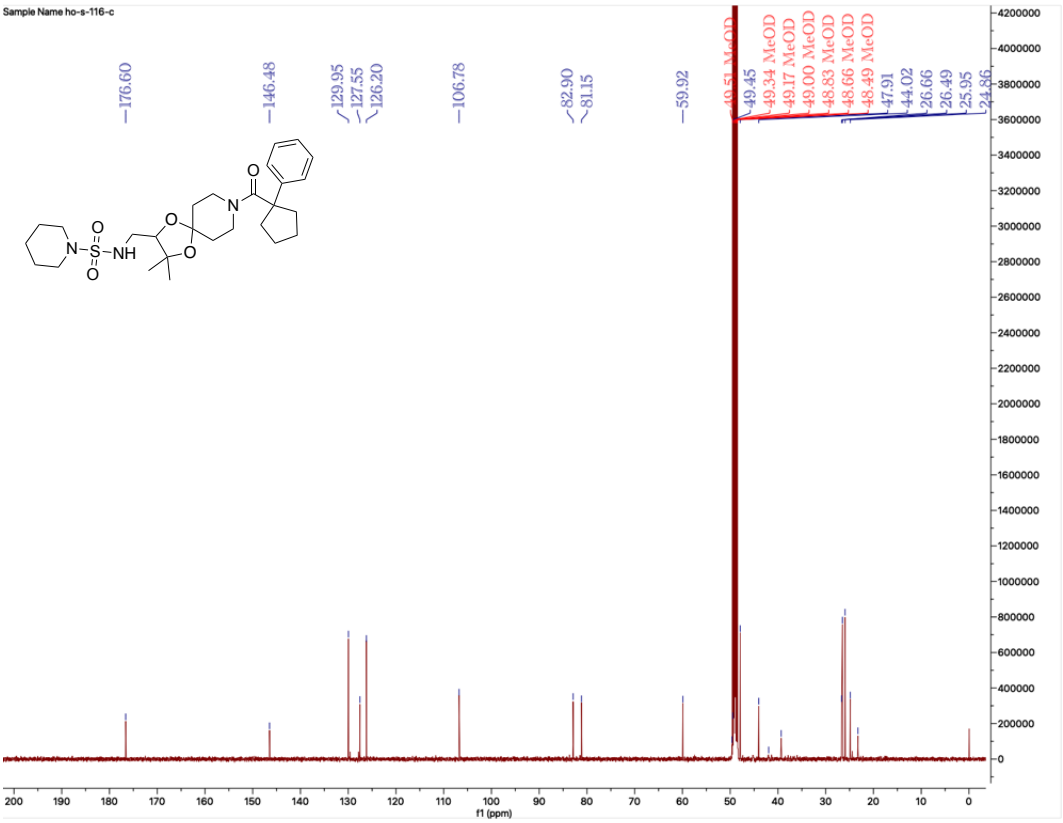


Figure S126: ^{1}H NMR (400 MHz, CD_3OD) for **6b**

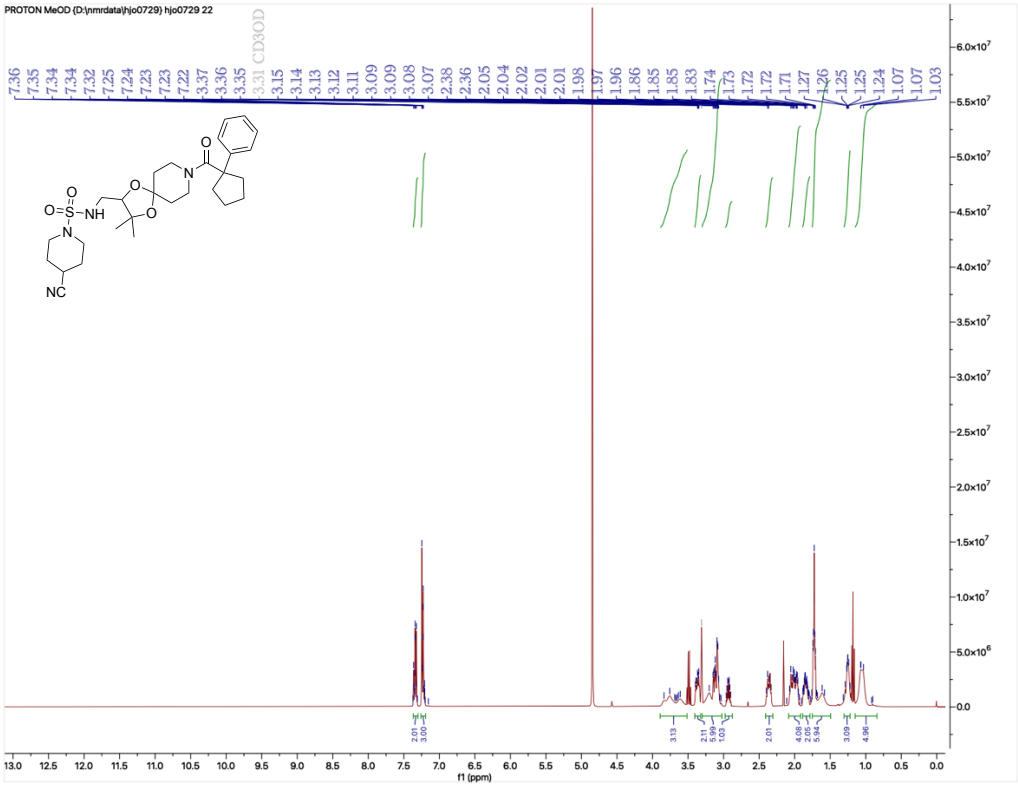


Figure S127: ^{13}C NMR (126 MHz, CD_3OD) for **6b**

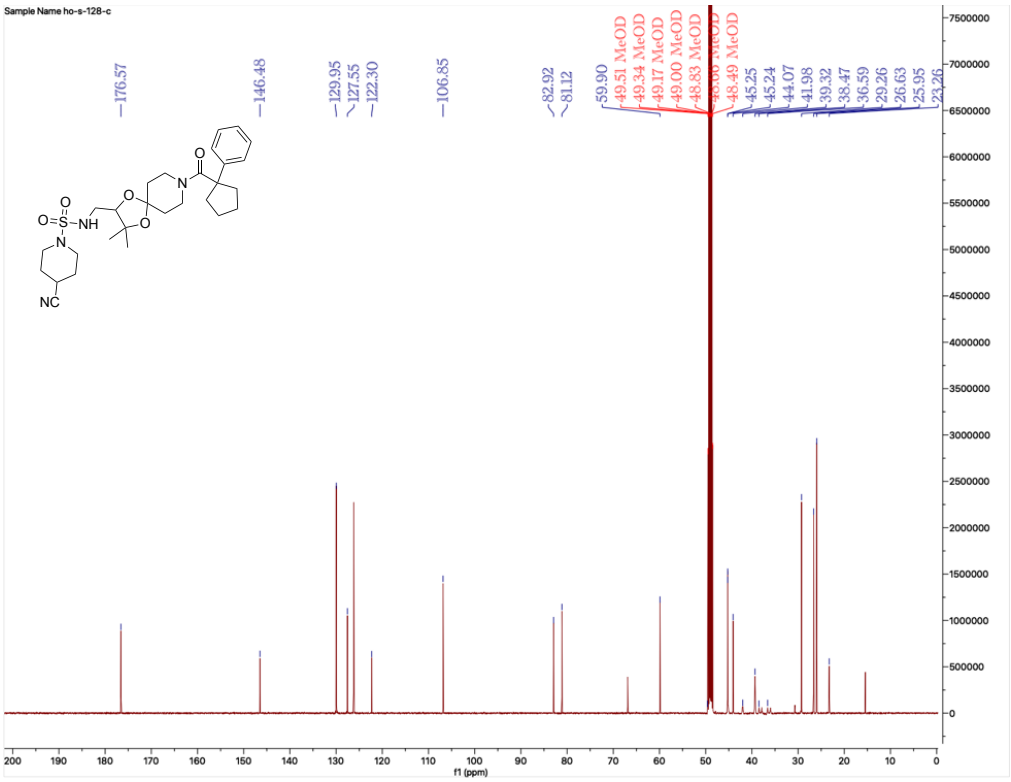


Figure S128: ^{1}H NMR (400 MHz, CD_3OD) for **6c**

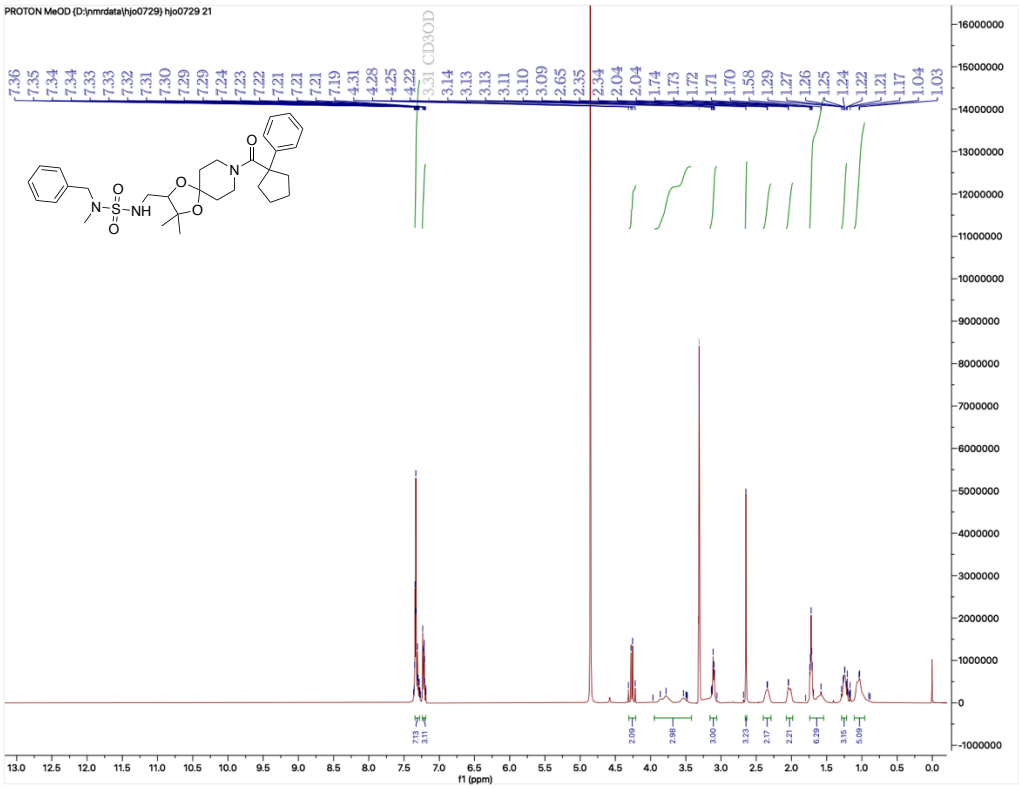


Figure S129: ^{13}C NMR (126 MHz, CD_3OD) for **6c**

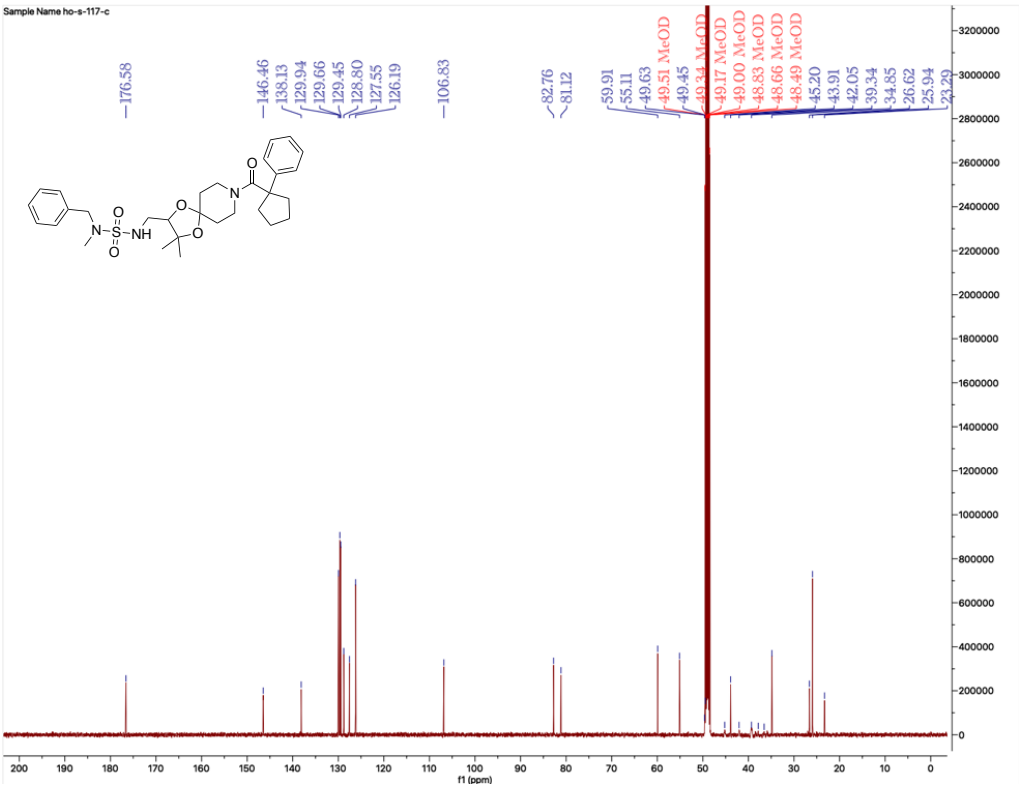


Figure S130: ^{1}H NMR (500 MHz, CD_3OD) for **6d**

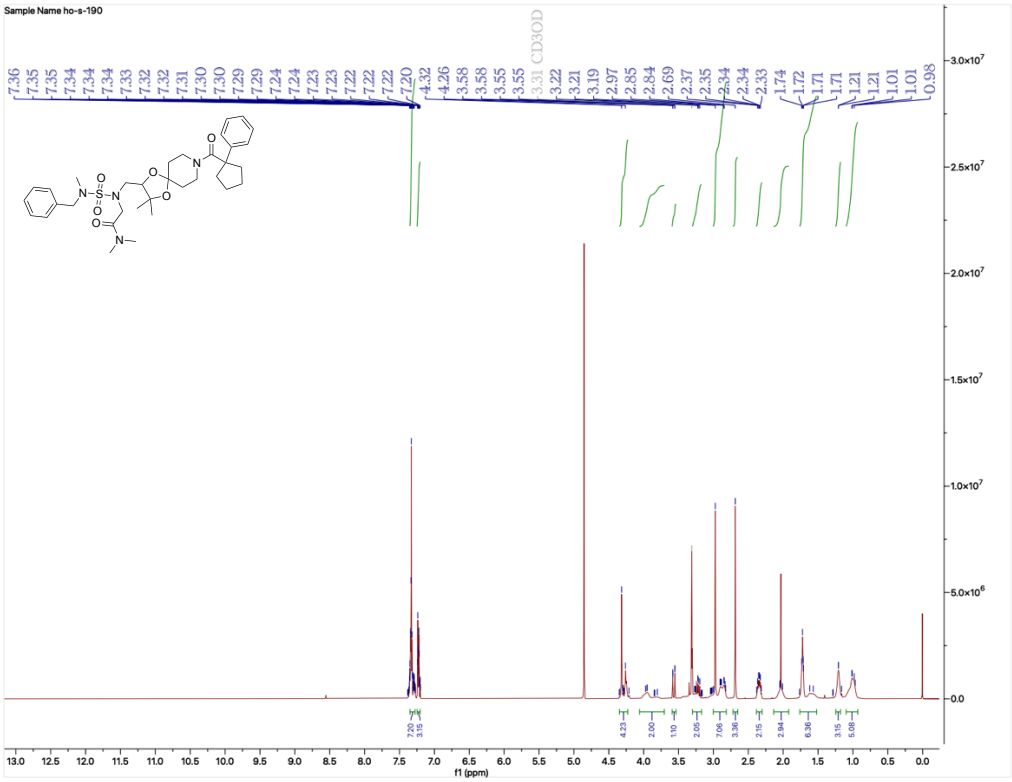


Figure S131: ^{13}C NMR (126 MHz, CD_3OD) for **6d**

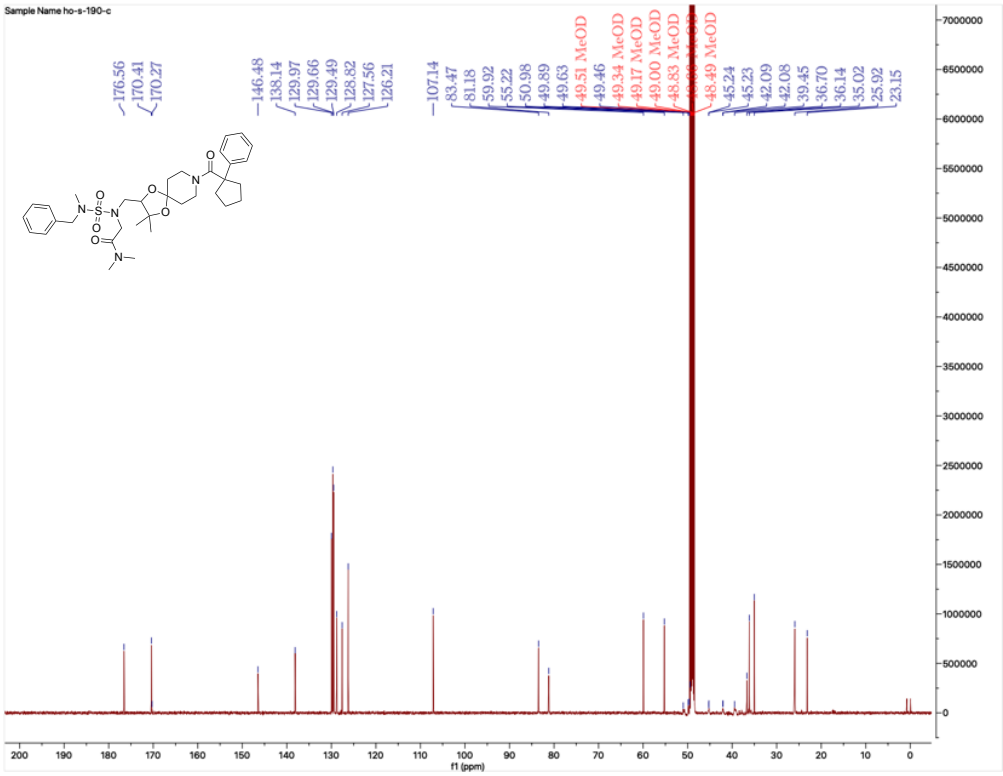


Figure S132: ^{1}H NMR (500 MHz, CD_3OD) for **6e**

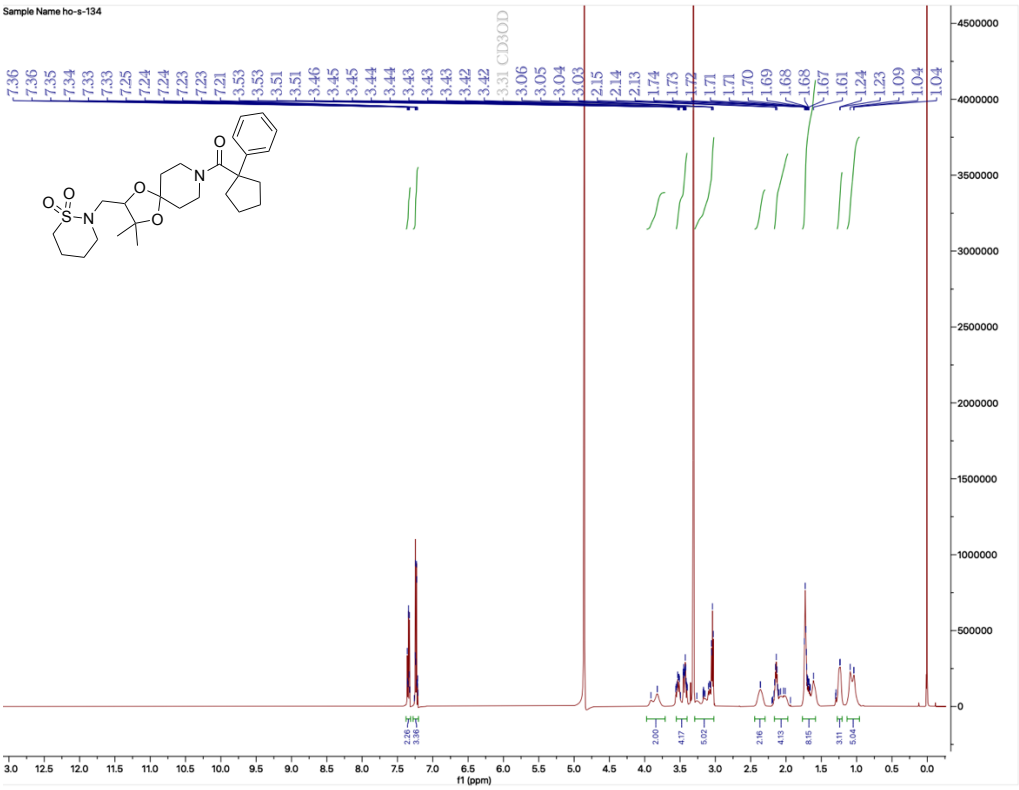


Figure S133: ^{13}C NMR (126 MHz, CD_3OD) for **6e**

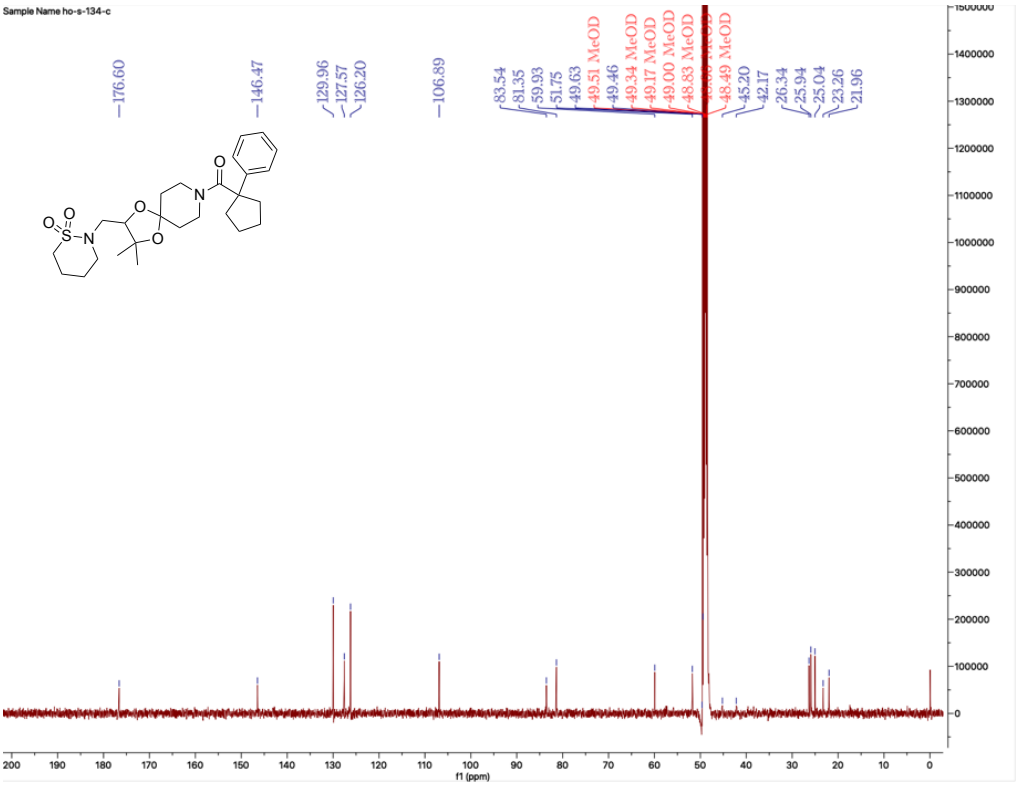


Figure S134: ^{1}H NMR (500 MHz, CD_3OD) for **7a**

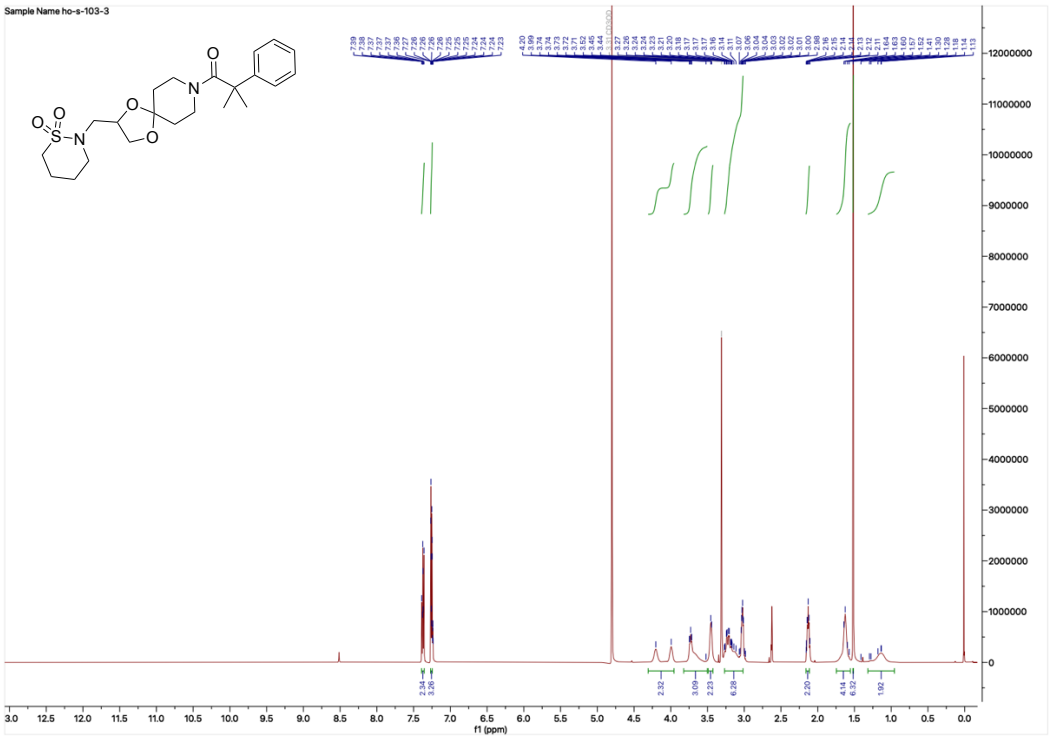


Figure S135: ^{13}C NMR (126 MHz, CD_3OD) for **7a**

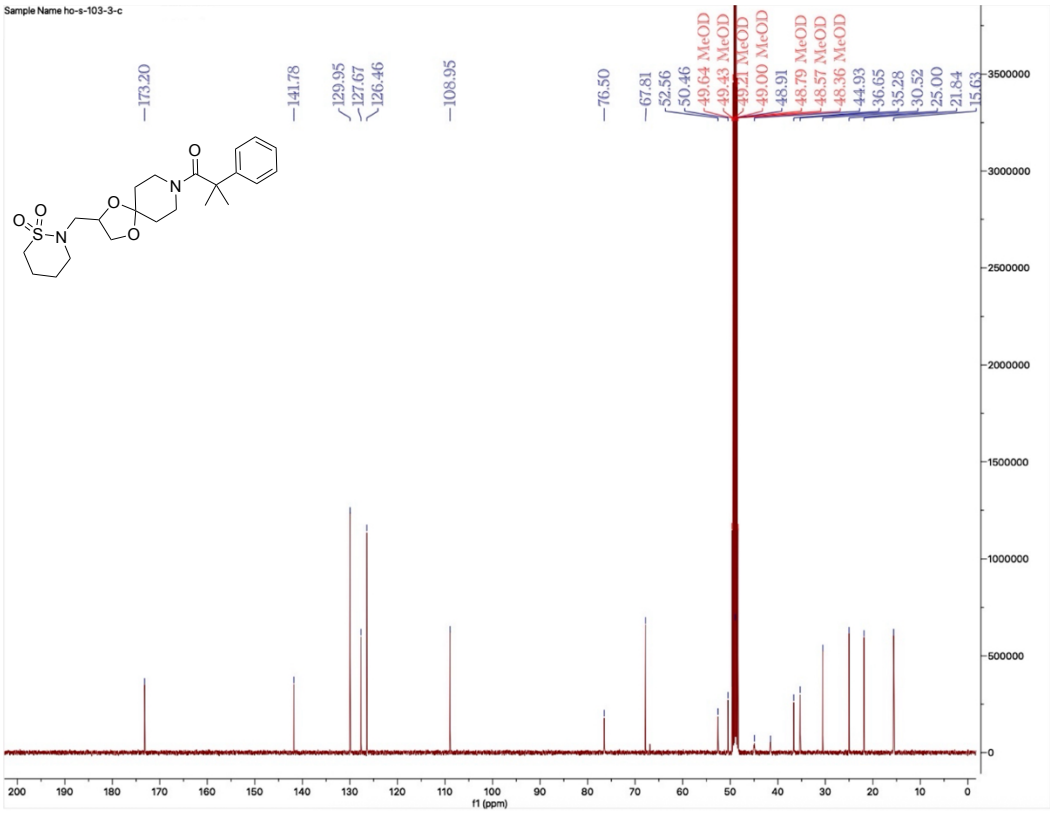


Figure S136: ^{1}H NMR (400 MHz, CD_3OD) for **7b**

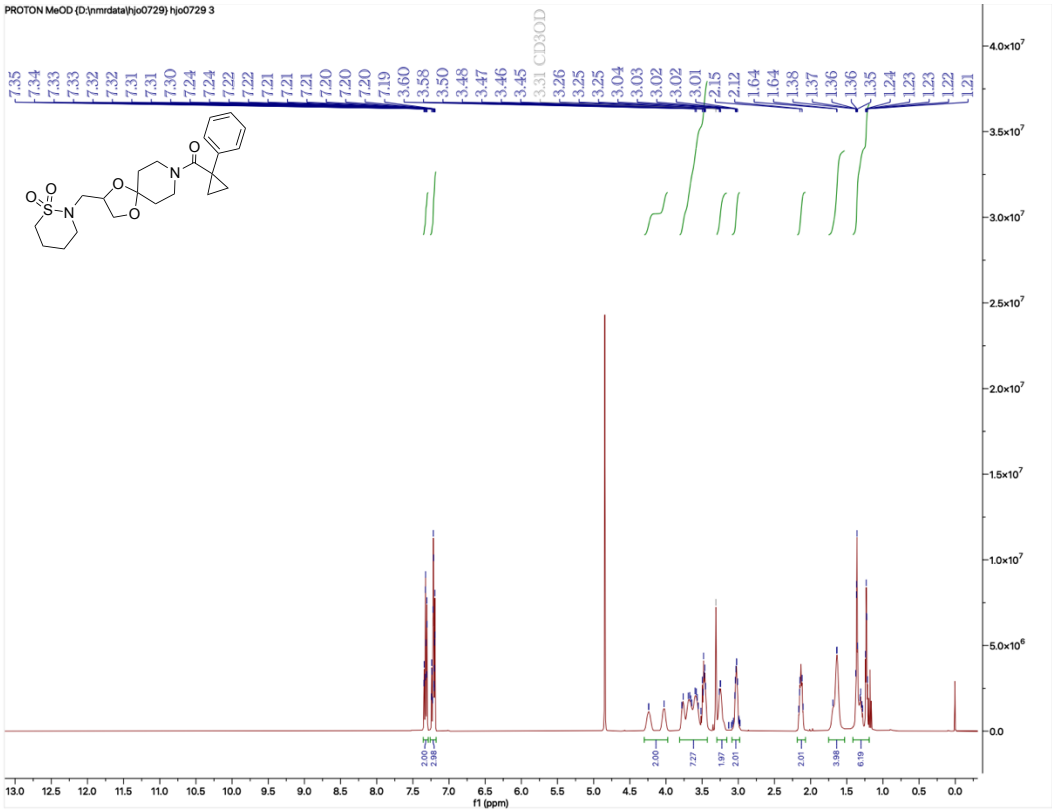


Figure S137: ^{13}C NMR (126 MHz, CD_3OD) for **7b**

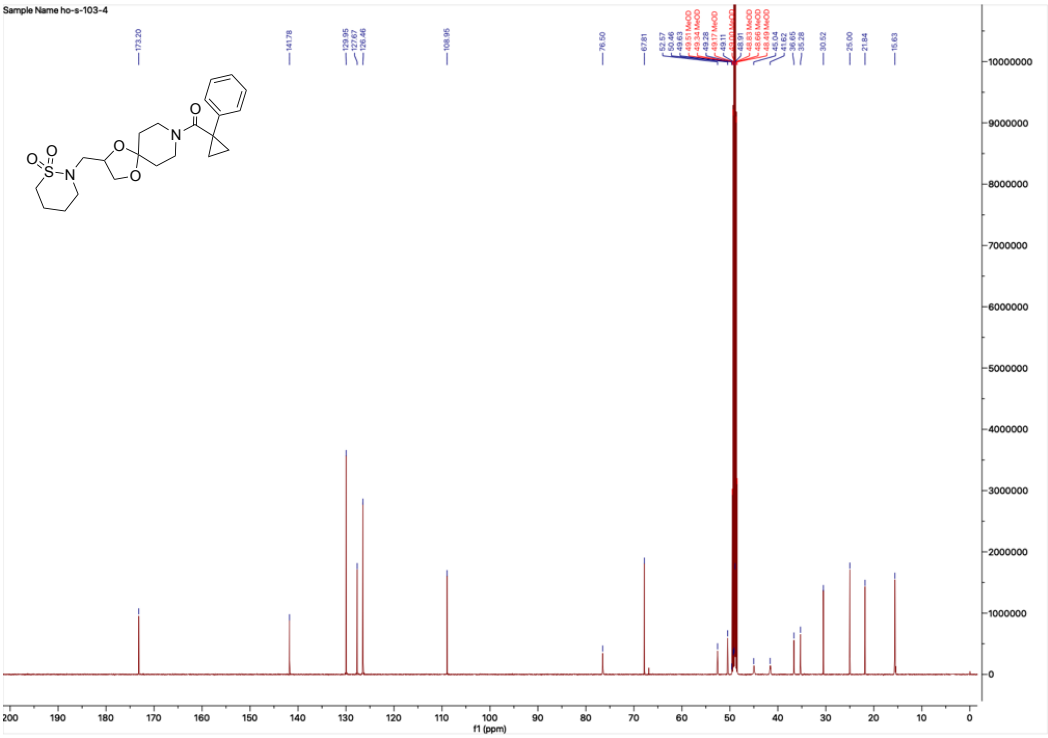


Figure S138: ^{1}H NMR (400 MHz, CD_3OD) for **7c**

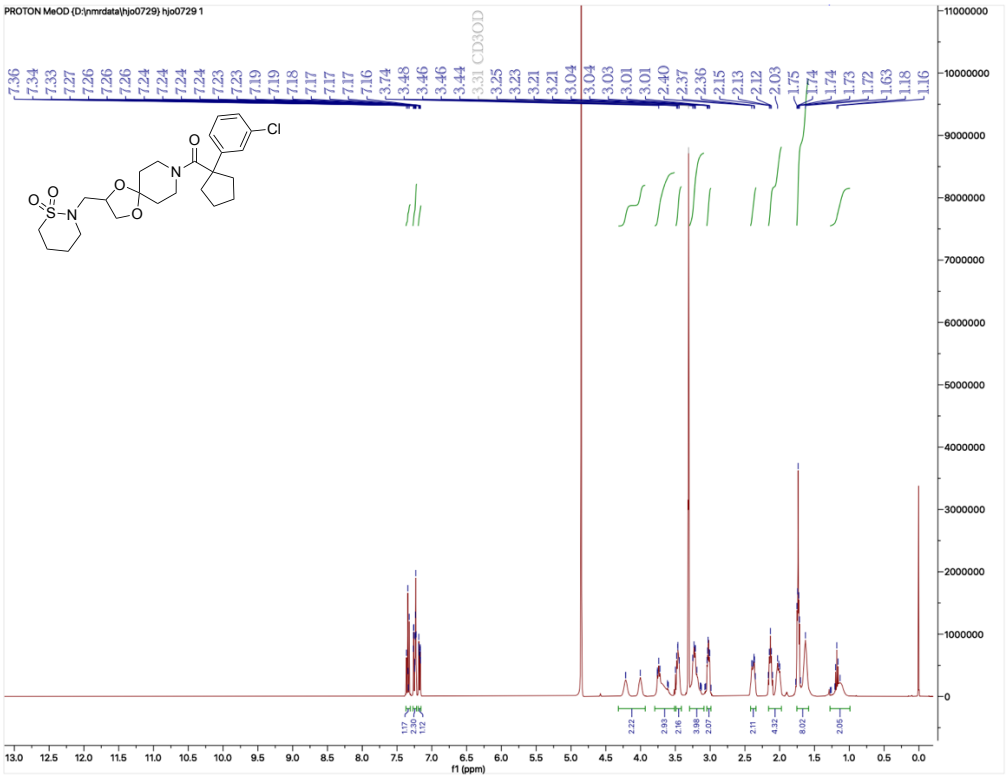


Figure S139: ^{13}C NMR (126 MHz, CD_3OD) for **7c**

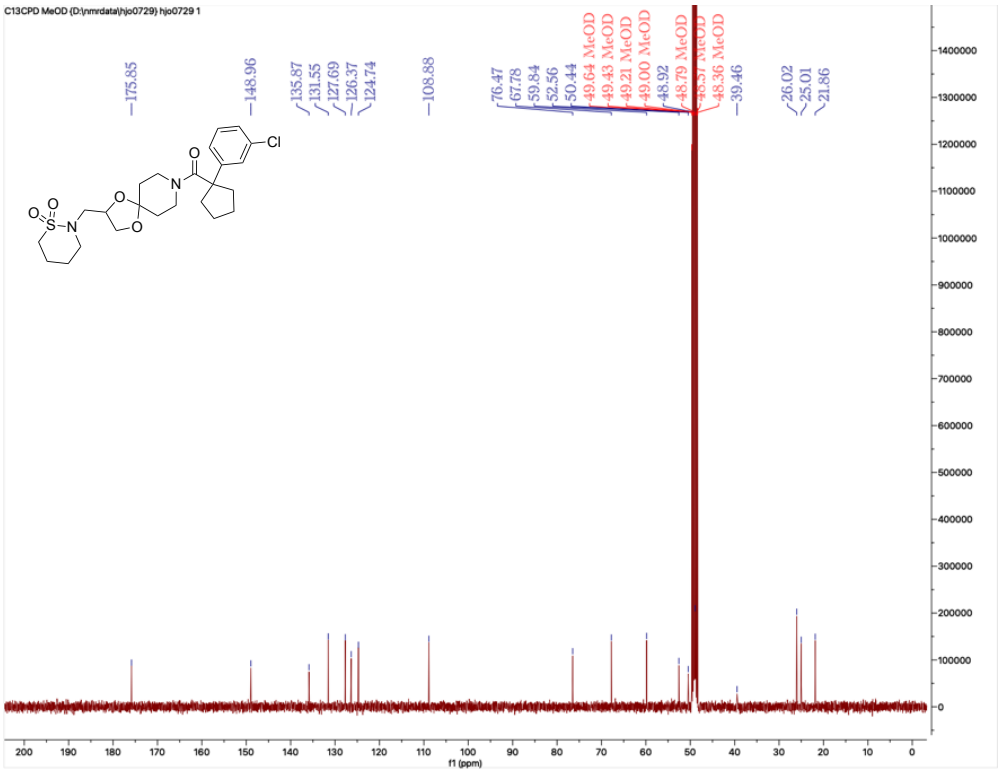


Figure S140: ^{1}H NMR (500 MHz, CD_3OD) for **7d**

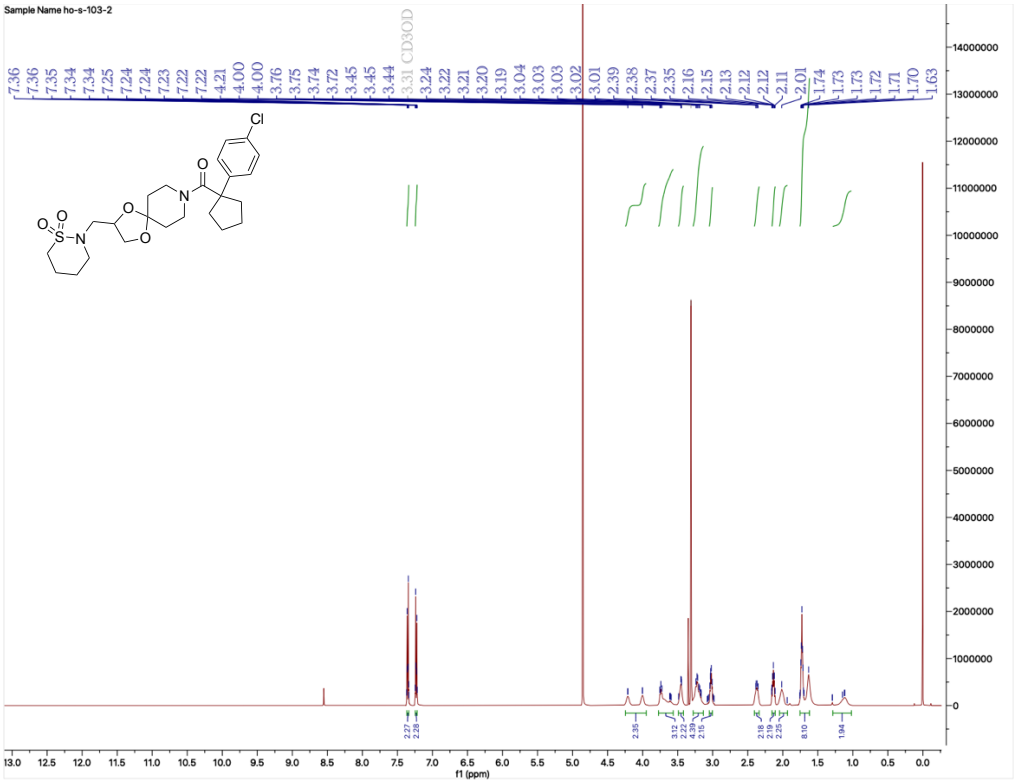


Figure S141: ^{13}C NMR (126 MHz, CD_3OD) for **7d**

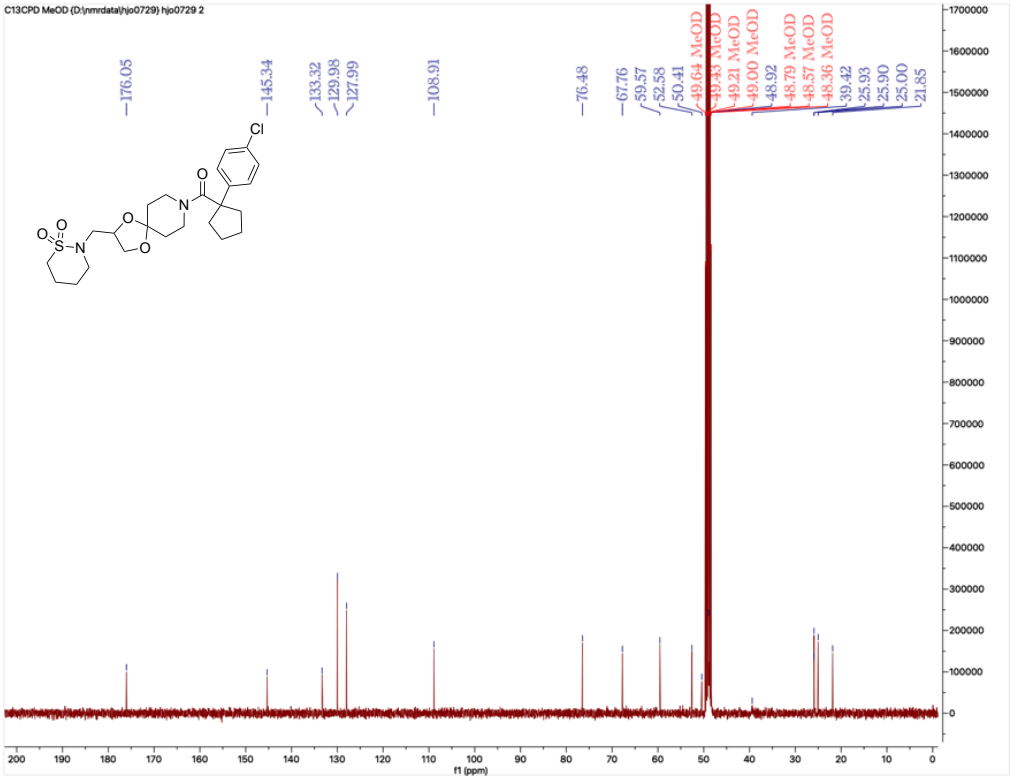


Figure S142: ^{1}H NMR (500 MHz, CD_3OD) for **R-3a**

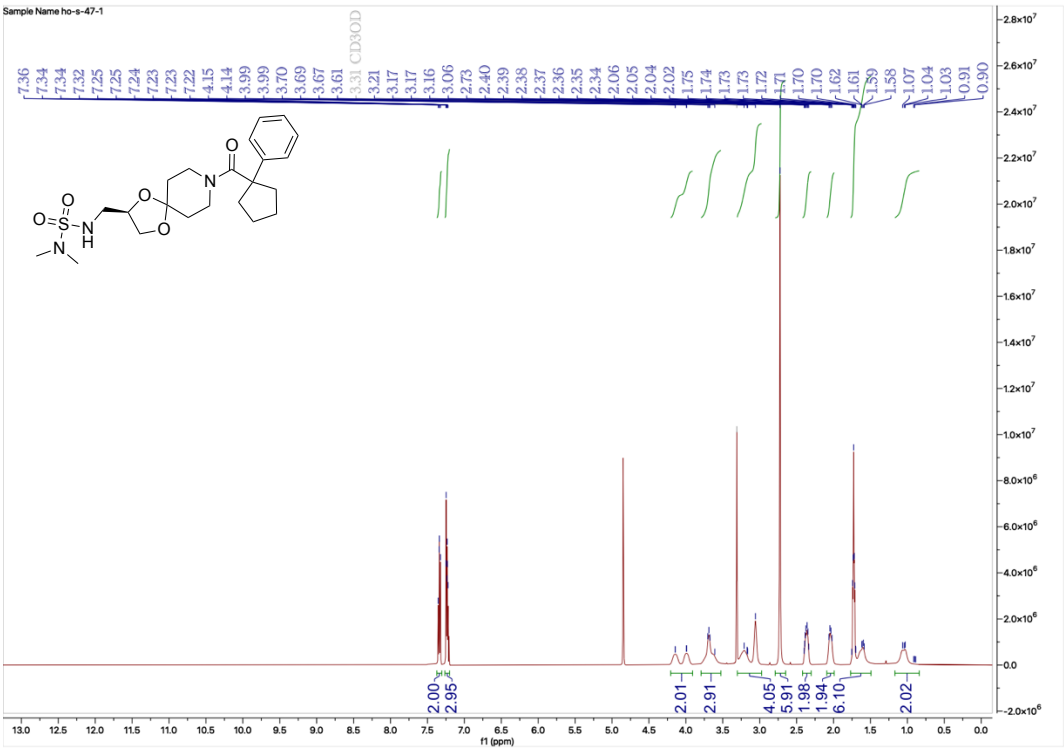


Figure S143: ^{13}C NMR (126 MHz, CD_3OD) for **R-3a**

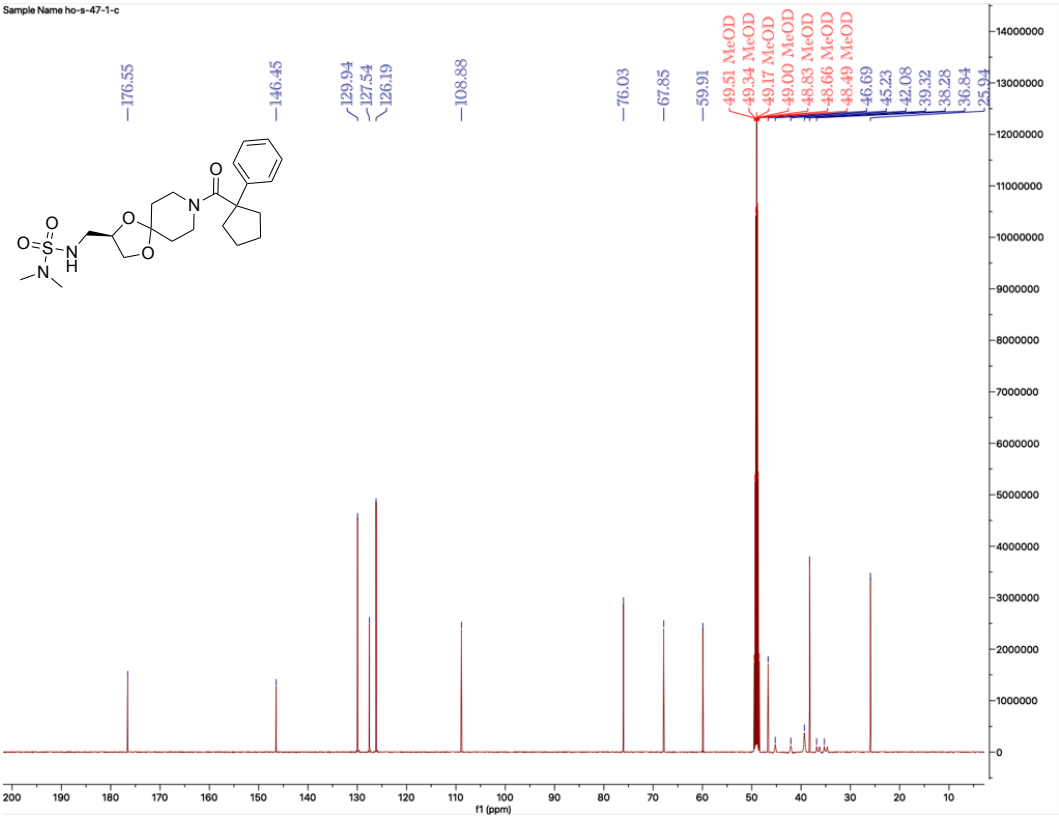


Figure S144: ^{1}H NMR (500 MHz, CD_3OD) for **S-3a**

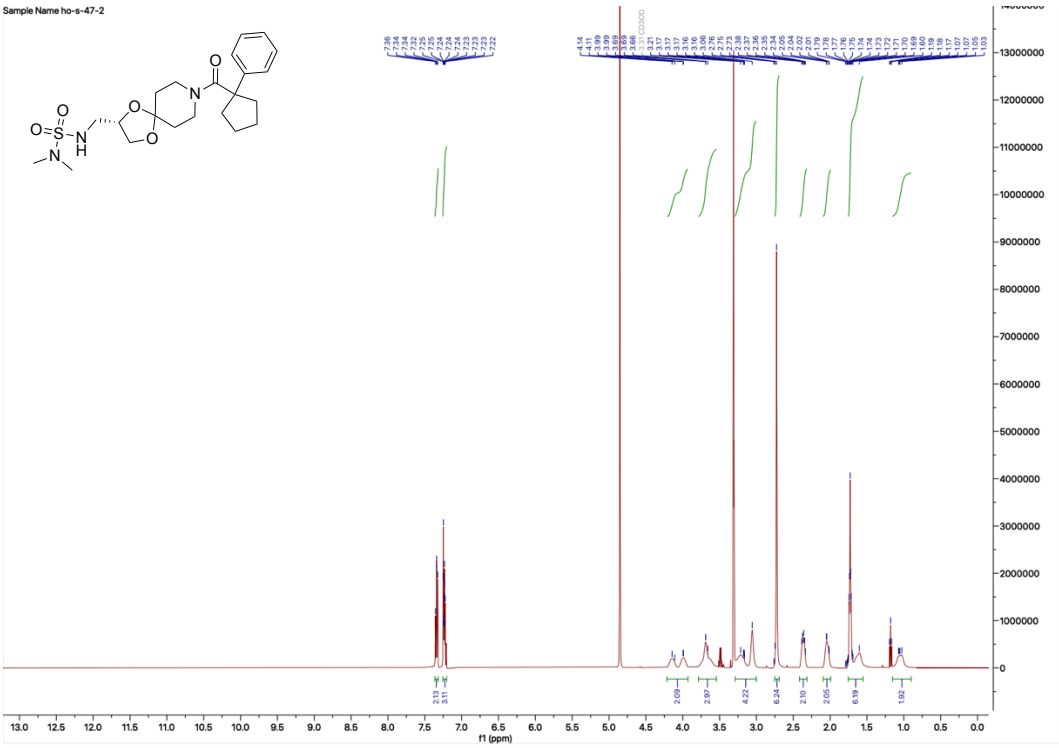


Figure S145: ^{13}C NMR (126 MHz, CD_3OD) for **S-3a**

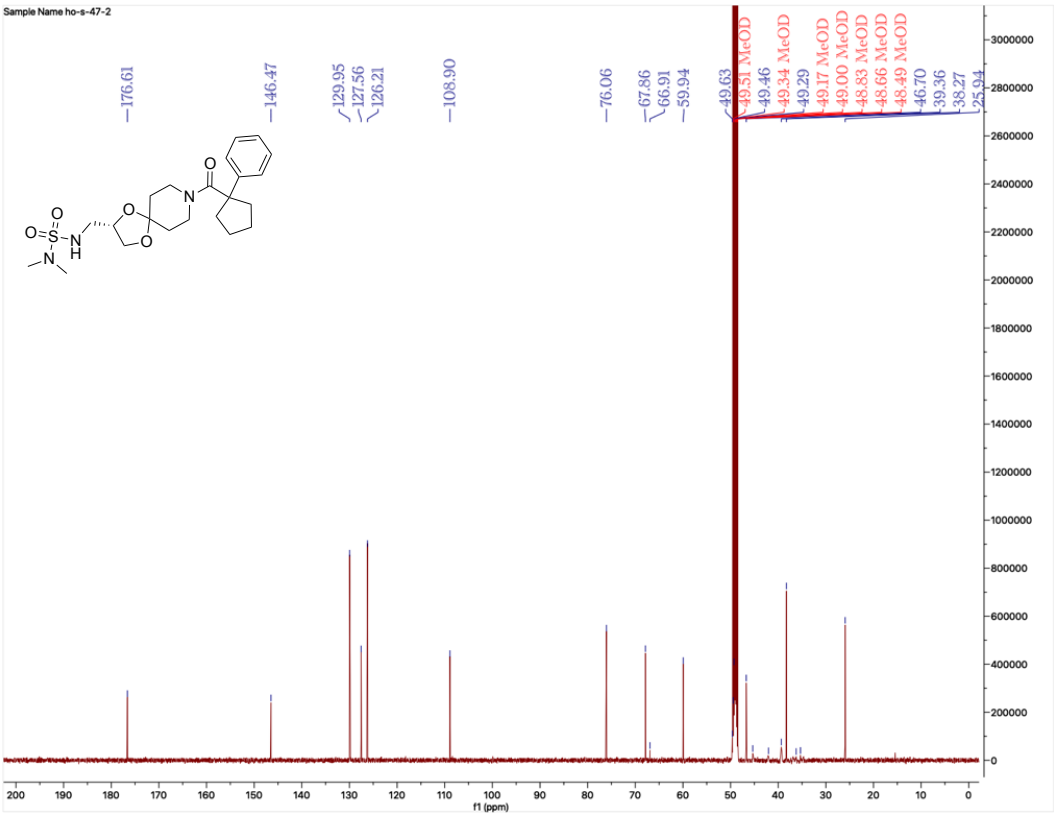


Figure S146: ^{1}H NMR (500 MHz, CD_3OD) for **S-3k**

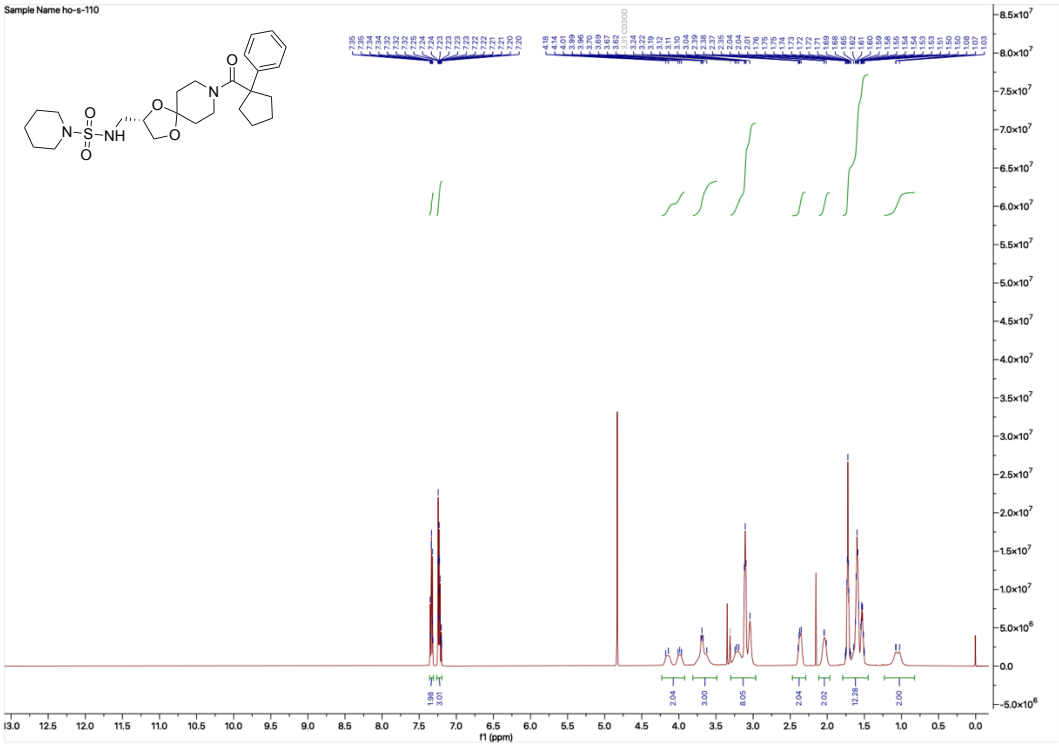


Figure S147: ^{13}C NMR (126 MHz, CD_3OD) for **S-3k**

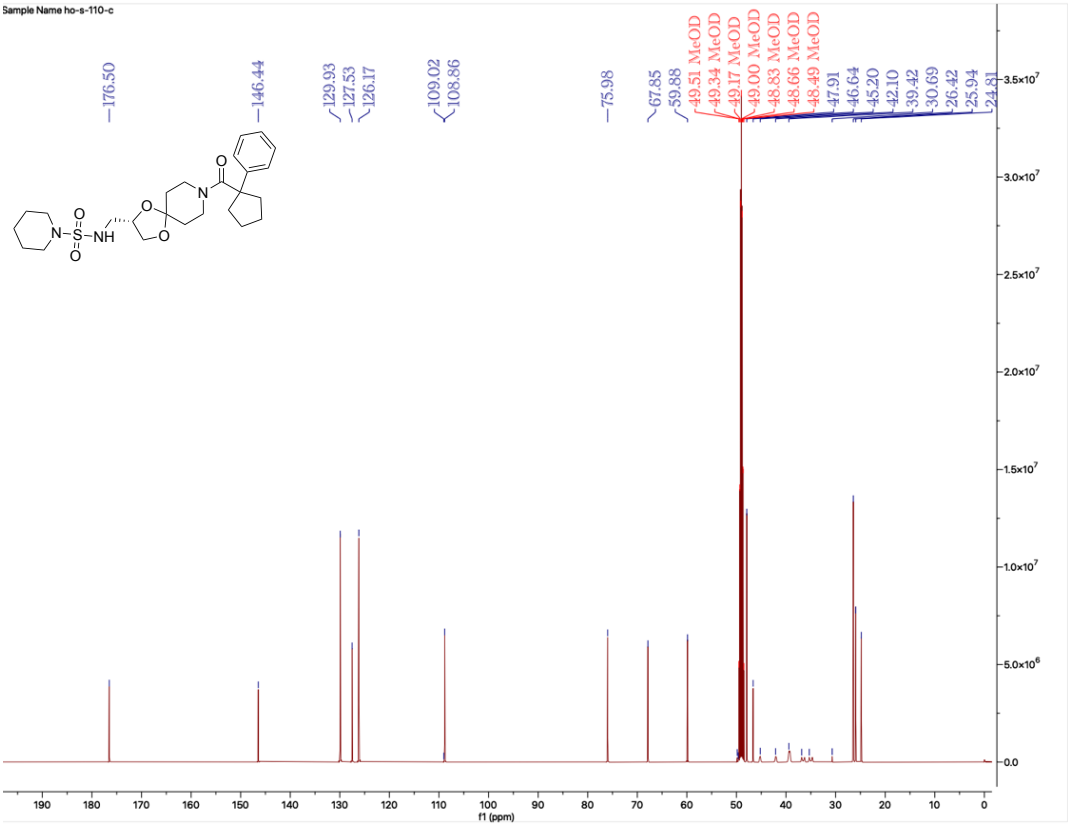


Figure S148: ^{1}H NMR (500 MHz, CD_3OD) for **R-3k**

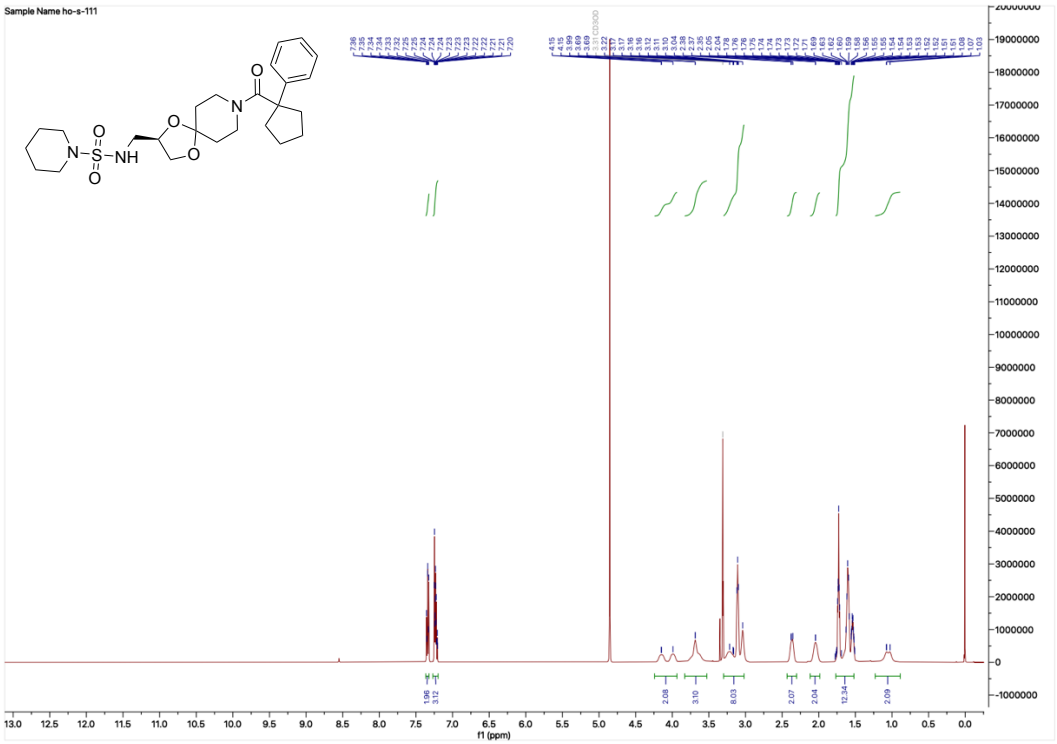


Figure S149: ^{13}C NMR (126 MHz, CD_3OD) for **R-3k**

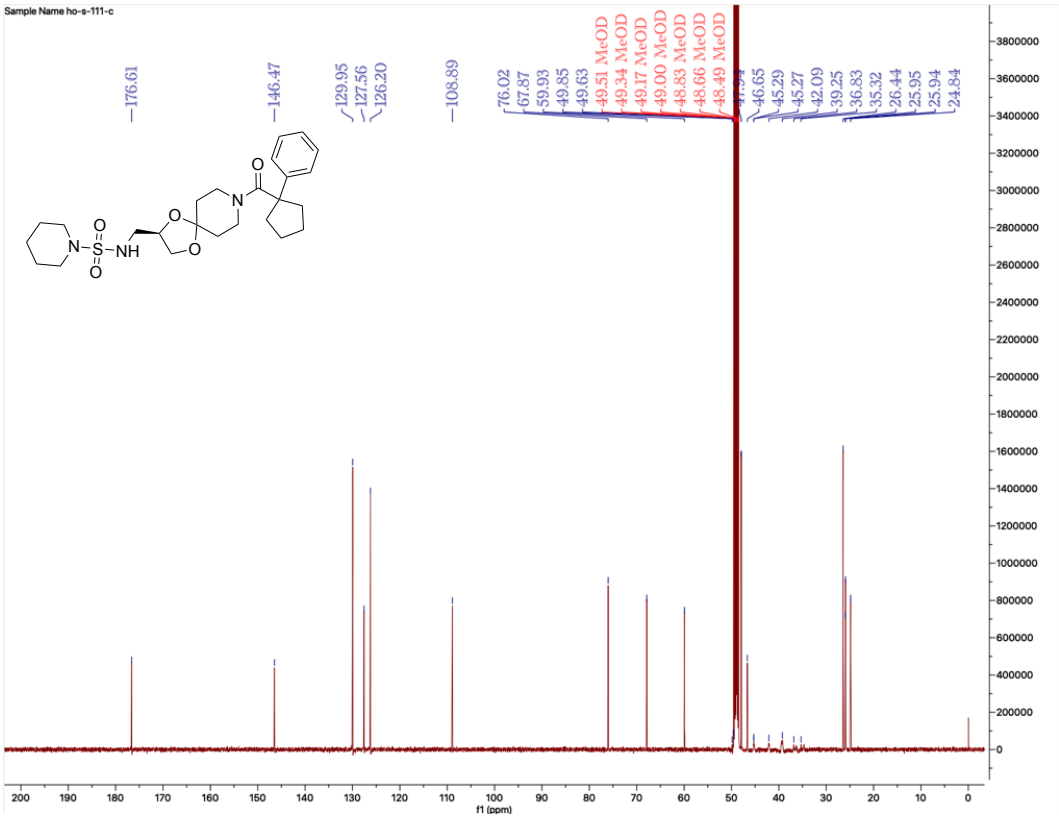


Figure S150: ^{1}H NMR (500 MHz, CD_3OD) for **R-1m**

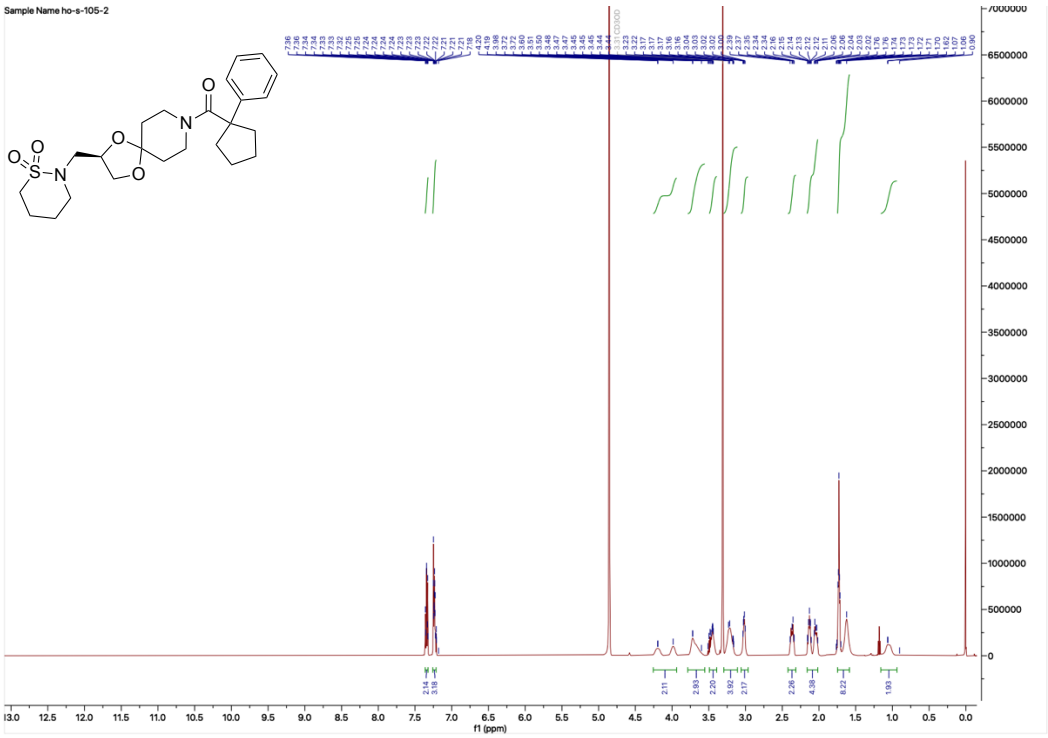


Figure S151: ^{13}C NMR (126 MHz, CD_3OD) for **R-1m**

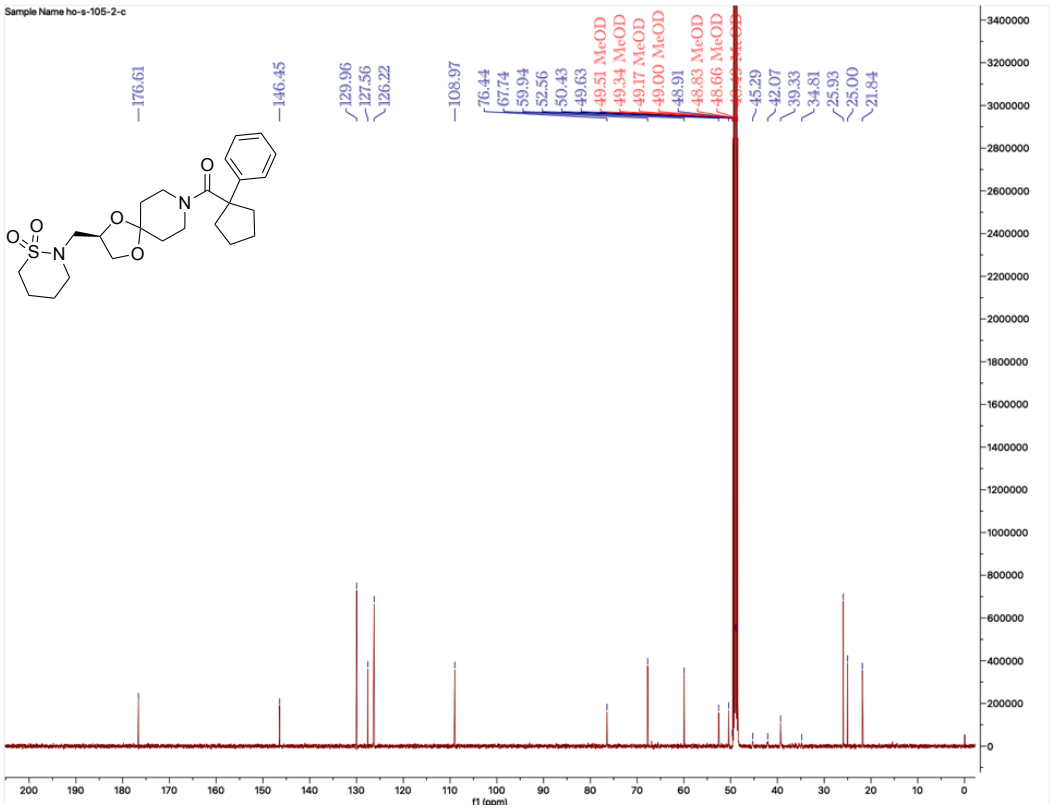


Figure S152: ^{1}H NMR (500 MHz, CD_3OD) for **S-1m**

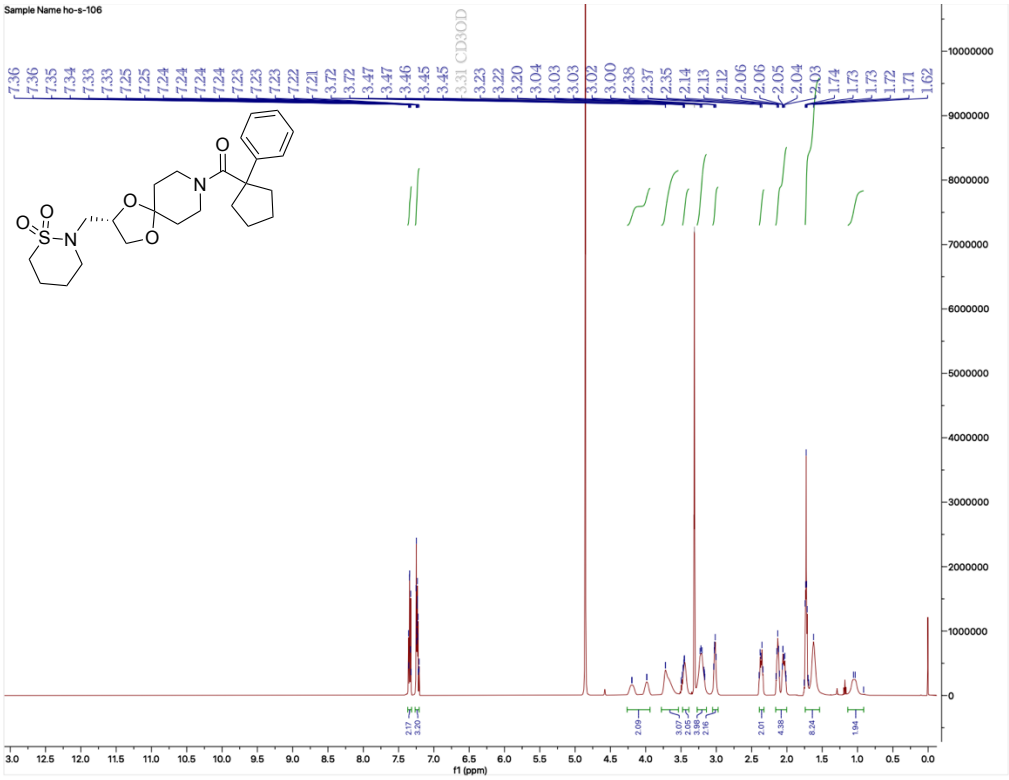


Figure S153: ^{13}C NMR (126 MHz, CD_3OD) for **S-1m**

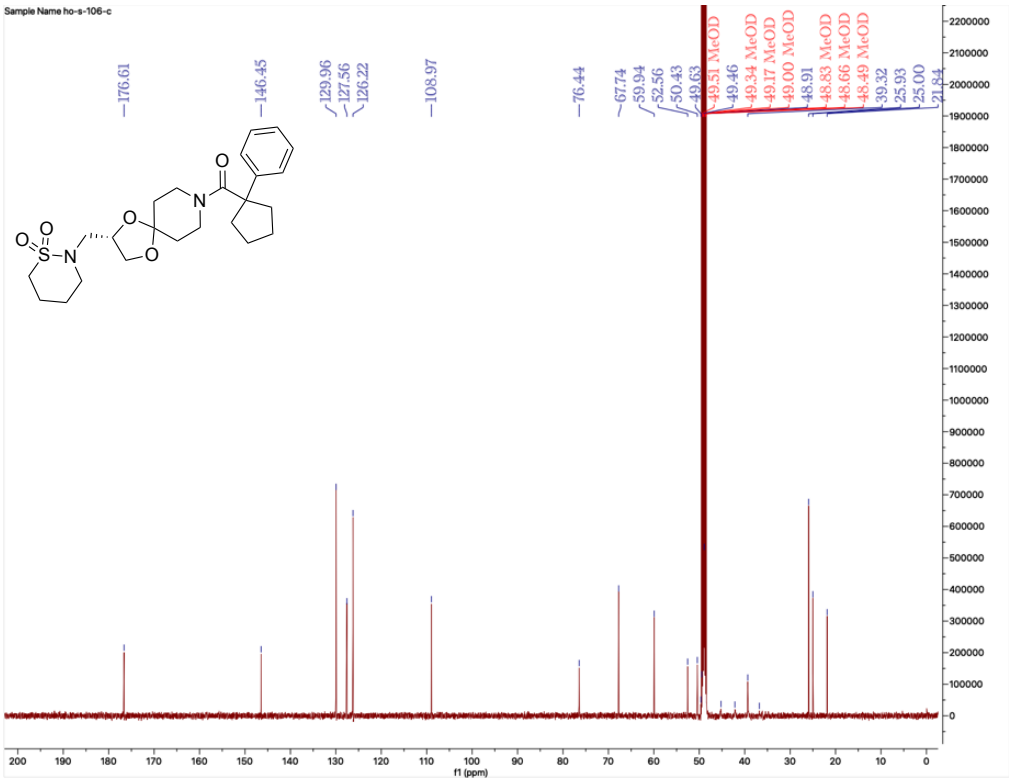


Figure S154: ^{1}H NMR (500 MHz, CD_3OD) for **S-4b**

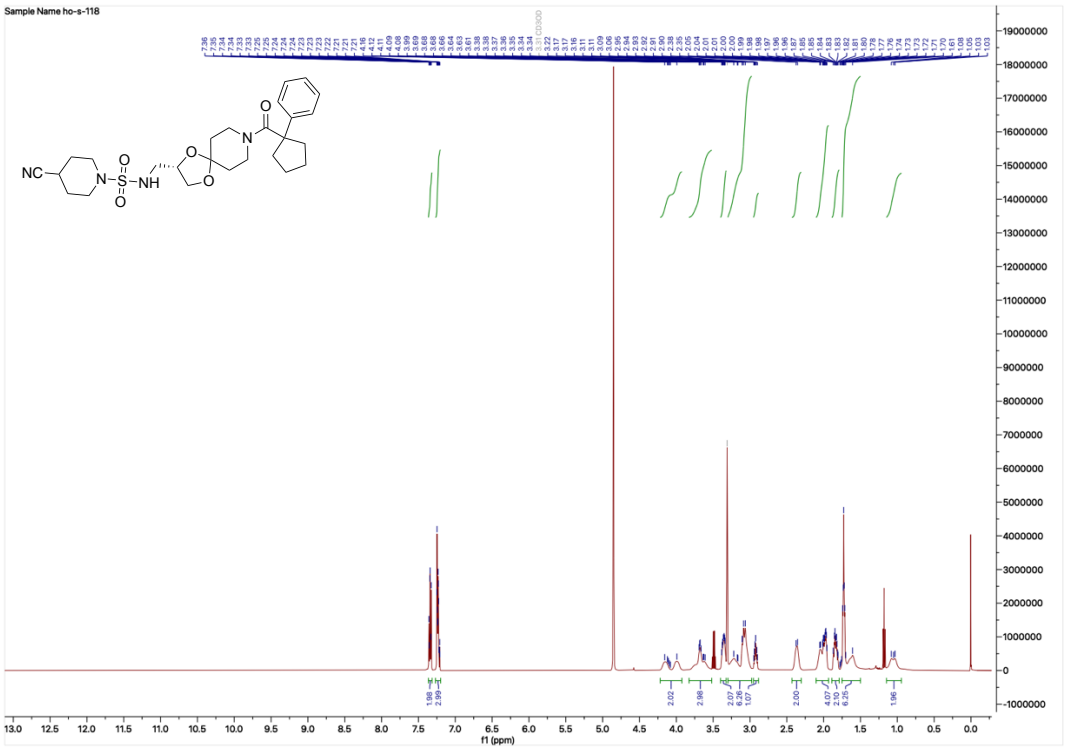


Figure S155: ^{13}C NMR (126 MHz, CD_3OD) for **S-4b**

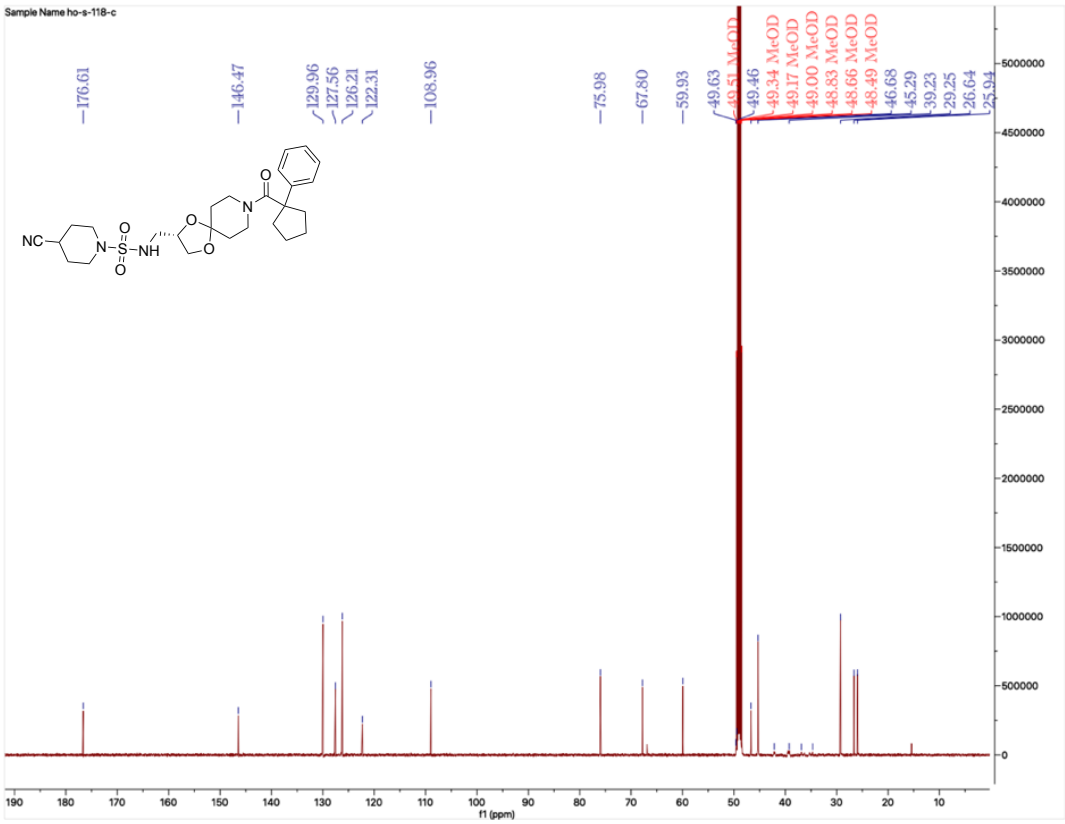


Figure S156: ^{1}H NMR (500 MHz, CD_3OD) for **R-4b**

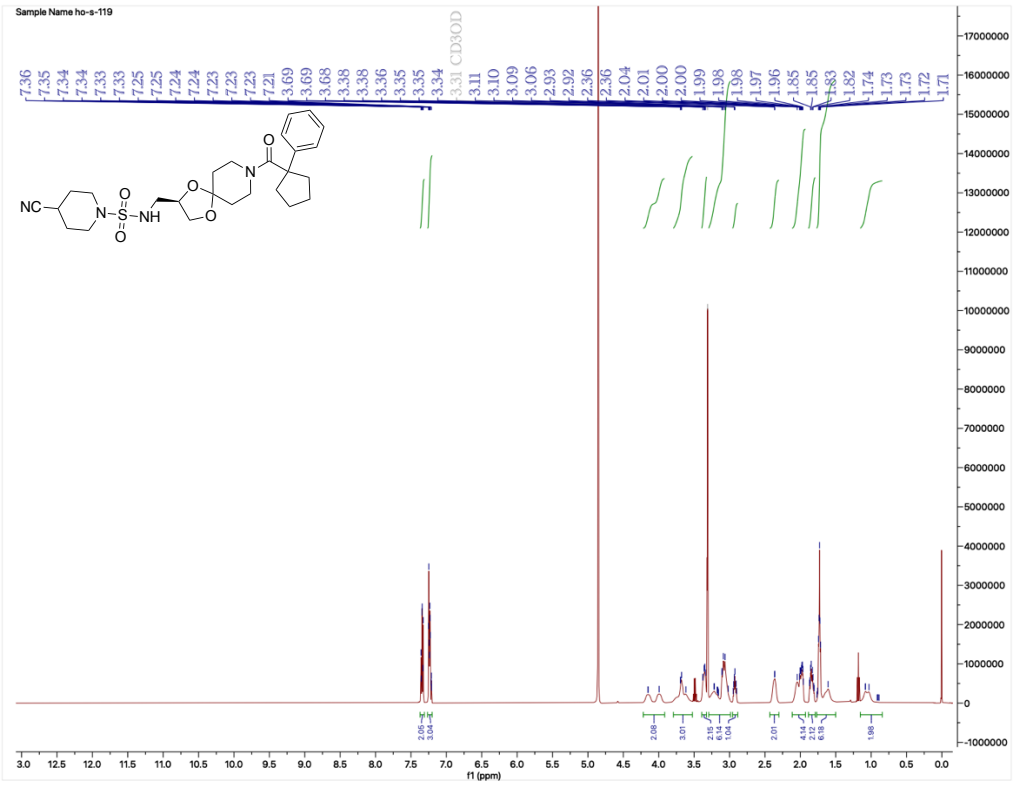


Figure S157: ^{13}C NMR (126 MHz, CD_3OD) for **R-4b**

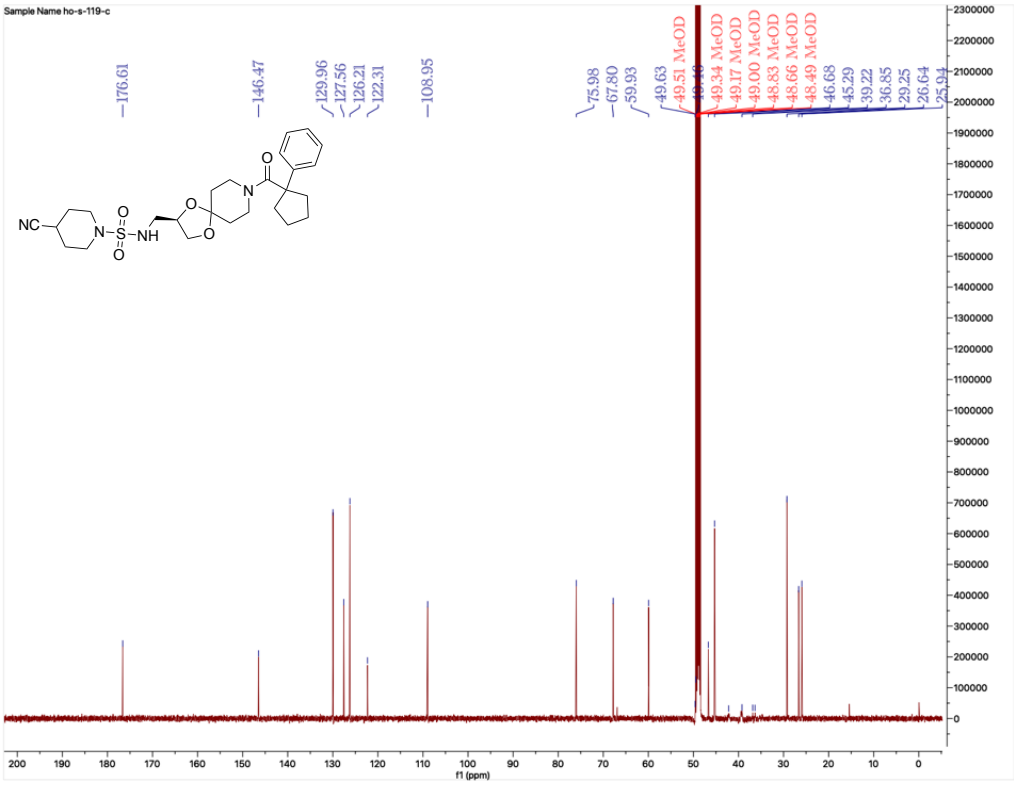


Figure S158: ^{1}H NMR (500 MHz, CD_3OD) for **S-5b**

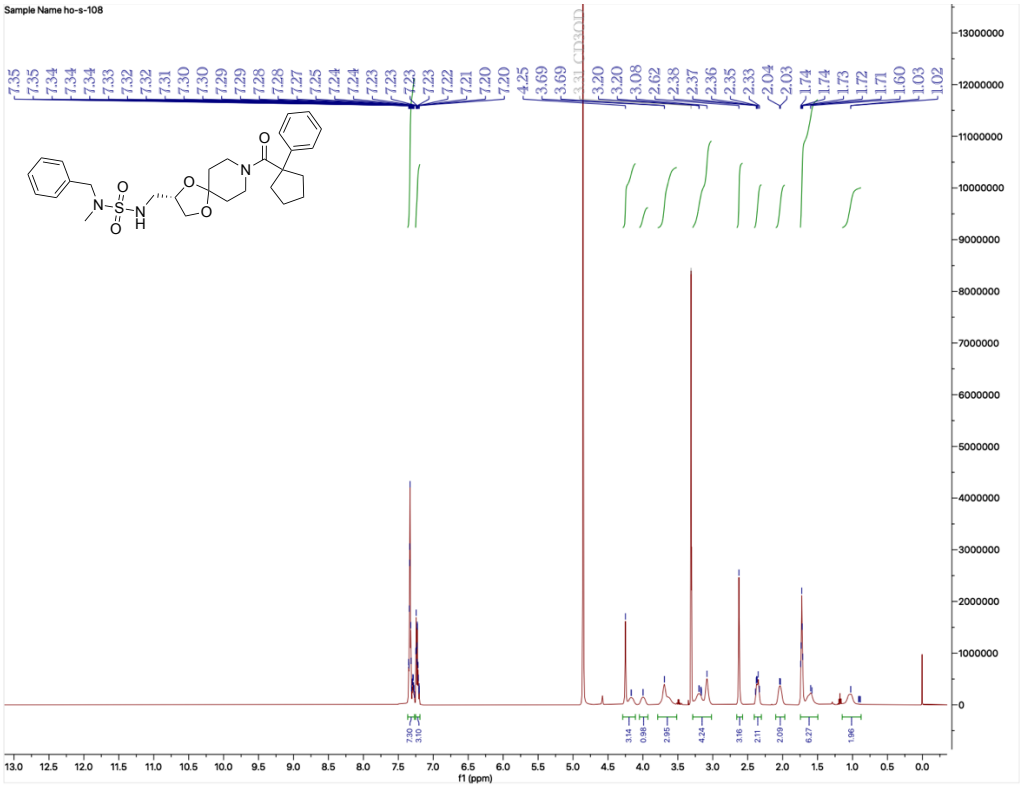


Figure S159: ^{13}C NMR (126 MHz, CD_3OD) for **S-5b**

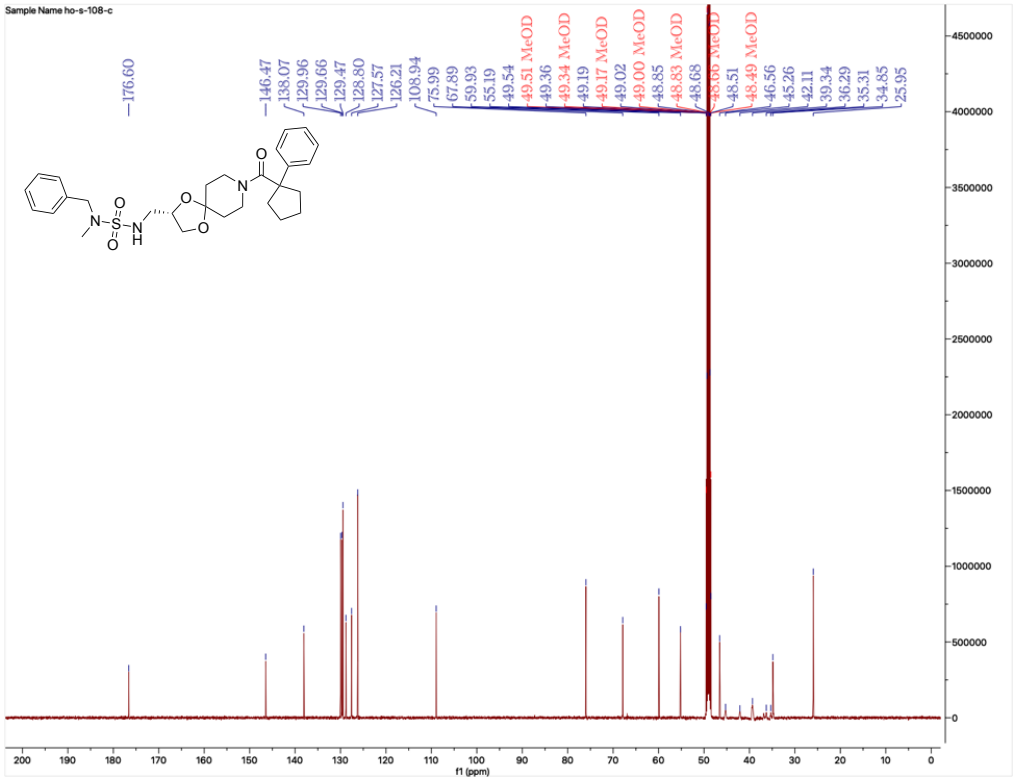


Figure S160: ^{1}H NMR (500 MHz, CD_3OD) for **R-5b**

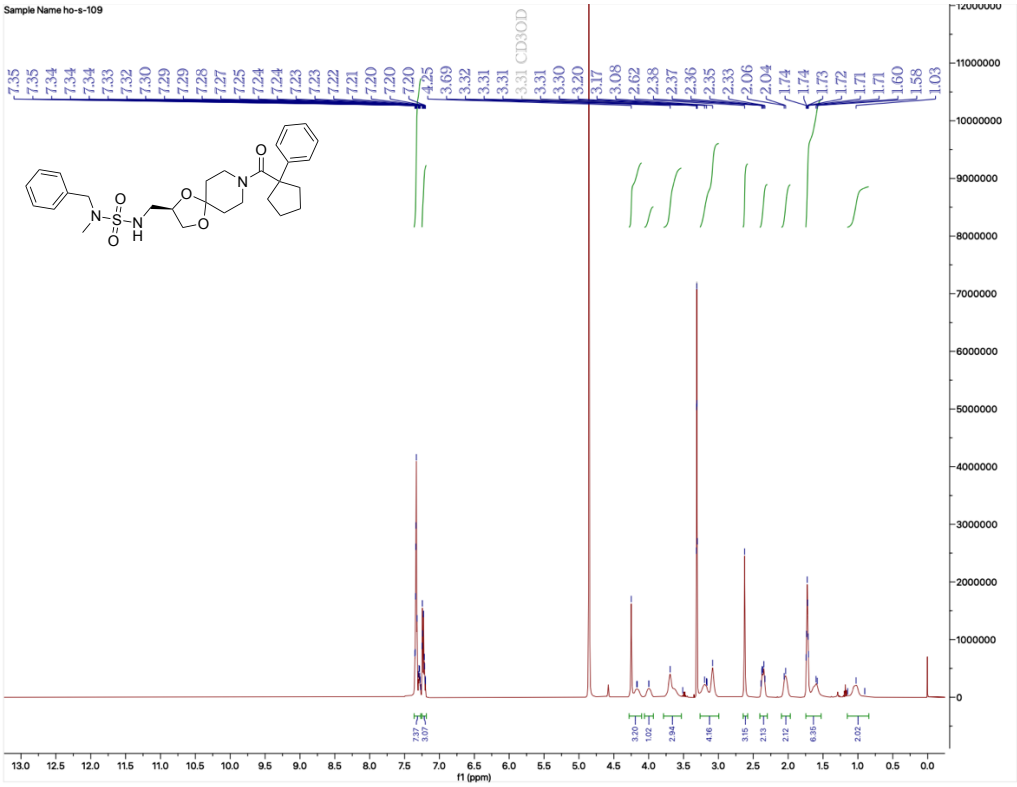
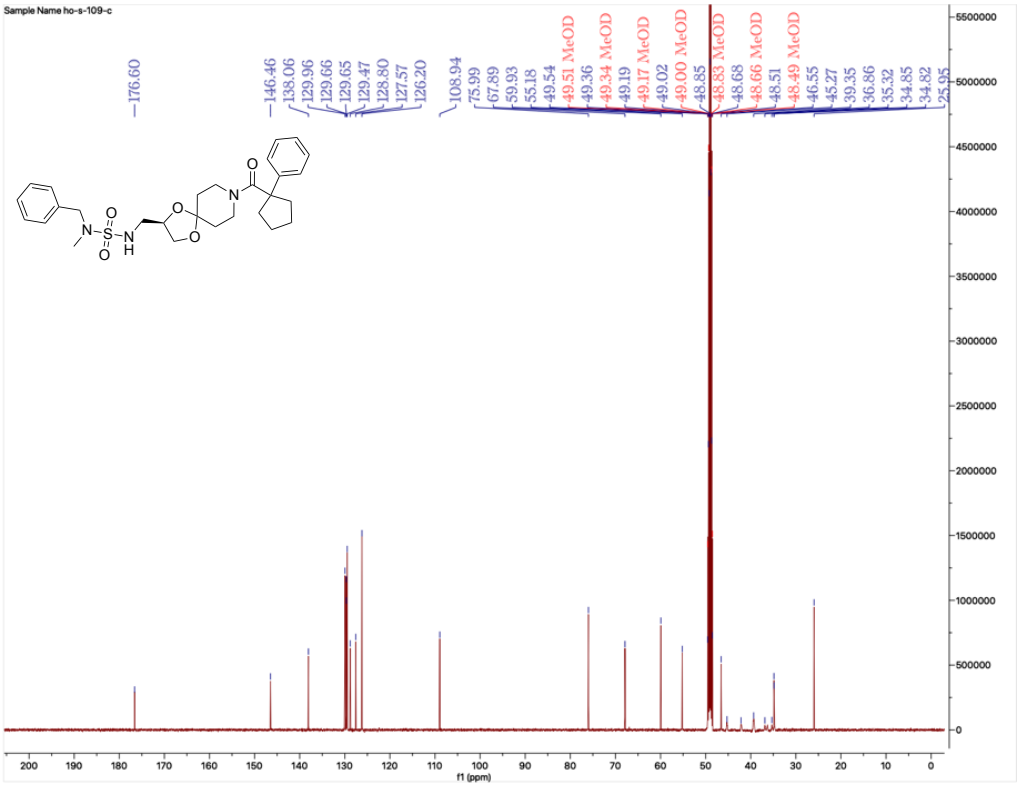
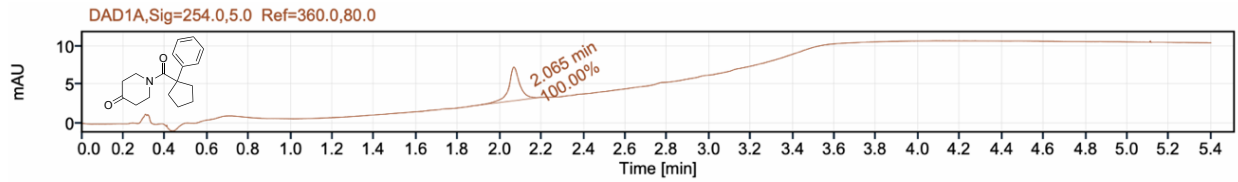


Figure S161: ^{13}C NMR (126 MHz, CD_3OD) for **R-5b**



HPLC analyses

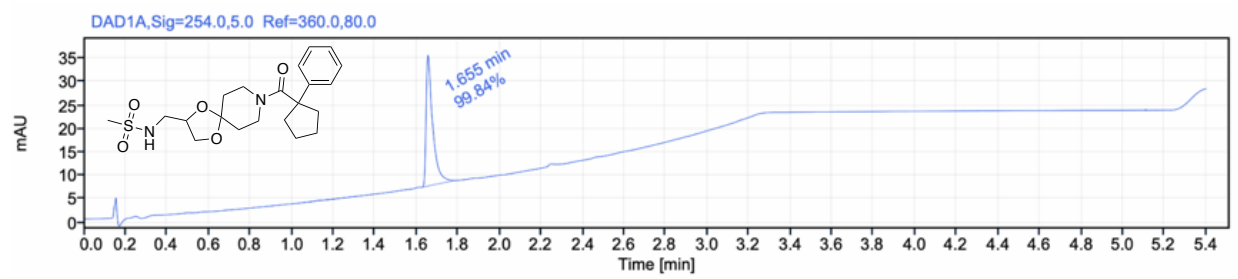
Figure S162: HPLC trace of intermediate **II**



Signal Name DAD1A

RT (min)	Signal description	Area	Area%
2.065	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0	16.1	100.00

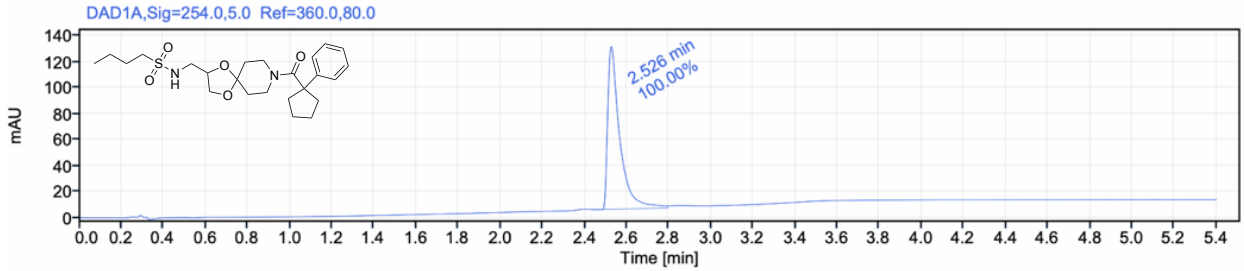
Figure S163: HPLC trace of **1a**



Signal Name DAD1A

RT (min)	Signal description	Area	Area%
2.129	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0	317.8	100.00

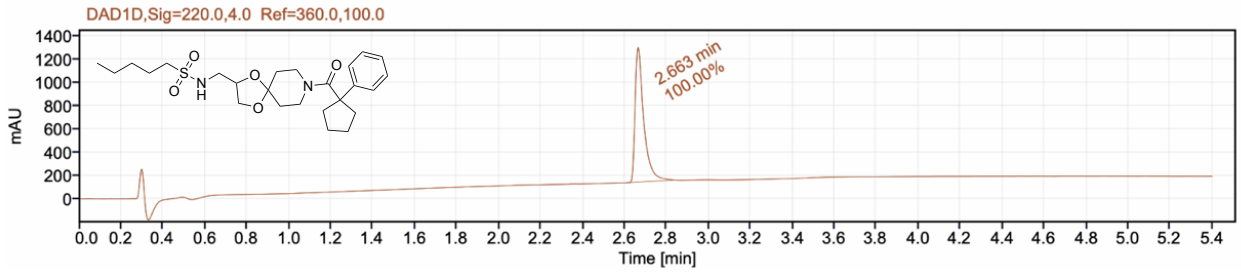
Figure S164: HPLC trace of **1b**



Signal Name DAD1A

RT (min)	Signal description	Area	Area%
2.526	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0	500.6	100.00

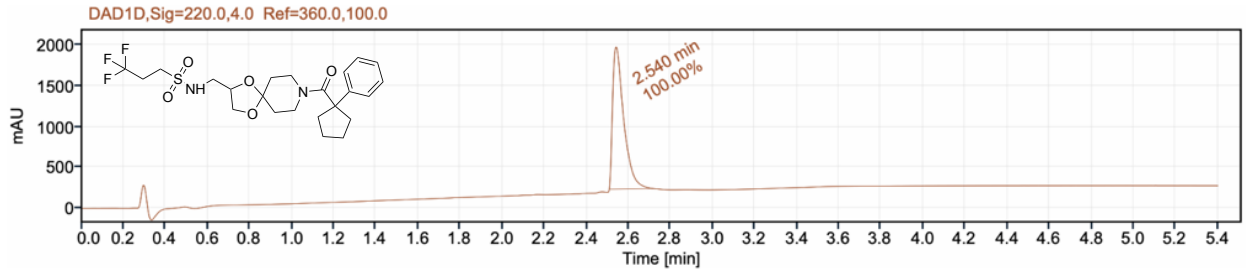
Figure S165: HPLC trace of **1c**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.663	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	3334.8	100.00

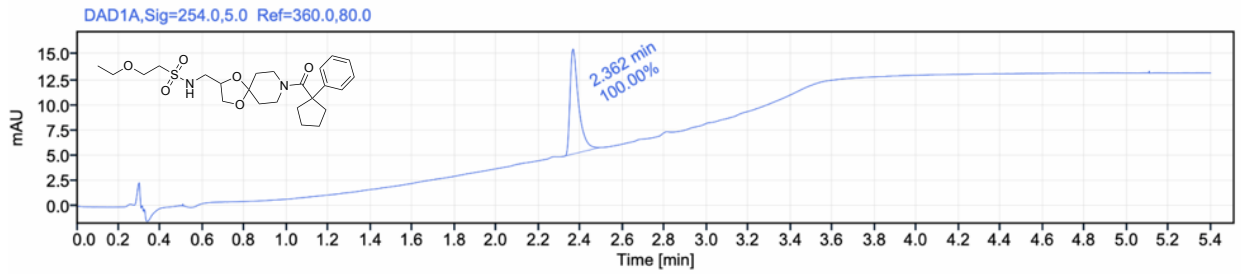
Figure S166: HPLC trace of **1d**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.540	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	6403.3	100.00

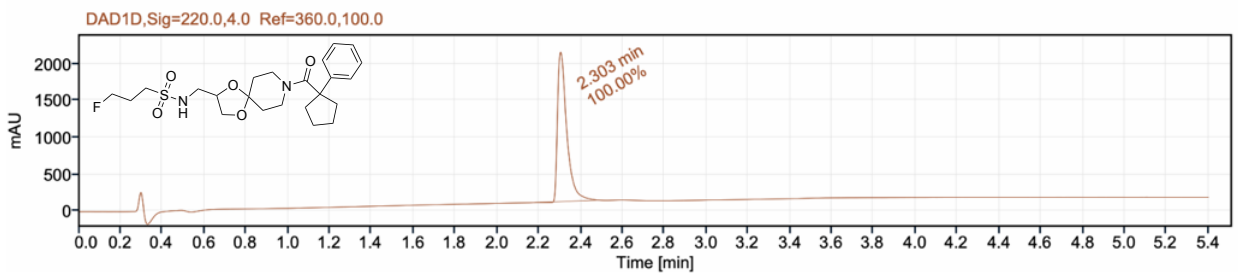
Figure S167: HPLC trace of **1e**



Signal Name DAD1A

RT (min)	Signal description	Area	Area%
2.362	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0	29.3	100.00

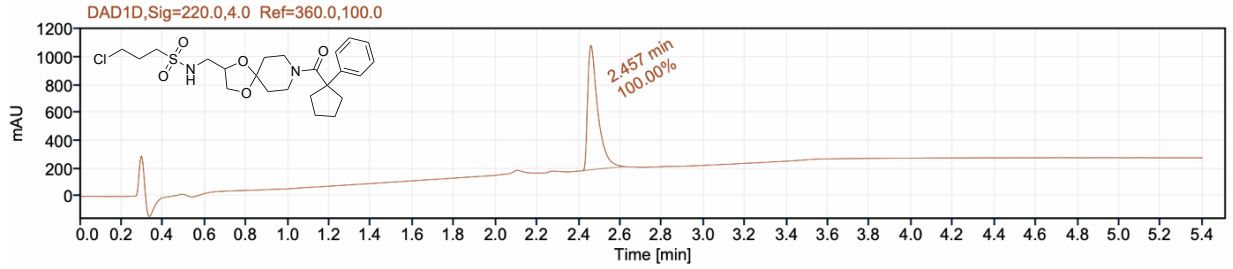
Figure S168: HPLC trace of **1f**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.303	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	6260.8	100.00

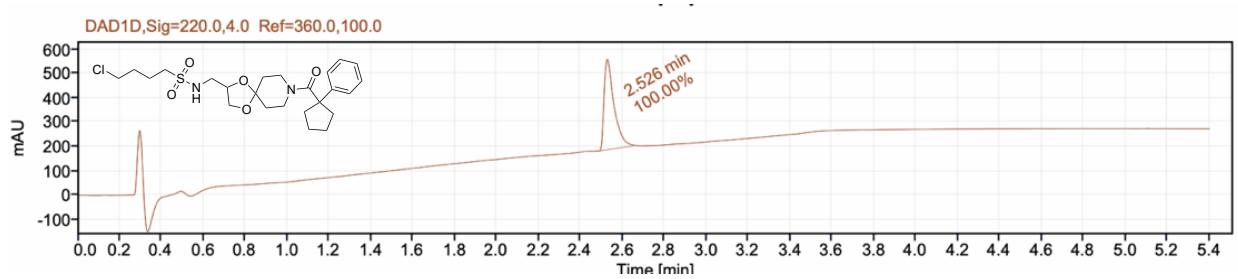
Figure S169: HPLC trace of **1g**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.457	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	3014.5	100.00

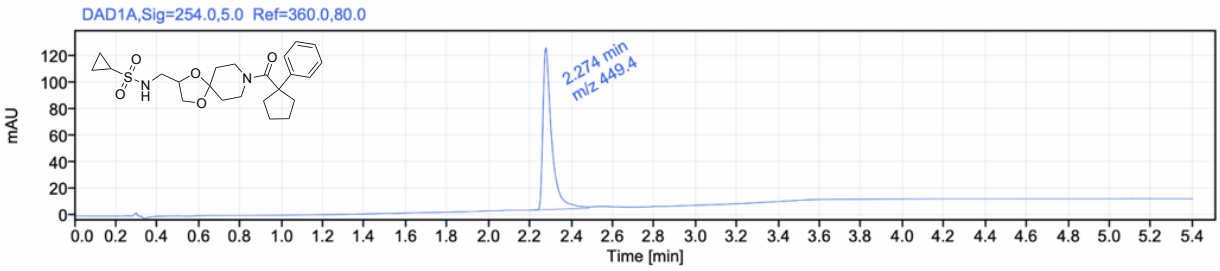
Figure S170: HPLC trace of **1h**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.526	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	1222.3	100.00

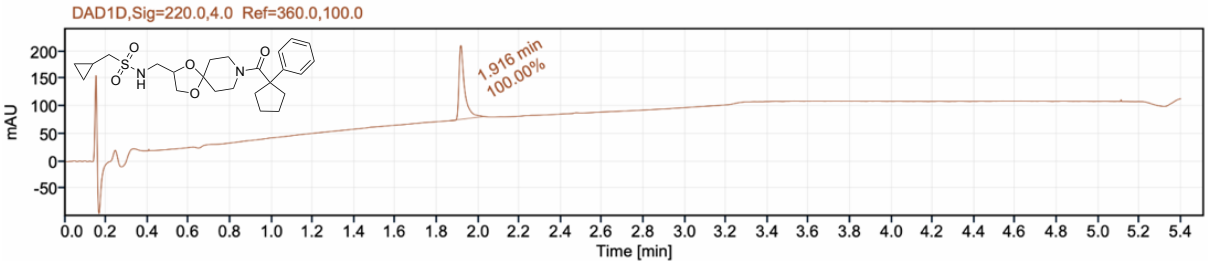
Figure S171: HPLC trace of **1i**



Signal Name DAD1A

RT (min)	Signal description	Area	Area%
2.274	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0	361.1	100.00

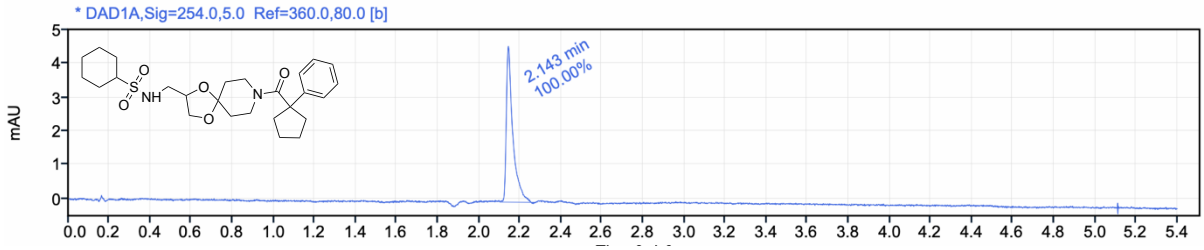
Figure S172: HPLC trace of **1j**



Signal Name DAD1D

RT (min)	Signal description	m/z	Purity UV(‰) / MS(%)	Area	Area%
1.916	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0			251.7	100.00

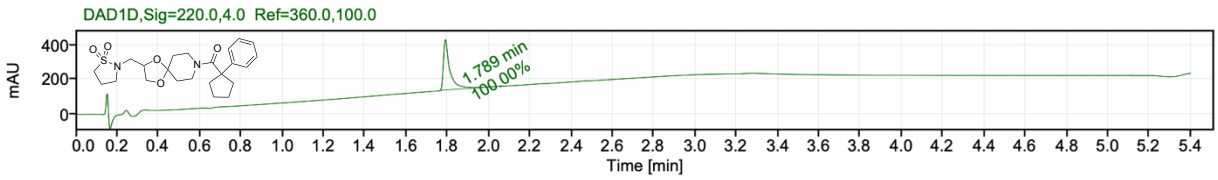
Figure S173: HPLC trace of **1k**



Signal Name DAD1A

RT (min)	Signal description	m/z	Purity UV(‰) / MS(%)	Area	Area%
2.143	* DAD1A,Sig=254.0,5.0 Ref=360.0,80.0 [b]			10.1	100.00

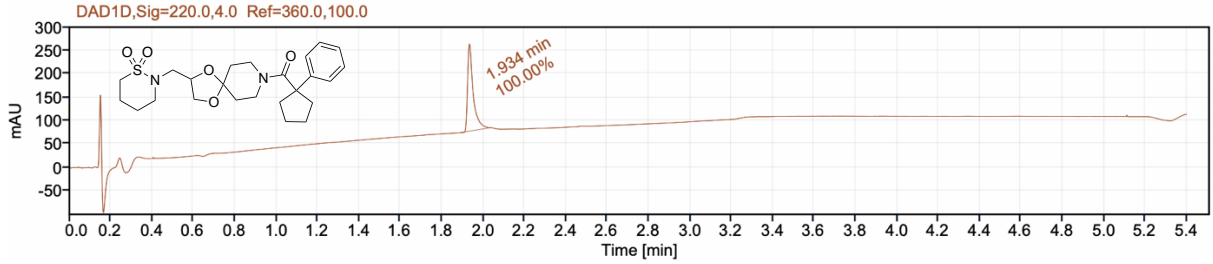
Figure S174: HPLC trace of **1l**



Signal Name DAD1D

RT (min)	Signal description	m/z	Purity UV(‰) / MS(%)	Area	Area%
1.789	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0			620.9	100.00

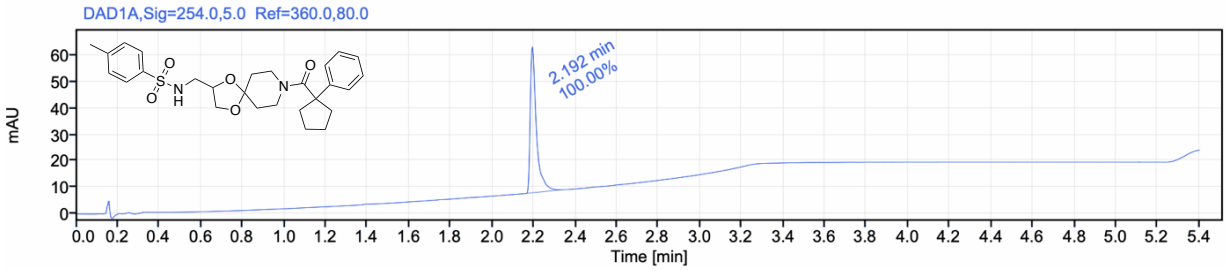
Figure S175: HPLC trace of **1m**



Signal Name DAD1D

RT (min)	Signal description	m/z	Purity UV(‰) / MS(%)	Area	Area%
1.934	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0			349.2	100.00

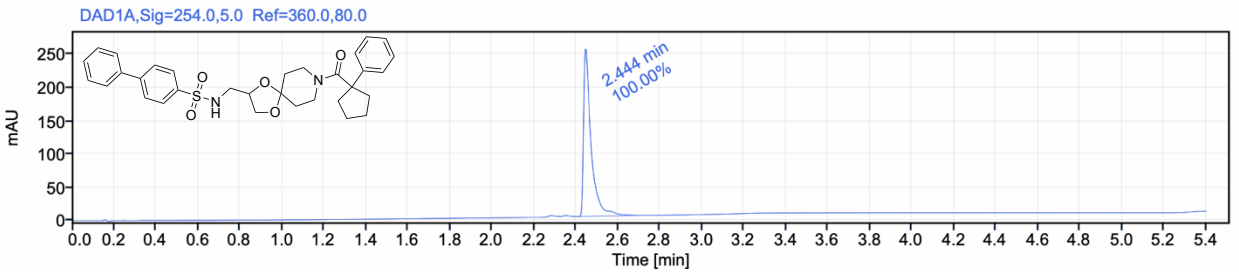
Figure S176: HPLC trace of **2a**



Signal Name DAD1A

RT (min)	Signal description	m/z	Purity UV(‰) / MS(%)	Area	Area%
2.192	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0			113.2	100.00

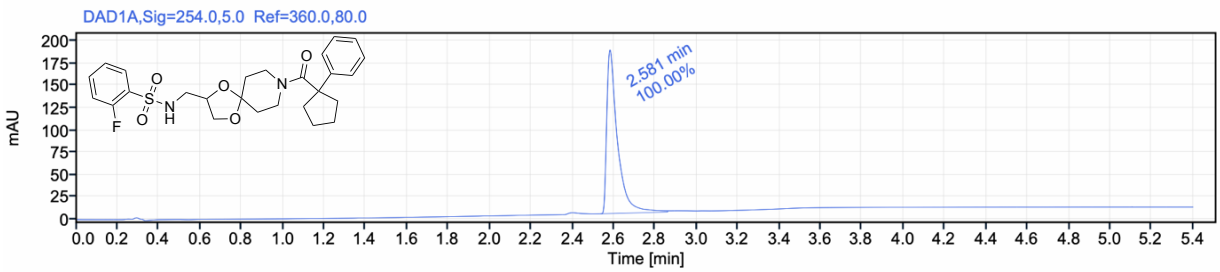
Figure S177: HPLC trace of **2b**



Signal Name DAD1A

RT (min)	Signal description	m/z	Purity UV(‰) / MS(%)	Area	Area%
2.444	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0			645.5	100.00

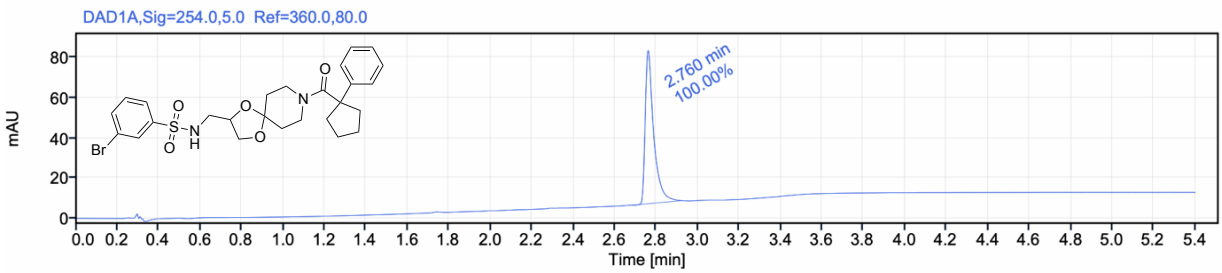
Figure S178: HPLC trace of **2c**



Signal Name DAD1A

RT (min)	Signal description	Area	Area%
2.581	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0	662.8	100.00

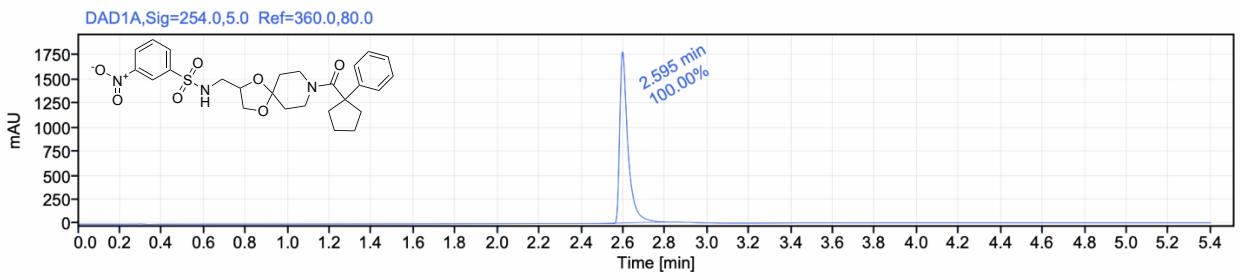
Figure S179: HPLC trace of **2d**



Signal Name DAD1A

RT (min)	Signal description	Area	Area%
2.760	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0	217.4	100.00

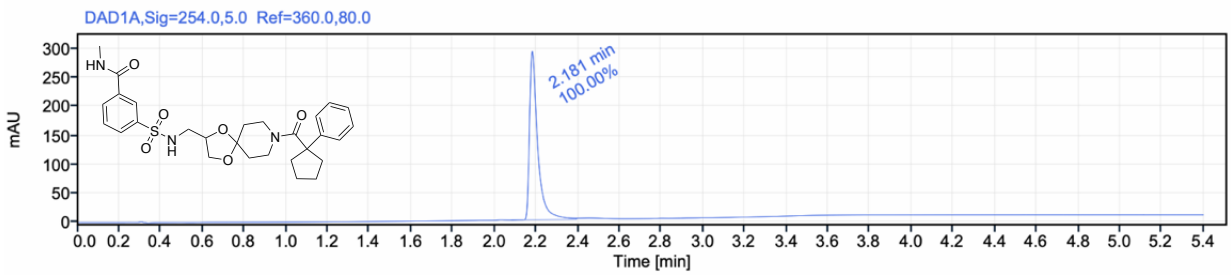
Figure S180: HPLC trace of **2e**



Signal Name DAD1A

RT (min)	Signal description	Area	Area%
2.595	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0	4839.8	100.00

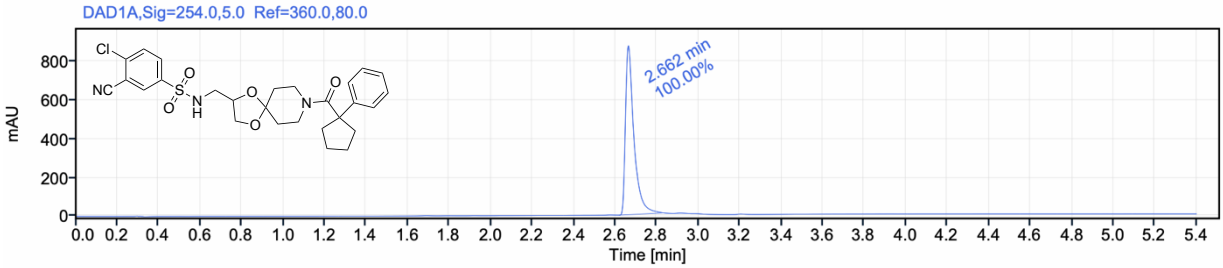
Figure S181: HPLC trace of **2f**



Signal Name DAD1A

RT (min)	Signal description	Area	Area%
2.181	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0	799.2	100.00

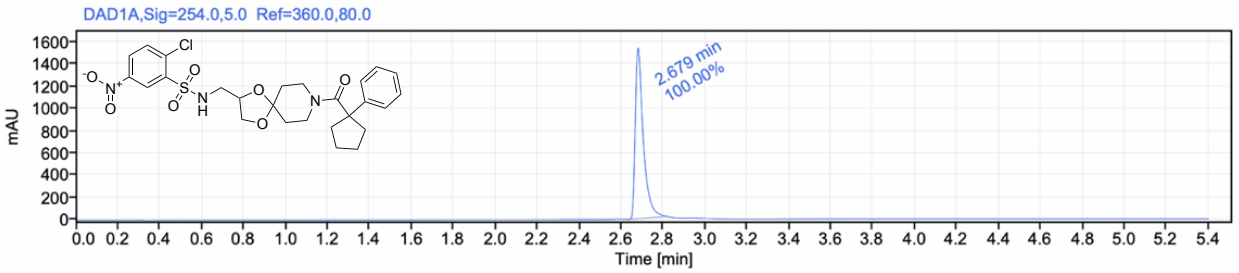
Figure S182: HPLC trace of **2g**



Signal Name DAD1A

RT (min)	Signal description	Area	Area%
2.662	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0	2470.1	100.00

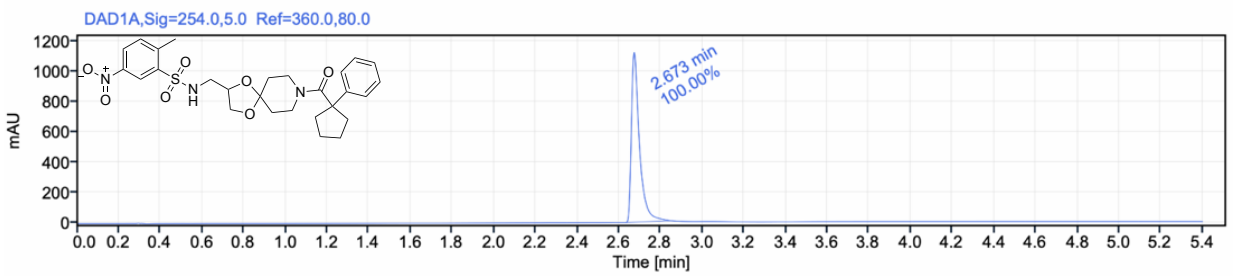
Figure S183: HPLC trace of **2h**



Signal Name DAD1A

RT (min)	Signal description	Area	Area%
2.679	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0	4066.0	100.00

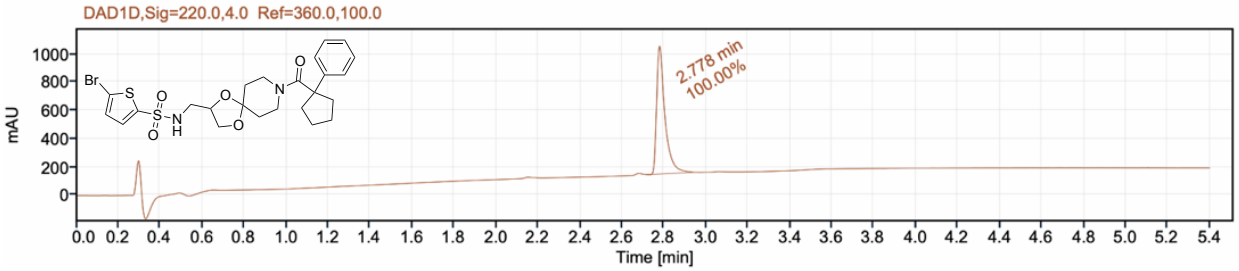
Figure S184: HPLC trace of **2i**



Signal Name DAD1A

RT (min)	Signal description	Area	Area%
2.673	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0	3008.6	100.00

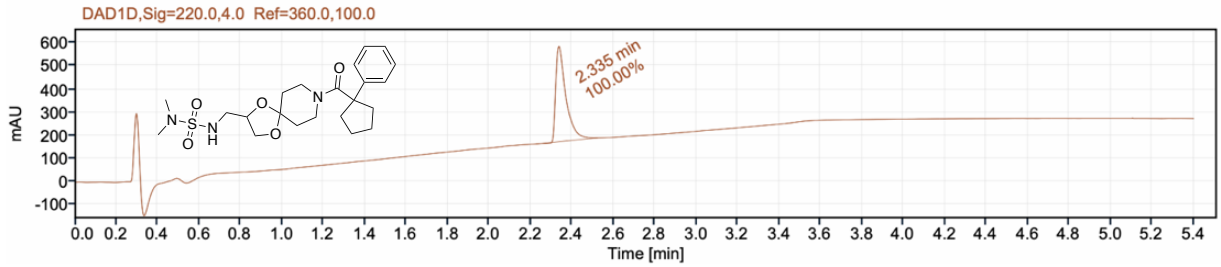
Figure S185: HPLC trace of **2j**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.778	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	2491.2	100.00

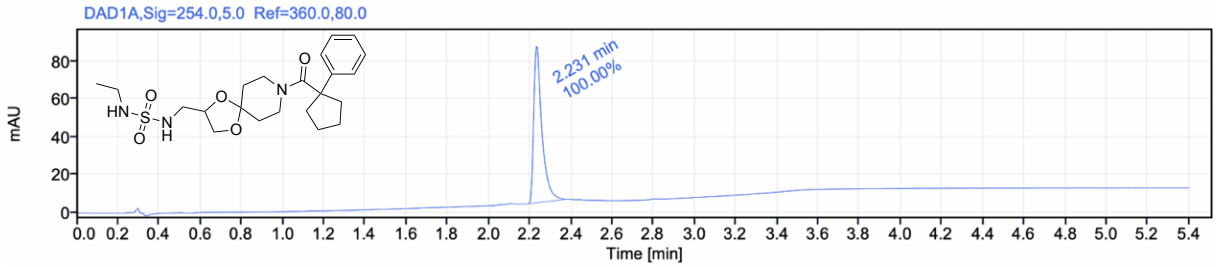
Figure S186: HPLC trace of **3a**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.335	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	1402.7	100.00

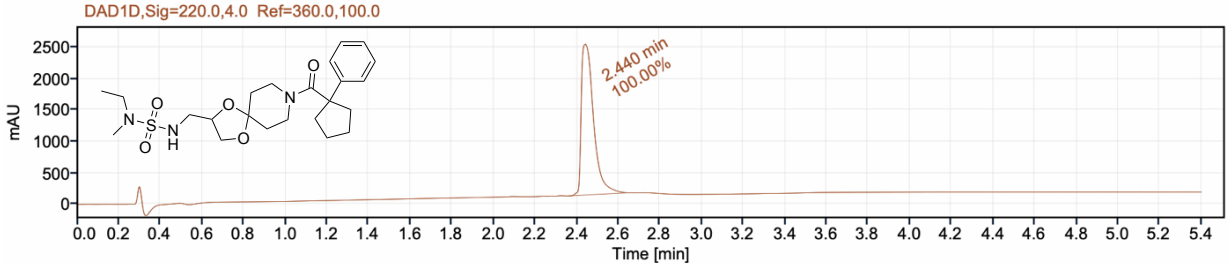
Figure S187: HPLC trace of **3b**



Signal Name DAD1A

RT (min)	Signal description	Area	Area%
2.231	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0	227.7	100.00

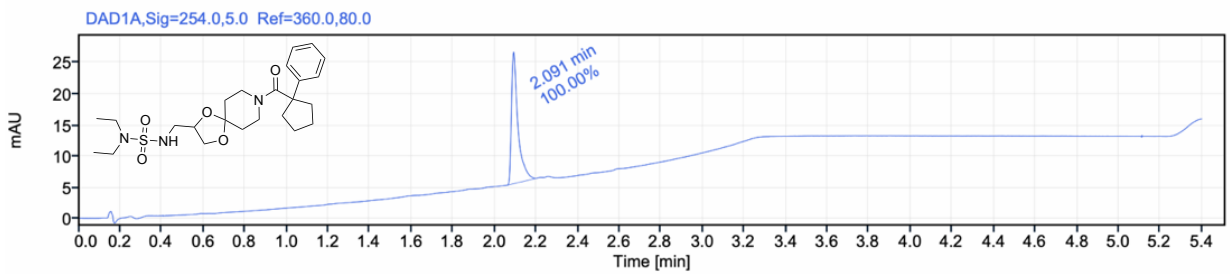
Figure S188: HPLC trace of **3c**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.440	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	9865.8	100.00

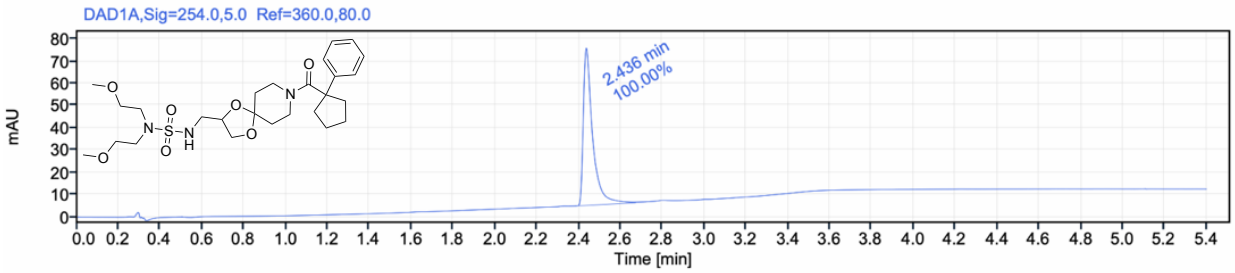
Figure S189: HPLC trace of **3d**



Signal Name DAD1A

RT (min)	Signal description	m/z	Purity UV(‰) / MS(%)	Area	Area%
2.091	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0			46.0	100.00

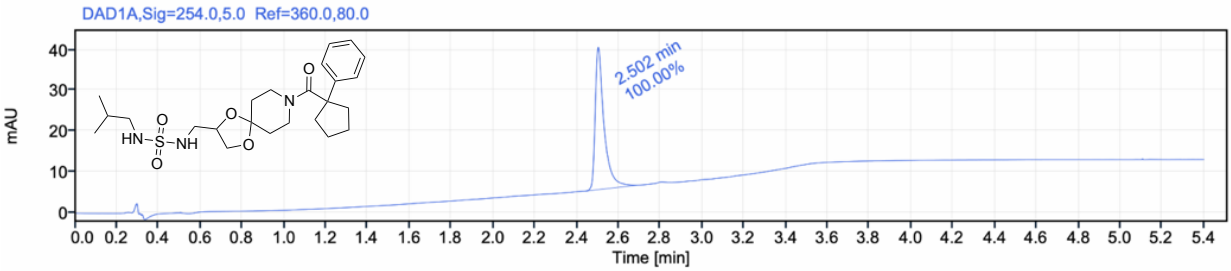
Figure S190: HPLC trace of **3e**



Signal Name DAD1A

RT (min)	Signal description	Area	Area%
2.436	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0	220.1	100.00

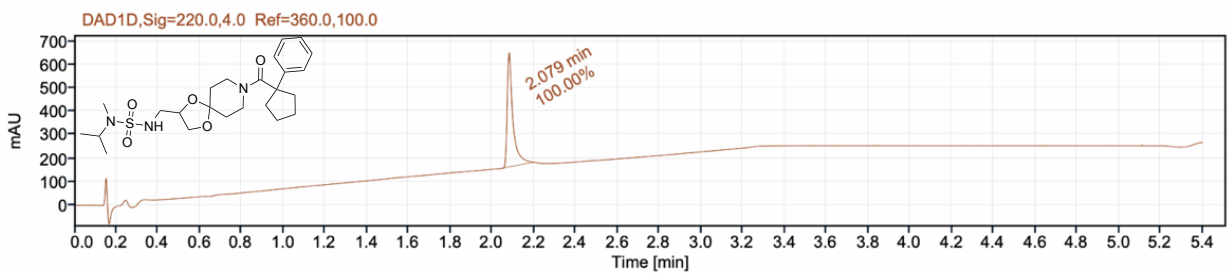
Figure S191: HPLC trace of **3f**



Signal Name DAD1A

RT (min)	Signal description	Area	Area%
2.502	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0	103.0	100.00

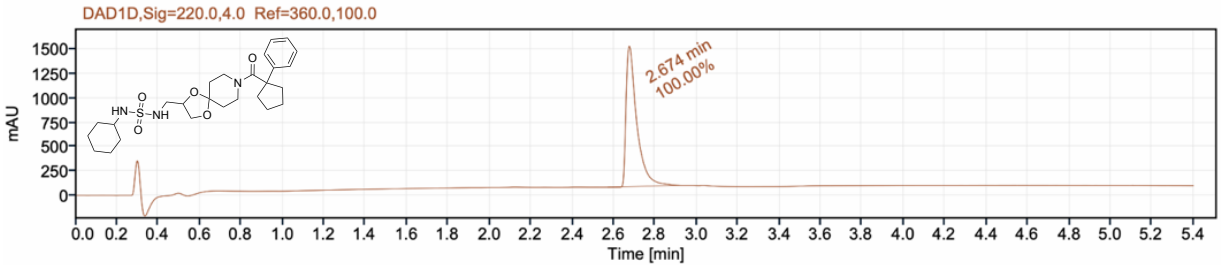
Figure S192: HPLC trace of **3g**



Signal Name DAD1D

RT (min)	Signal description	m/z	Purity UV(‰) / MS(%)	Area	Area%
2.079	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0			924.6	100.00

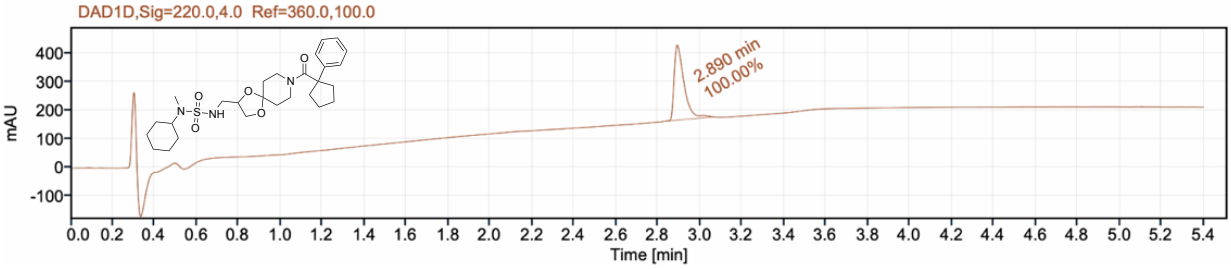
Figure S193: HPLC trace of **3h**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.674	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	5219.9	100.00

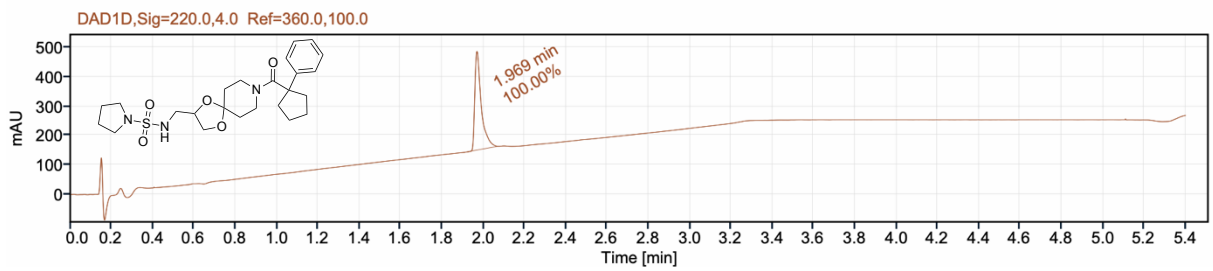
Figure S194: HPLC trace of **3i**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.890	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	857.1	100.00

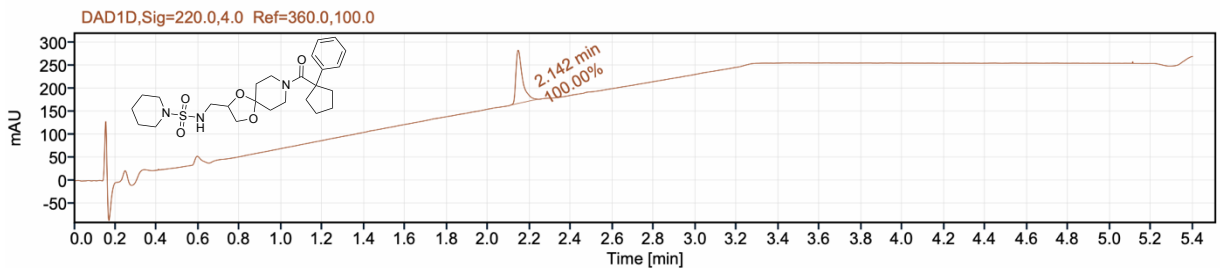
Figure S195: HPLC trace of **3j**



Signal Name DAD1D

RT (min)	Signal description	m/z	Purity UV(‰) / MS(%)	Area	Area%
1.969	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0			731.3	100.00

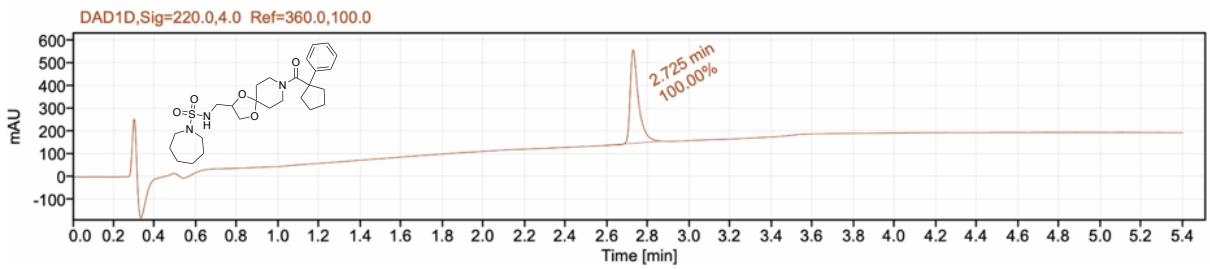
Figure S196: HPLC trace of **3k**



Signal Name DAD1D

RT (min)	Signal description	m/z	Purity UV(‰) / MS(%)	Area	Area%
2.142	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0			256.6	100.00

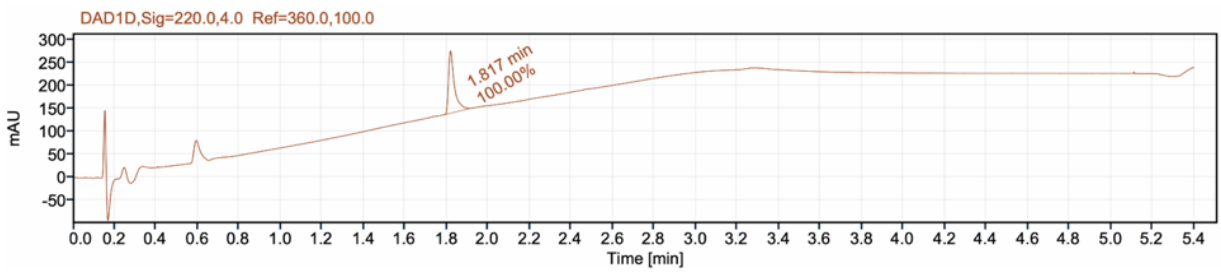
Figure S197: HPLC trace of **3l**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.725	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	1144.6	100.00

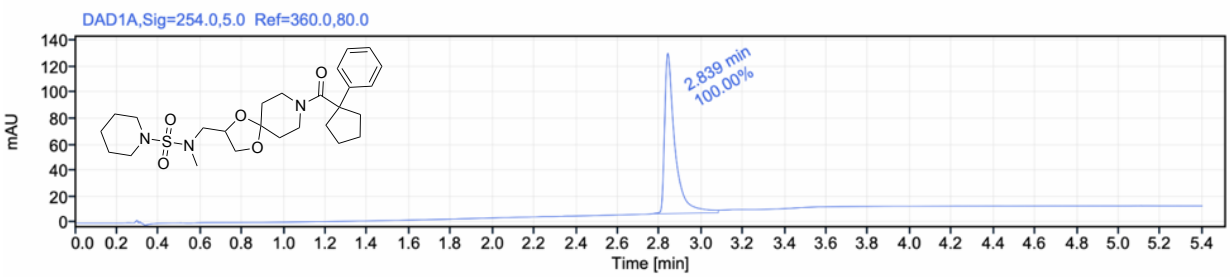
Figure S198: HPLC trace of **3m**



Signal Name DAD1D

RT (min)	Signal description	m/z	Purity UV(‰) / MS(%)	Area	Area%
1.817	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0			270.5	100.00

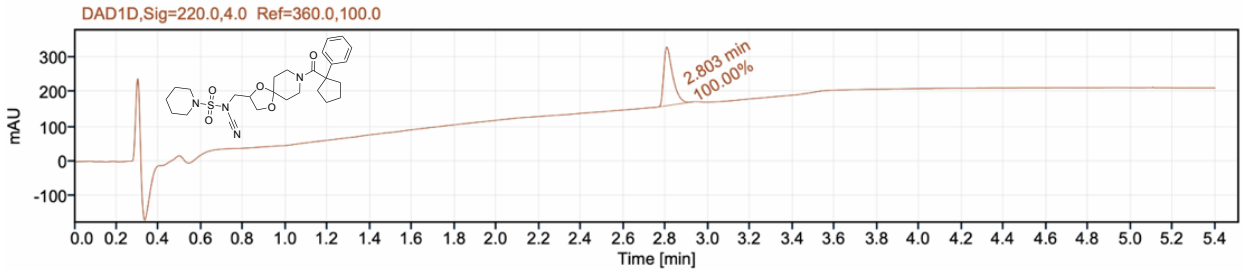
Figure S199: HPLC trace of **3n**



Signal Name DAD1A

RT (min)	Signal description	Area	Area%
2.839	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0	424.4	100.00

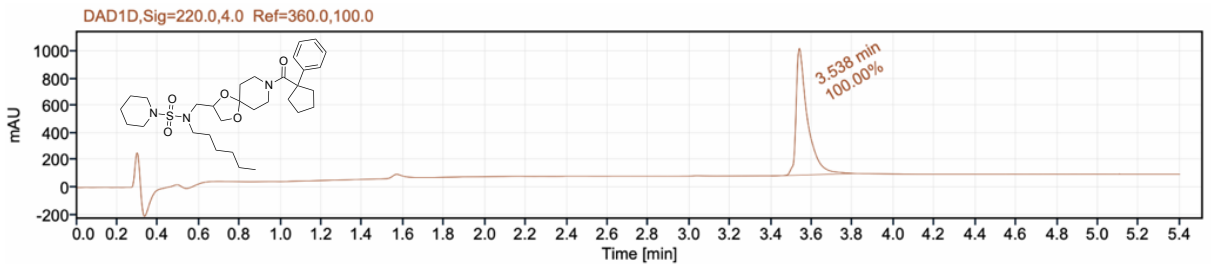
Figure S200: HPLC trace of **3o**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.803	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	502.8	100.00

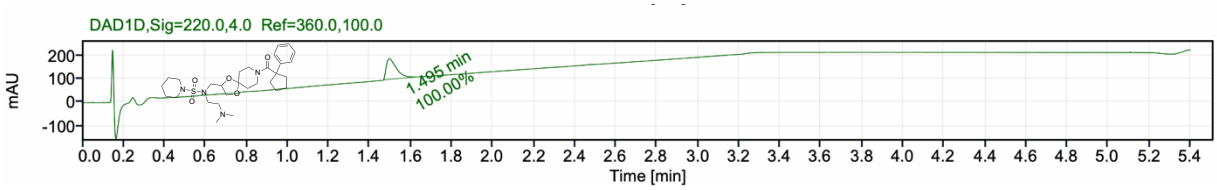
Figure S201: HPLC trace of **3p**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
3.538	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	3617.1	100.00

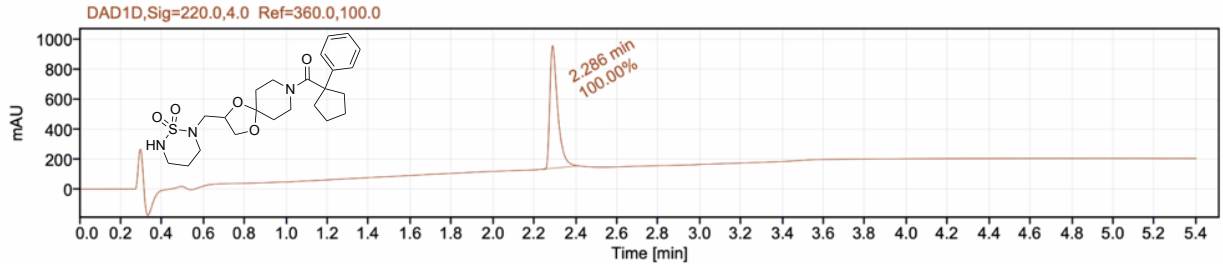
Figure S202: HPLC trace of **3q**



Signal Name DAD1D

RT (min)	Signal description	m/z	Purity UV(‰) / MS(%)	Area	Area%
1.495	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0			306.9	100.00

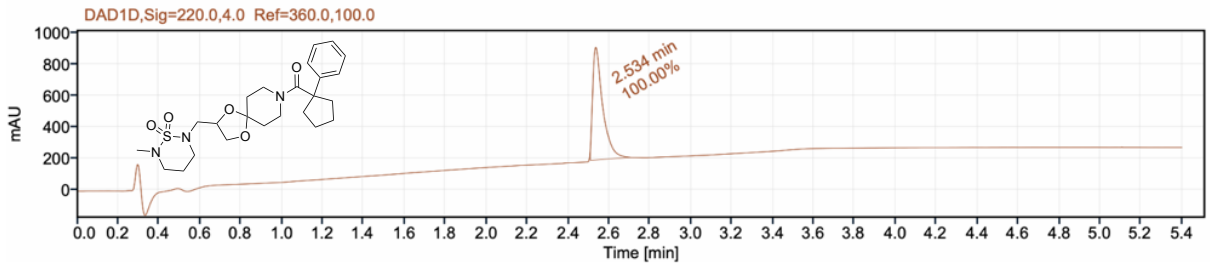
Figure S203: HPLC trace of **3r**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.286	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	2156.1	100.00

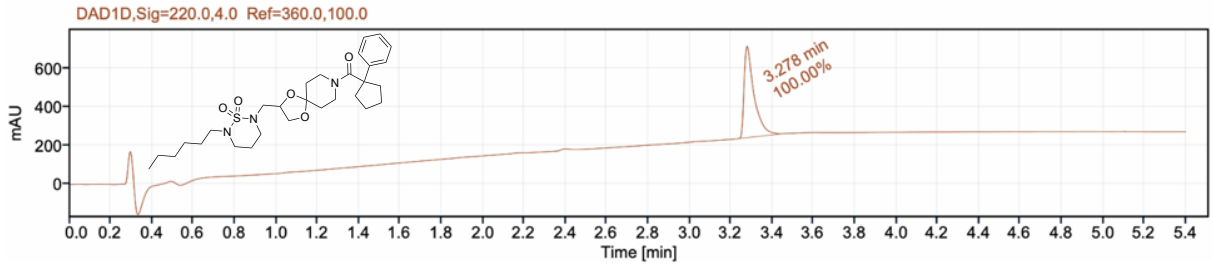
Figure S204: HPLC trace of **3s**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.534	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	2451.8	100.00

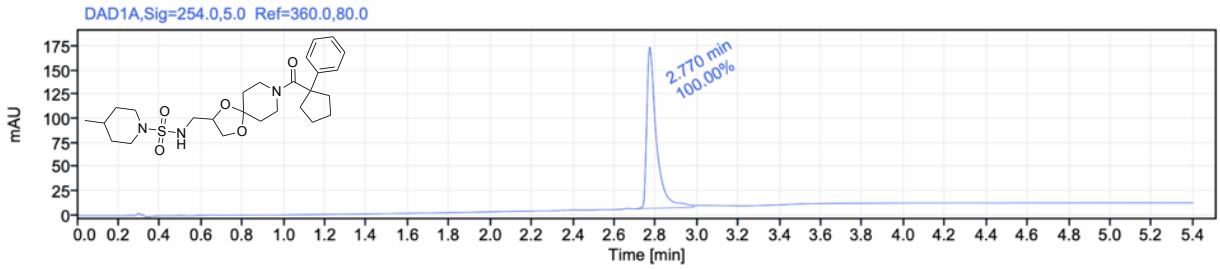
Figure S205: HPLC trace of **3t**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
3.278	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	1575.4	100.00

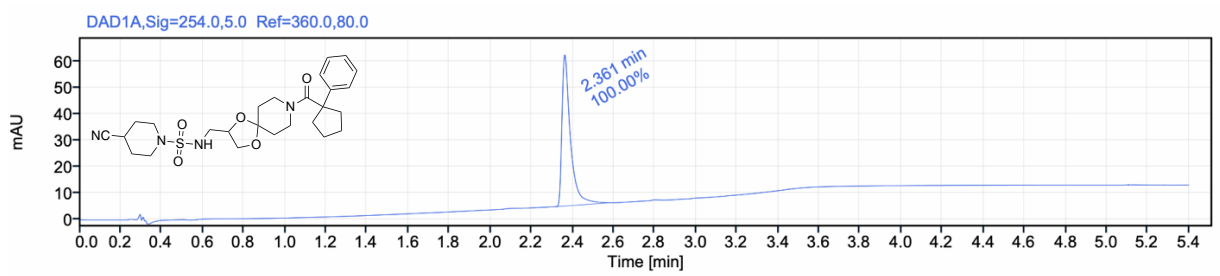
Figure S206: HPLC trace of **4a**



Signal Name DAD1A

RT (min)	Signal description	Area	Area%
2.770	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0	543.1	100.00

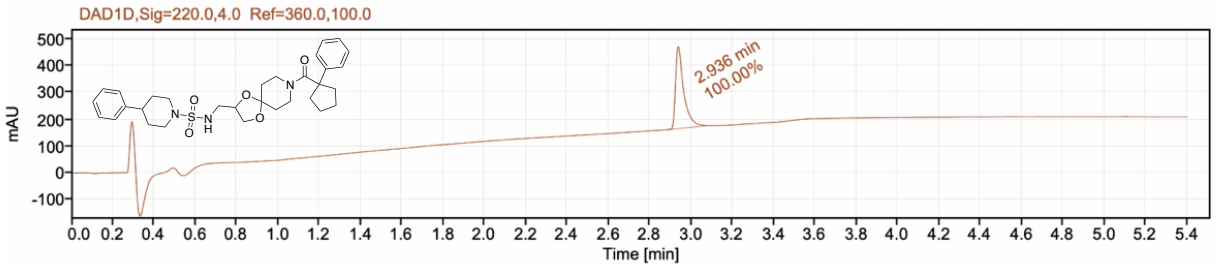
Figure S207: HPLC trace of **4b**



Signal Name DAD1A

RT (min)	Signal description	Area	Area%
2.361	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0	164.9	100.00

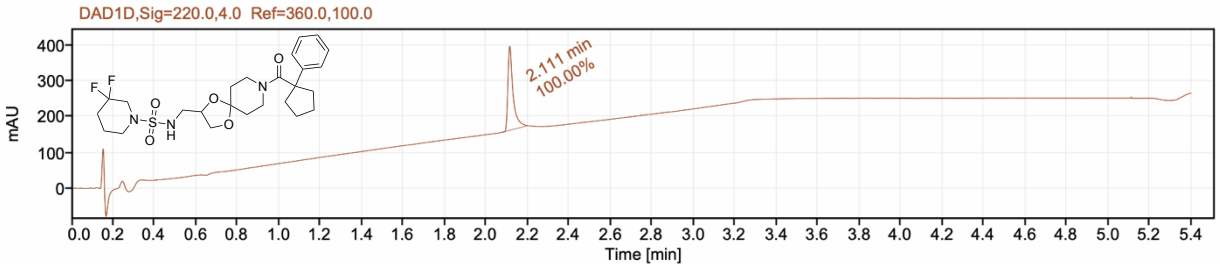
Figure S208: HPLC trace of **4c**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.936	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	852.2	100.00

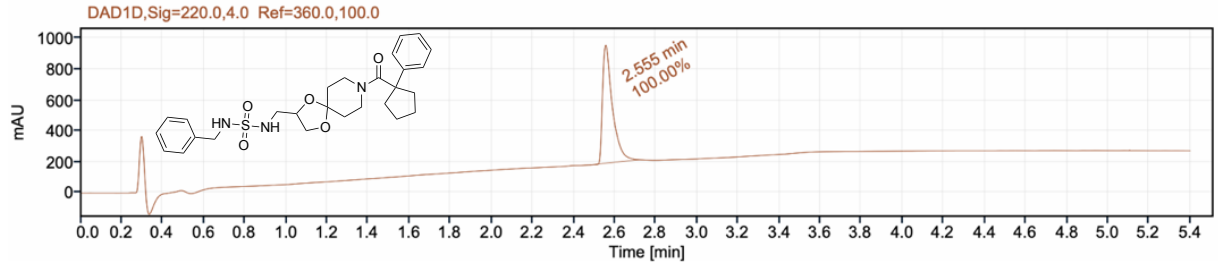
Figure S209: HPLC trace of **4d**



Signal Name DAD1D

RT (min)	Signal description	m/z	Purity UV(‰) / MS(%)	Area	Area%
2.111	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0			410.3	100.00

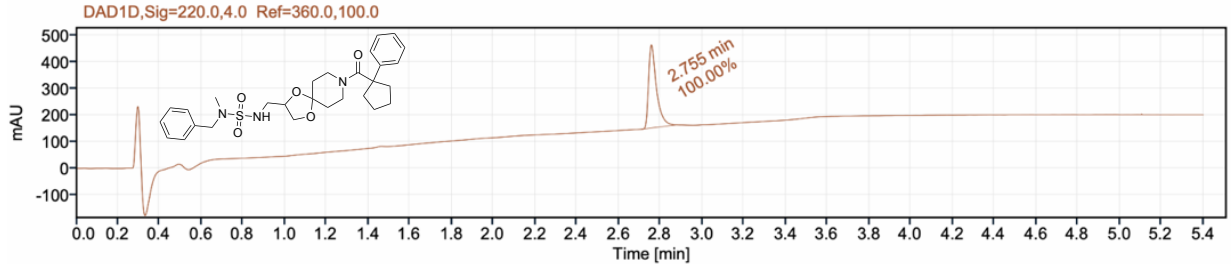
Figure S210: HPLC trace of **5a**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.555	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	2538.9	100.00

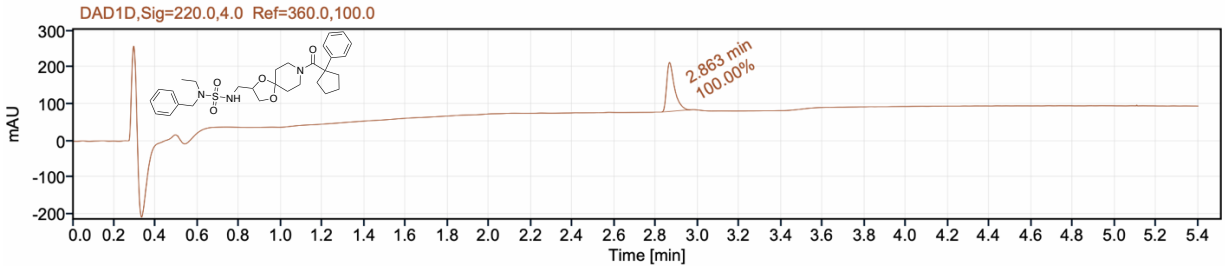
Figure S211: HPLC trace of **5b**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.755	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	830.4	100.00

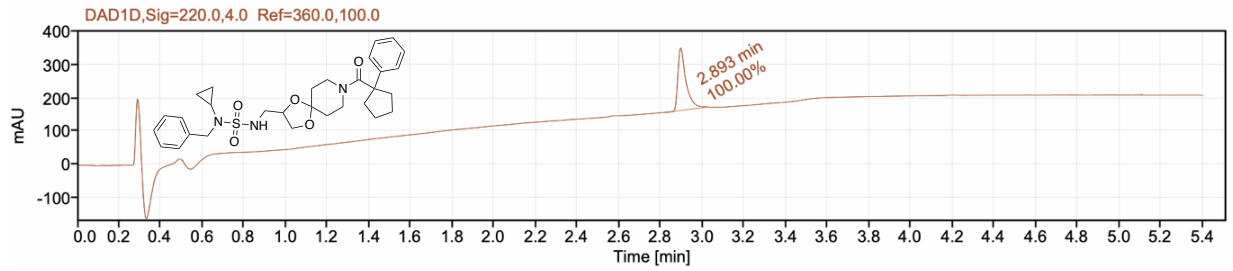
Figure S212: HPLC trace of **5c**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.863	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	347.3	100.00

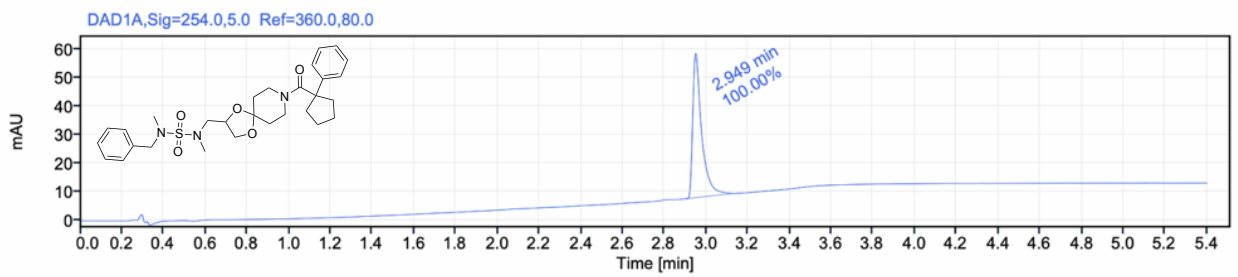
Figure S213: HPLC trace of **5d**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.893	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	506.1	100.00

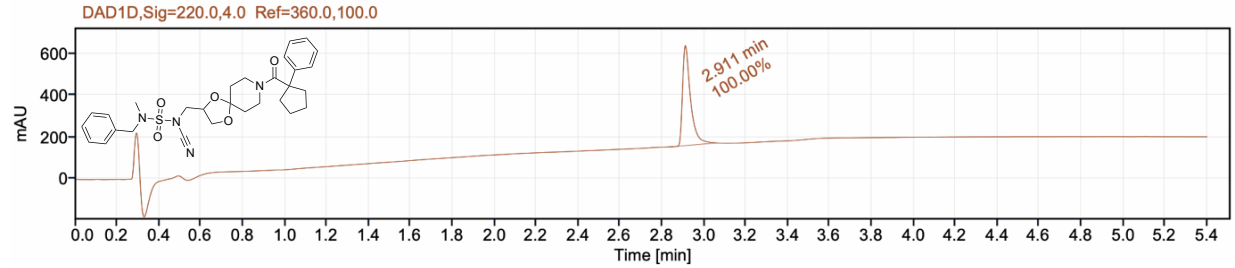
Figure S214: HPLC trace of **5e**



Signal Name DAD1A

RT (min)	Signal description	Area	Area%
2.949	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0	148.9	100.00

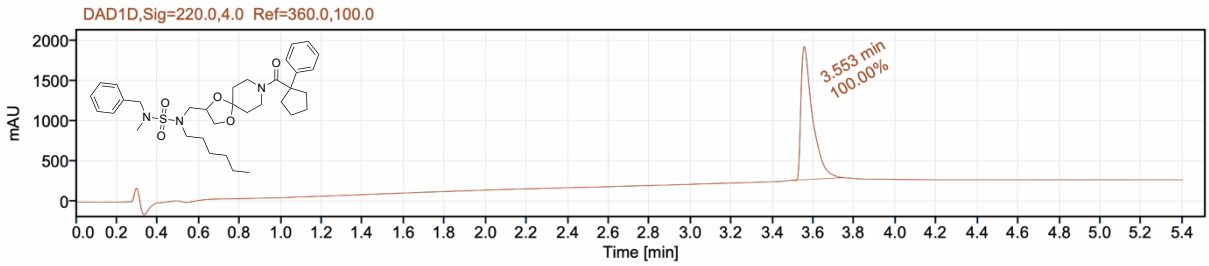
Figure S215: HPLC trace of **5f**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.911	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	1262.4	100.00

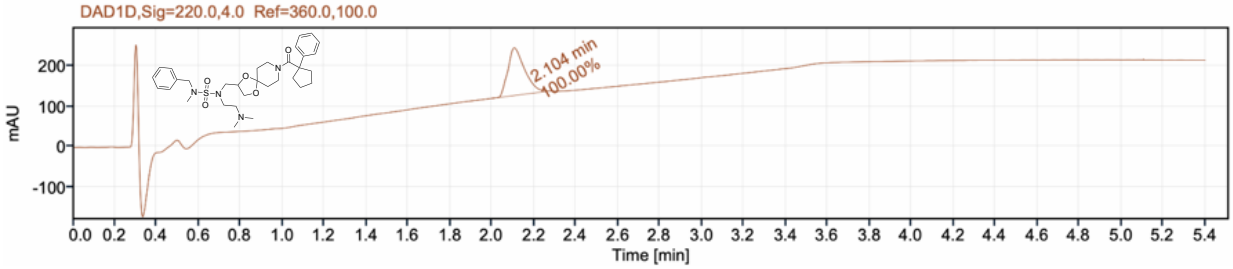
Figure S216: HPLC trace of **5g**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
3.553	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	6452.7	100.00

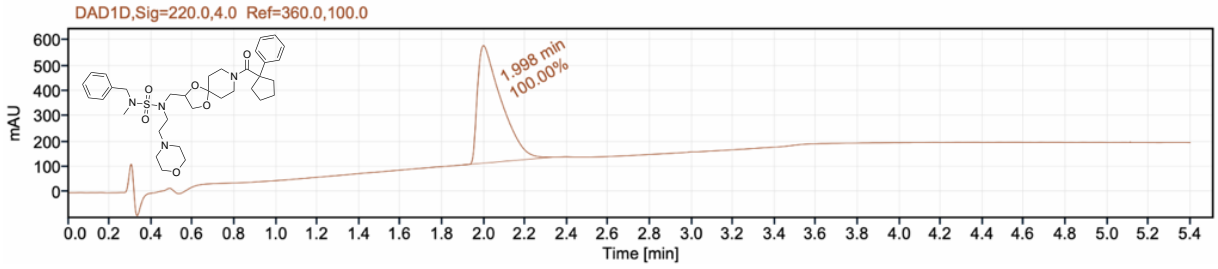
Figure S217: HPLC trace of **5h**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.104	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	646.6	100.00

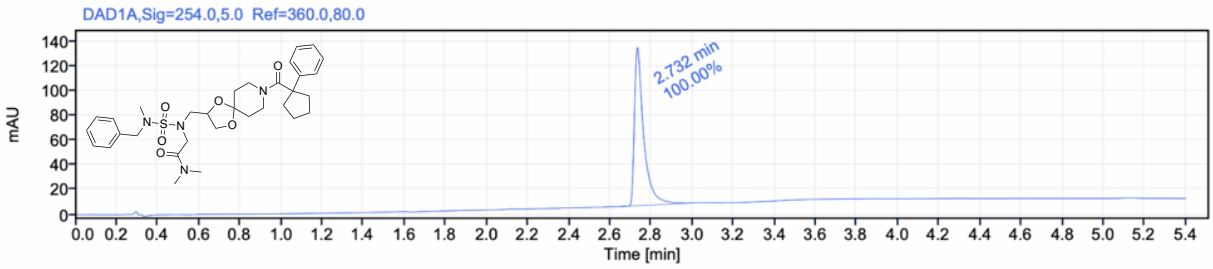
Figure S218: HPLC trace of **5i**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
1.998	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	3678.6	100.00

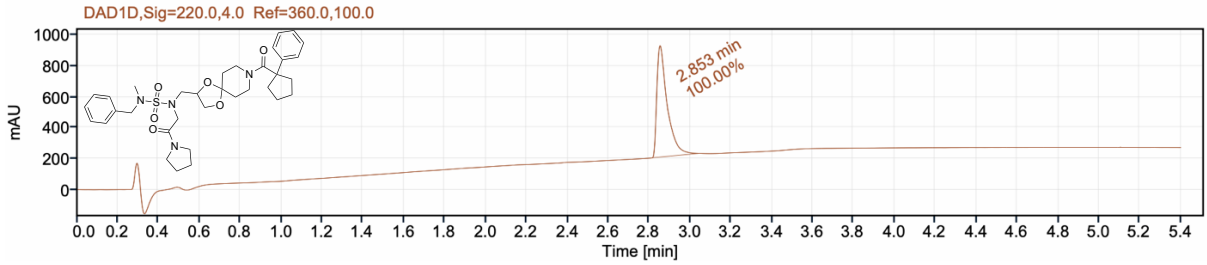
Figure S219: HPLC trace of **5j**



Signal Name DAD1A

RT (min)	Signal description	Area	Area%
2.732	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0	403.3	100.00

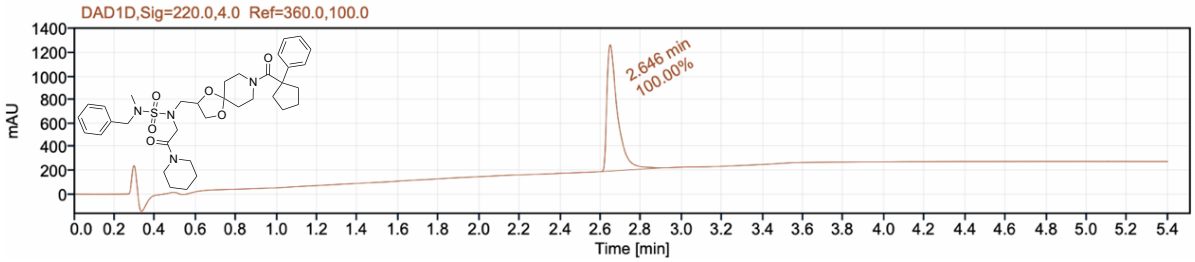
Figure S220: HPLC trace of **5k**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.853	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	2549.0	100.00

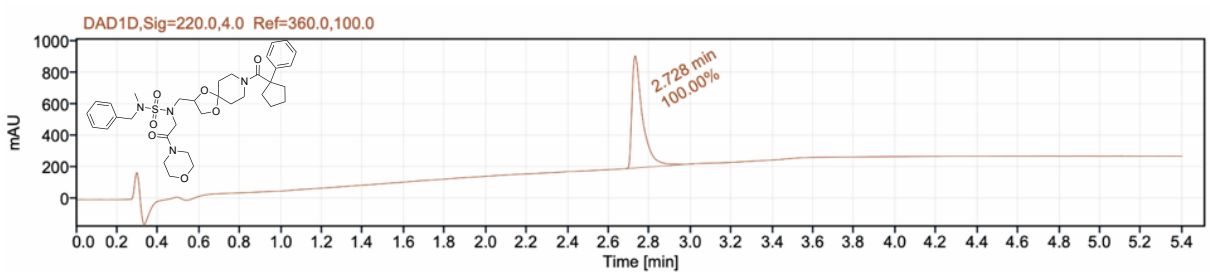
Figure S221: HPLC trace of **5l**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.646	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	3916.9	100.00

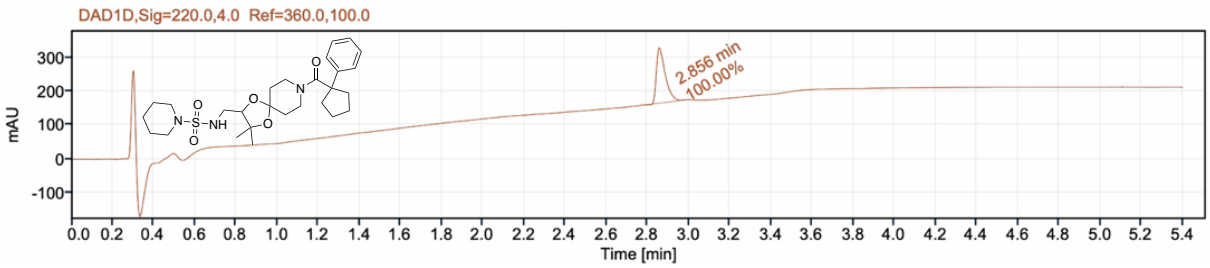
Figure S222: HPLC trace of **5m**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.728	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	2560.2	100.00

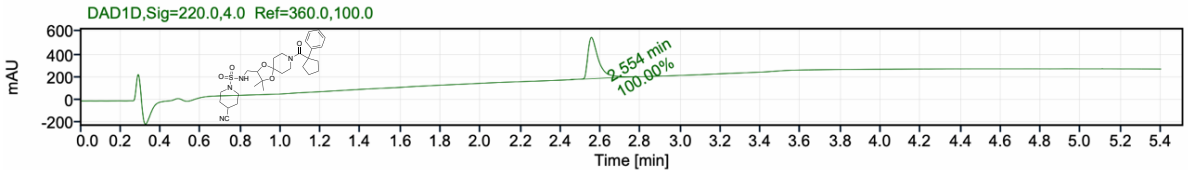
Figure S223: HPLC trace of **6a**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.856	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	492.3	100.00

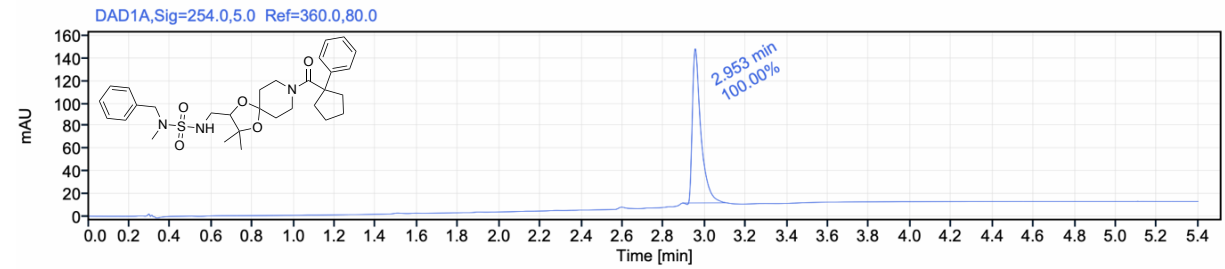
Figure S224: HPLC trace of **6b**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.554	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	1327.0	100.00

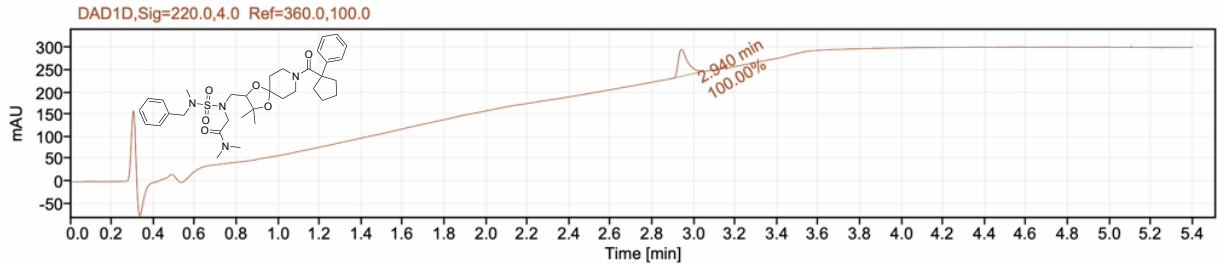
Figure S225: HPLC trace of **6c**



Signal Name DAD1A

RT (min)	Signal description	Area	Area%
2.953	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0	396.2	100.00

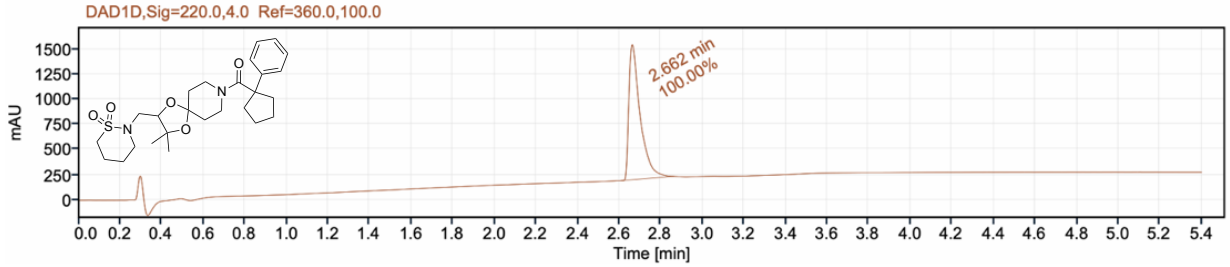
Figure S226: HPLC trace of **6d**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.940	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	190.6	100.00

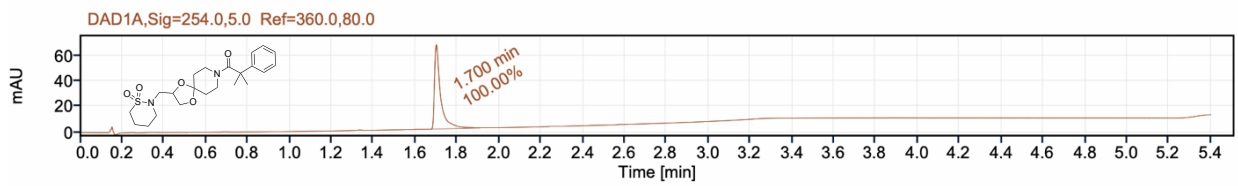
Figure S227: HPLC trace of **6e**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.662	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	5074.7	100.00

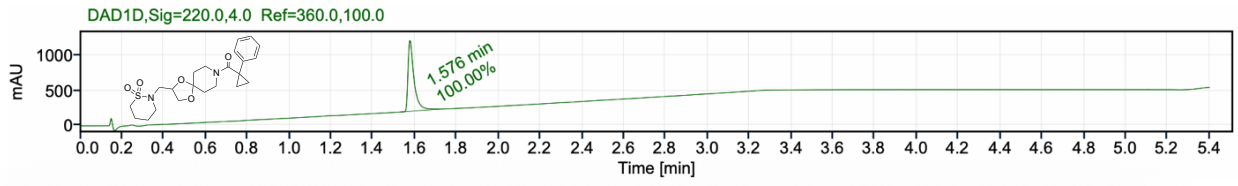
Figure S228: HPLC trace of **7a**



Signal Name DAD1A

RT (min)	Signal description	m/z	Purity UV(‰) / MS(%)	Area	Area%
1.700	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0			137.6	100.00

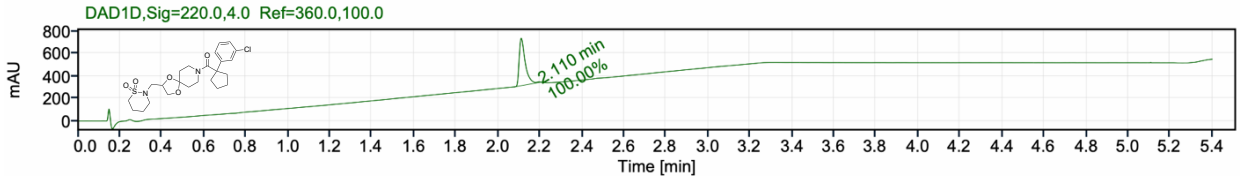
Figure S229: HPLC trace of **7b**



Signal Name DAD1D

RT (min)	Signal description	m/z	Purity UV(‰) / MS(%)	Area	Area%
1.576	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0			2029.8	100.00

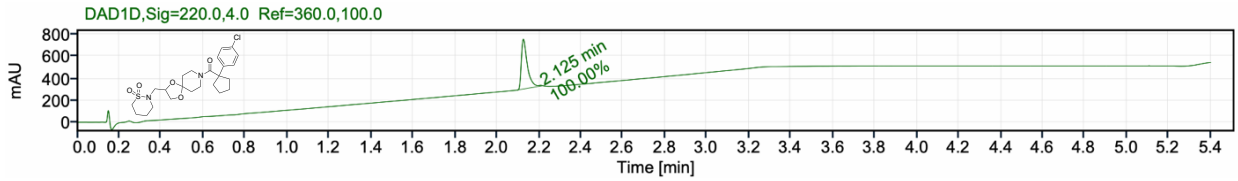
Figure S230: HPLC trace of **7c**



Signal Name DAD1D

RT (min)	Signal description	m/z	Purity UV(‰) / MS(%)	Area	Area%
2.110	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0			840.7	100.00

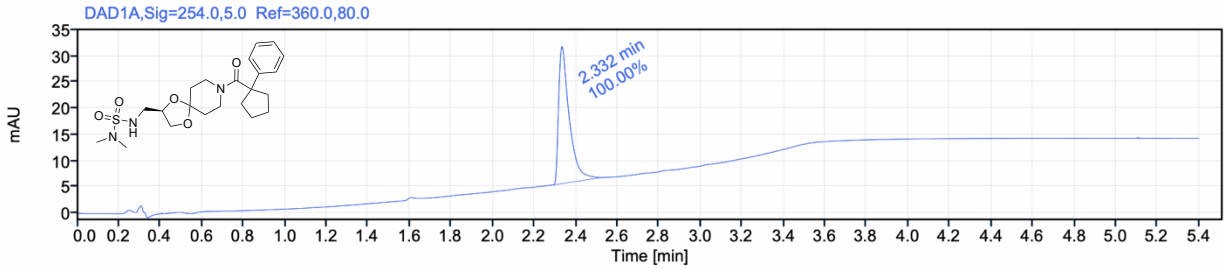
Figure S231: HPLC trace of **7d**



Signal Name DAD1D

RT (min)	Signal description	m/z	Purity UV(‰) / MS(%)	Area	Area%
2.125	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0			908.6	100.00

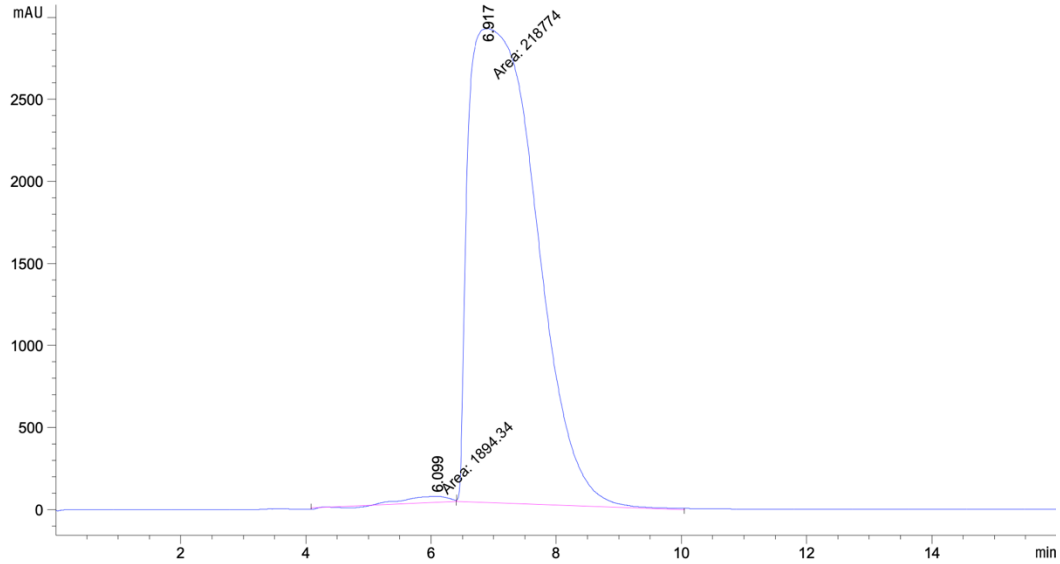
Figure S232: HPLC trace of **R-3a**



Signal Name DAD1A

RT (min)	Signal description	Area	Area%
2.332	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0	93.2	100.00

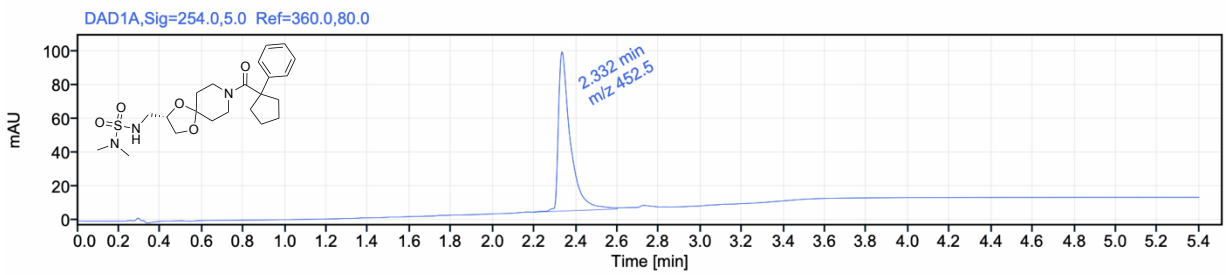
Figure S233: Chiral HPLC trace of **R-3a**



Signal 1: DAD1 B, Sig=220,4 Ref=off

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	6.099	MM	0.8779	1894.33691	35.96227	0.8585
2	6.917	MM	1.2621	2.18774e5	2889.12842	99.1415

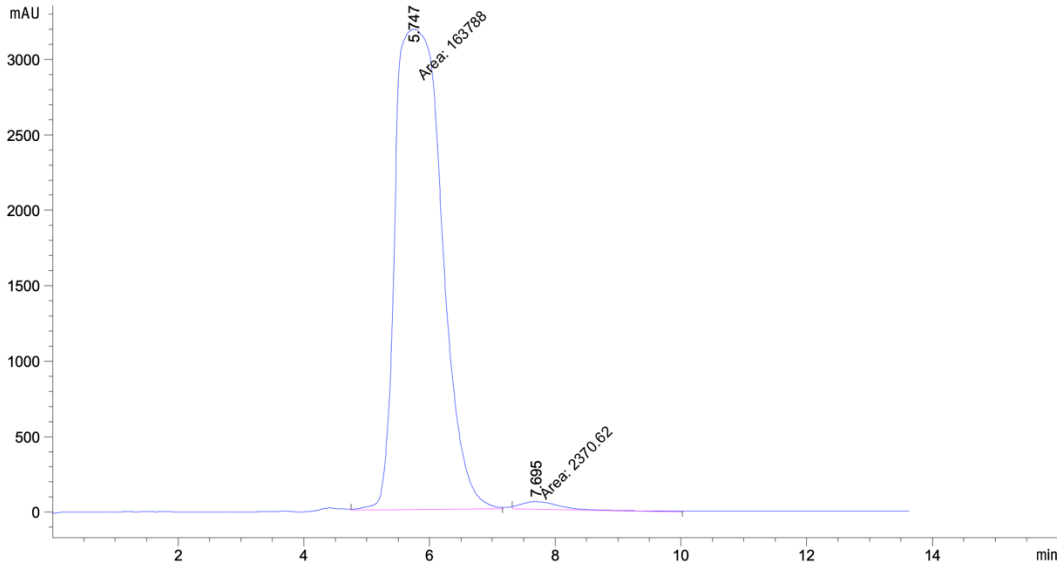
Figure S234: HPLC trace of **S-3a**



Signal Name DAD1A

RT (min)	Signal description	Area	Area%
2.332	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0	376.5	100.00

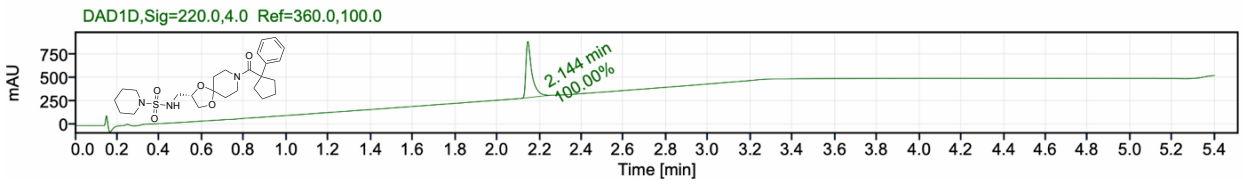
Figure S235: Chiral HPLC trace of **S-3a**



Signal 1: DAD1 B, Sig=220,4 Ref=off

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	5.747	MM	0.8578	1.63788e5	3182.13818	98.5733
2	7.695	MM	0.7726	2370.61914	51.13731	1.4267

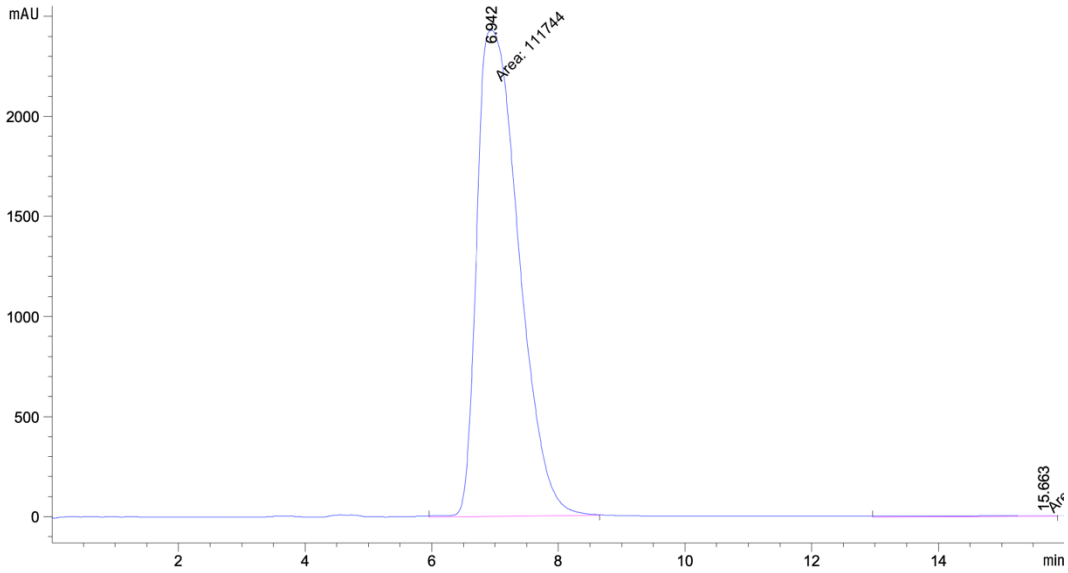
Figure S236: HPLC trace of **S-3k**



Signal Name DAD1D

RT (min)	Signal description	m/z	Purity UV(‰) / MS(%)	Area	Area%
2.144	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0			1172.1	100.00

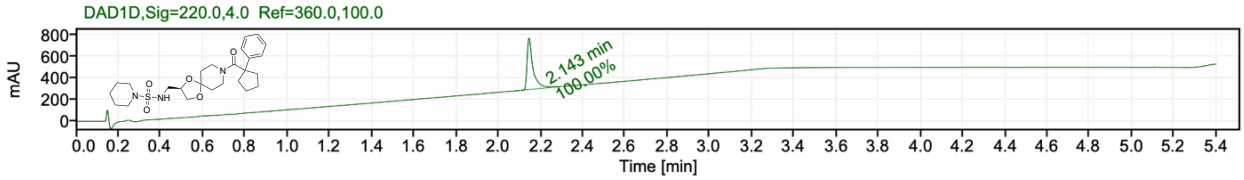
Figure S237: Chiral HPLC trace of **S-3k**



Signal 1: DAD1 B, Sig=220,4 Ref=off

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	6.942	MM	0.7668	1.11744e5	2428.92163	99.4461
2	15.663	MM	2.2899	622.38013	4.52995	0.5539

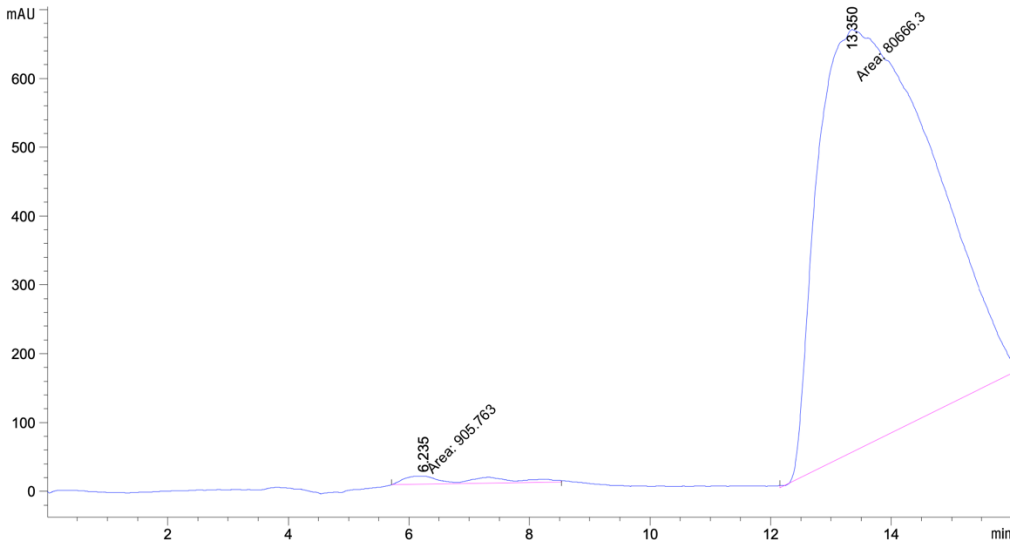
Figure S238: HPLC trace of **R-3k**



Signal Name DAD1D

RT (min)	Signal description	m/z	Purity UV(‰) / MS(%)	Area	Area%
2.143	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0			935.2	100.00

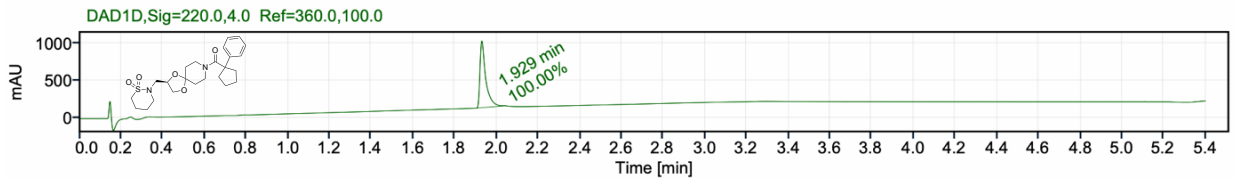
Figure S239: Chiral HPLC trace of **R-3k**



Signal 1: DAD1 B, Sig=220,4 Ref=off

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	6.235	MM	1.2822	905.76251	11.77319	1.1104
2	13.350	MM	2.1888	8.06663e4	614.22253	98.8896

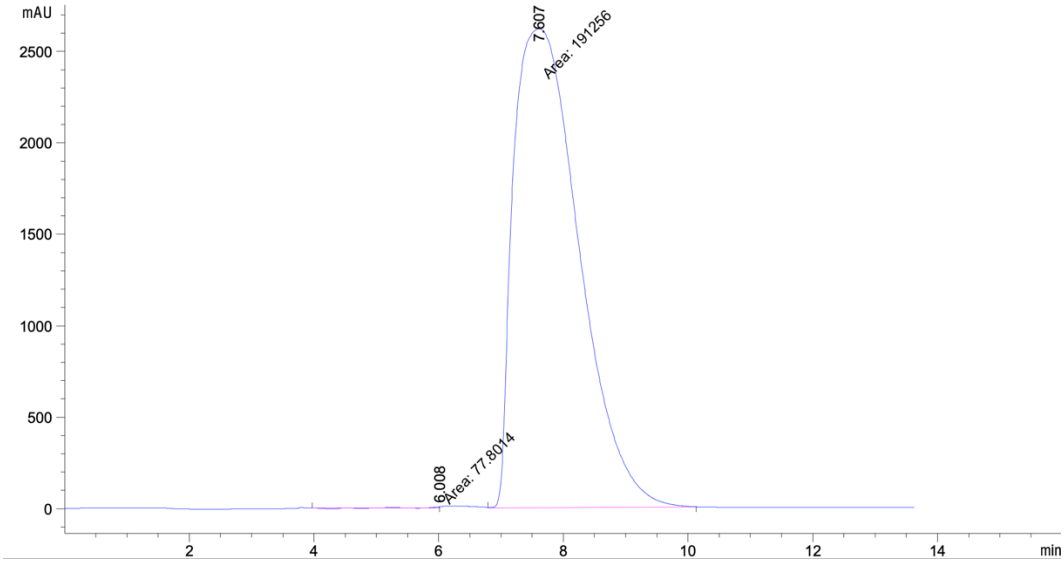
Figure S240: HPLC trace of **R-1m**



Signal Name DAD1D

RT (min)	Signal description	m/z	Purity UV(‰) / MS(%)	Area	Area%
1.929	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0			1687.6	100.00

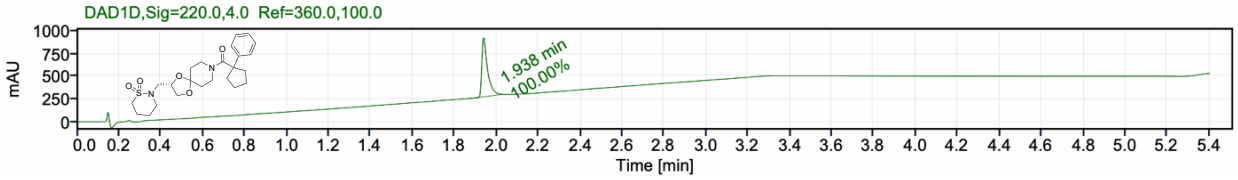
Figure S241: Chiral HPLC trace of **R-1m**



Signal 1: DAD1 B, Sig=220,4 Ref=off

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	6.008	MM	0.2028	77.80135	6.39372	0.0407
2	7.607	MM	1.2168	1.91256e5	2619.55542	99.9593

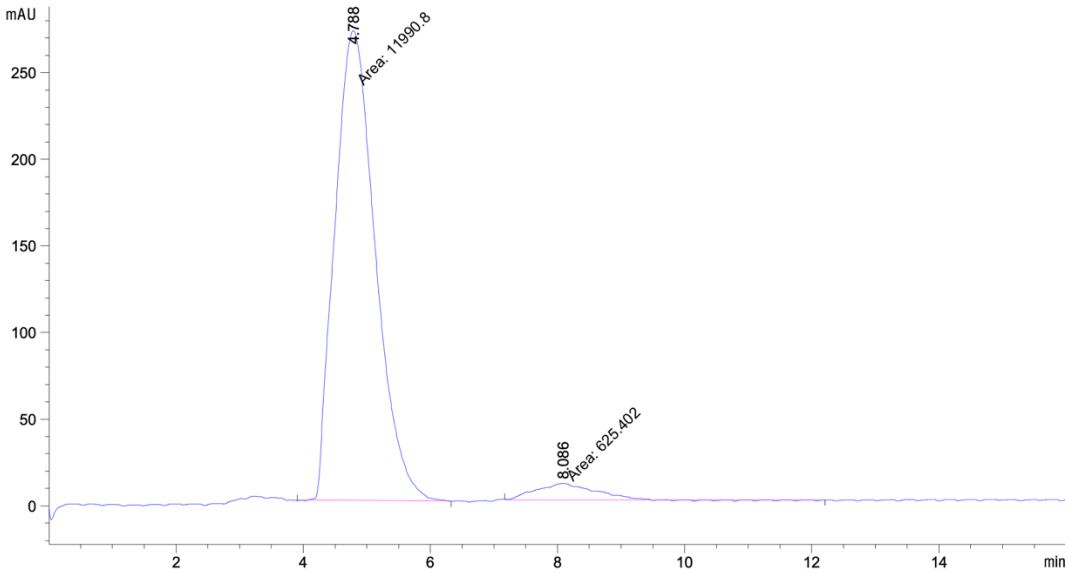
Figure S242: HPLC trace of **S-1m**



Signal Name DAD1D

RT (min)	Signal description	m/z	Purity UV(‰) / MS(%)	Area	Area%
1.938	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0			1227.3	100.00

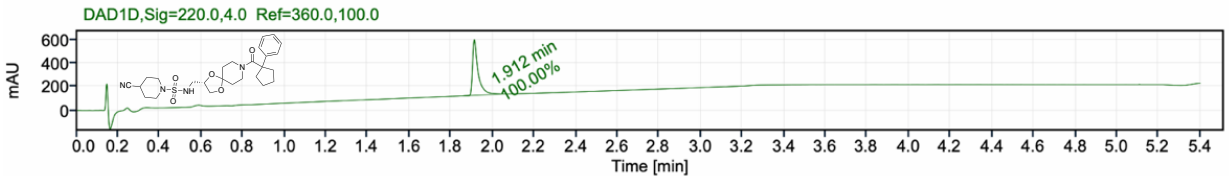
Figure S243: Chiral HPLC trace of **S-1m**



Signal 1: DAD1 B, Sig=220,4 Ref=off

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	4.788	MM	0.7373	1.19908e4	271.06897	95.0429
2	8.086	MM	1.0977	625.40216	9.49558	4.9571

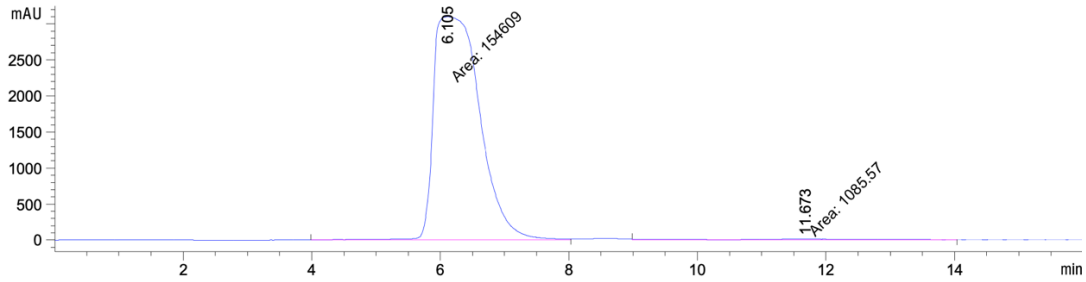
Figure S244: HPLC trace of **S-4b**



Signal Name DAD1D

RT (min)	Signal description	m/z	Purity UV(‰) / MS(%)	Area	Area%
1.912	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0			888.6	100.00

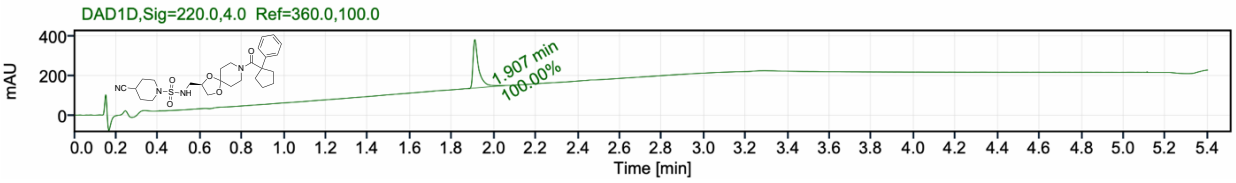
Figure S245: Chiral HPLC trace of **S-4b**



Signal 2: DAD1 B, Sig=220,4 Ref=off

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	6.105	MM	0.8332	1.54609e5	3092.85156	99.3028
2	11.673	MM	1.9753	1085.57361	9.15960	0.6972

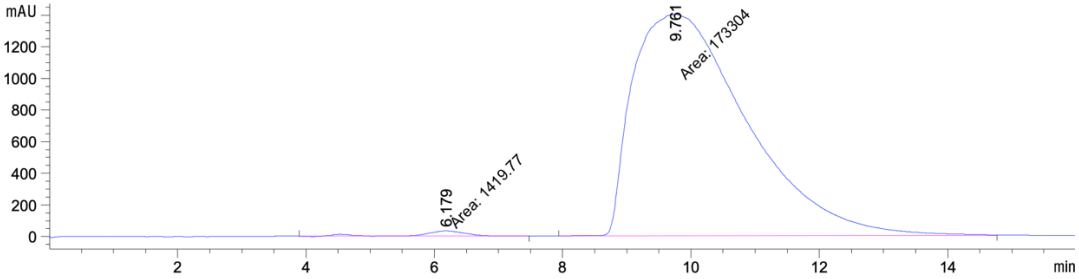
Figure S246: HPLC trace of **R-4b**



Signal Name DAD1D

RT (min)	Signal description	m/z	Purity UV(‰) / MS(%)	Area	Area%
1.907	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0			467.8	100.00

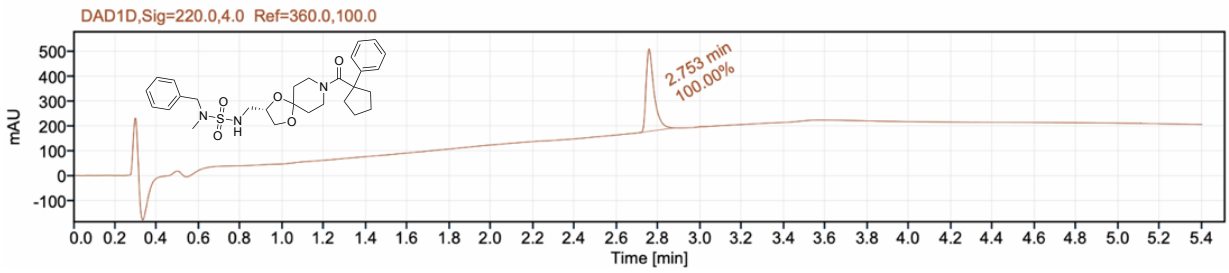
Figure S247: Chiral HPLC trace of **R-4b**



Signal 2: DAD1 B, Sig=220,4 Ref=off

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	6.179	MM	0.7478	1419.77014	31.64187	0.8126
2	9.761	MM	2.0644	1.73304e5	1399.15979	99.1874

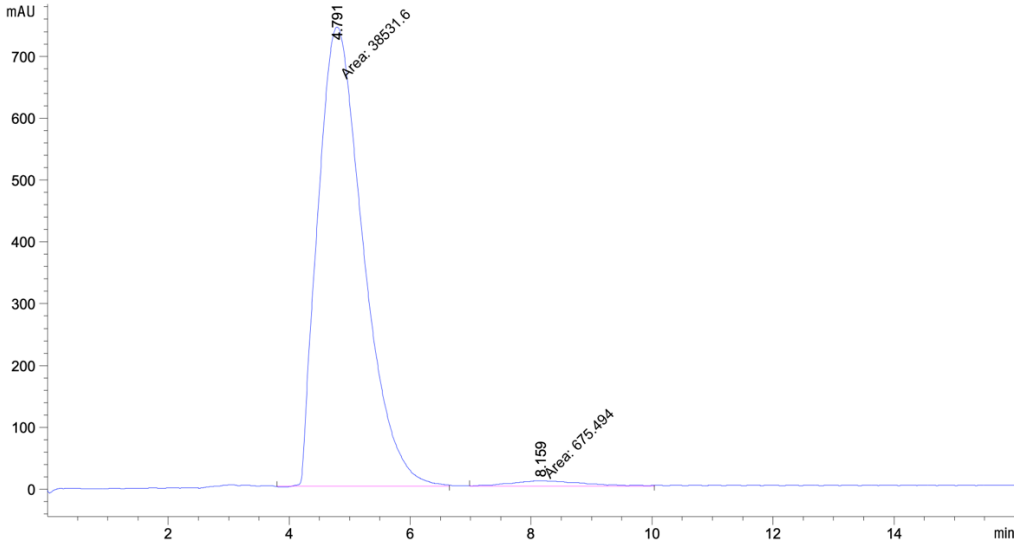
Figure S248: HPLC trace of **S-5b**



Signal Name DAD1D

RT (min)	Signal description	Area	Area%
2.753	DAD1D,Sig=220.0,4.0 Ref=360.0,100.0	882.0	100.00

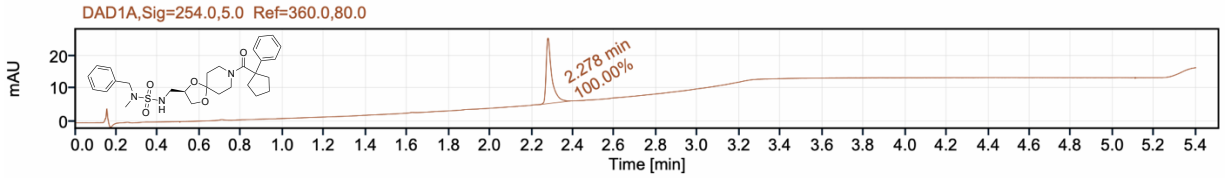
Figure S249: Chiral HPLC trace of **S-5b**



Signal 1: DAD1 B, Sig=220,4 Ref=off

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	4.791	MM	0.8655	3.85316e4	741.98560	98.2771
2	8.159	MM	1.3044	675.49414	8.63099	1.7229

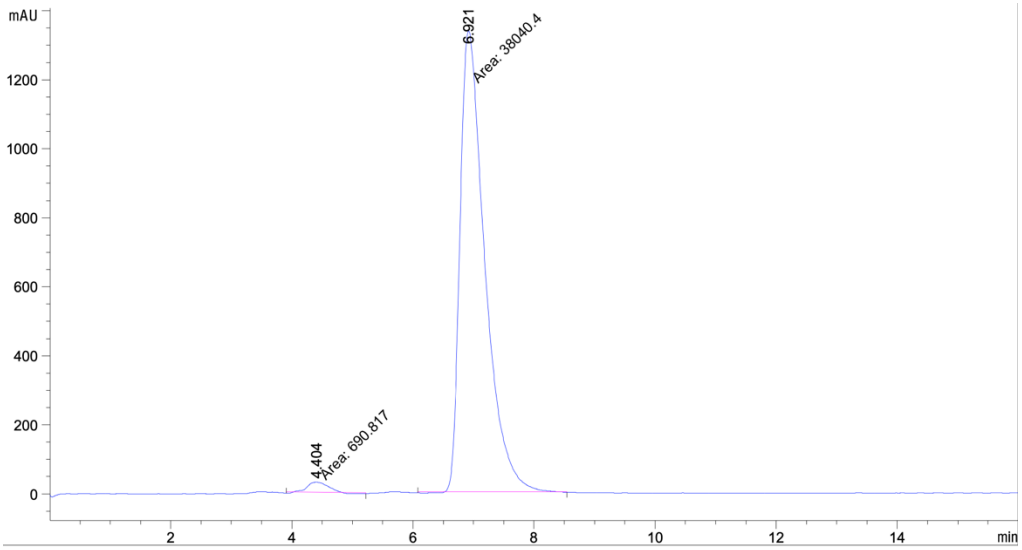
Figure S250: HPLC trace of **R-5b**



Signal Name DAD1A

RT (min)	Signal description	m/z	Purity UV(‰) / MS(%)	Area	Area%
2.278	DAD1A,Sig=254.0,5.0 Ref=360.0,80.0			36.6	100.00

Figure S251: Chiral HPLC trace of **R-5b**



Signal 1: DAD1 B, Sig=220,4 Ref=off

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	4.404	MM	0.3981	690.81689	28.92428	1.7836
2	6.921	MM	0.4747	3.80404e4	1335.53735	98.2164