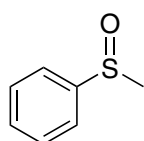


Supplementary Information

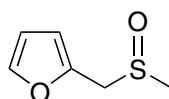
A Peroxotungstate-Ionic Liquid Brush Assembly: an Efficient and Reusable Catalyst for Selectively Oxidizing Sulfides with Aqueous H₂O₂ Solution in Neat Water

Xianying Shi,* Wenjuan Ma, Hui Ou, Xiaoyan Han, Congmin Lu, Yan Chen and Junfa Wei*

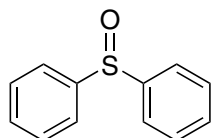
School of Chemistry and Chemical Engineering, Shaanxi Normal University and Key Laboratory for Macromolecular Science of Shaanxi Province, Xi'an, 710062, P. R. China



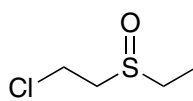
Methyl phenyl sulfoxide:
¹H NMR (300 MHz, CDCl₃) δ/ppm 7.65 (d, 2H, *J* 5.7 Hz), 7.54-7.52 (m, 3H), 2.73 (s, 3H).



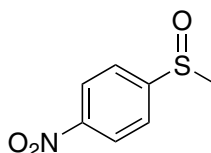
Methyl furfuryl sulfoxide:
¹H NMR (300 MHz, CDCl₃) δ/ppm 7.44 (s, 2H), 6.41 (s, 2H), 4.05 (s, 2H), 2.53 (s, 3H).



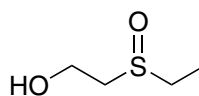
Diphenyl sulfoxide: ¹H NMR (300 MHz, CDCl₃) δ/ppm 7.65 (d, 4H, *J* 3.9 Hz), 7.45-7.44 (m, 6H).



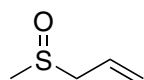
2-Chloroethyl ethyl sulfoxide:
¹H NMR (300 MHz, CDCl₃) δ/ppm 3.94 (t, 2H, *J* 5.6 Hz), 3.06 (t, 2H, *J* 4.4 Hz), 2.81 (q, 2H, *J* 2.4 Hz), 1.35 (t, 3H, *J* 7.2 Hz).



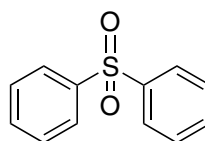
Methyl-4-nitrophenyl sulfoxide:
¹H NMR (300 MHz, CDCl₃) δ/ppm 8.41 (d, 2H, *J* 8.1 Hz), 7.85 (d, 2H, *J* 8.1 Hz), 2.83 (s, 3H).



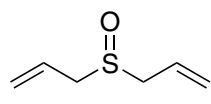
2-Hydroxyethyl ethyl sulfoxide:
¹H NMR (300 MHz, CDCl₃) δ/ppm 4.13 (t, 2H), 3.23-3.10 (m, 4H), 1.42 (t, 3H, *J* 7.5 Hz).



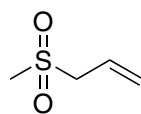
Allyl methyl sulfoxide: ¹H NMR (300 MHz, CDCl₃) δ/ppm 5.94-5.85 (m, 1H), 5.48~5.38 (m, 2H), 3.50 (d, 2H, *J* 7.8 Hz), 2.56 (s, 3H).



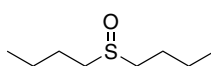
Diphenyl sulfone: ¹H NMR (300 MHz, CDCl₃) δ/ppm 7.95 (d, 4H, *J* 6.9 Hz), 7.59-7.48 (m, 6H).



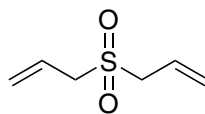
Diallyl sulfoxide: ¹H NMR (300 MHz, CDCl₃) δ/ppm 5.94-5.86 (m, 2H), 5.48~5.38 (m, 4H), 3.52 (d, 4H, *J* 6.6 Hz).



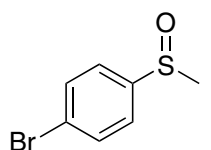
Allyl methyl sulfone: ¹H NMR (300 MHz, CDCl₃) δ/ppm 5.97-5.83 (m, 1H), 5.47-5.39 (m, 2H), 3.68 (d, 2H, *J* 6.6 Hz), 2.81 (s, 3H).



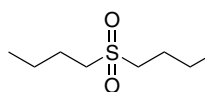
Di-*n*-butyl sulfoxide: ¹H NMR (300 MHz, CDCl₃) δ/ppm 2.61 (t, 4H, *J* 6.2), 1.73-1.66 (m, 4H), 1.47-1.40 (m, 4H), 0.90 (t, 6H, *J* 7.2).



Diallyl sulfone: ¹H NMR (300 MHz, CDCl₃) δ/ppm 6.00-5.86 (m, 2H), 5.53-5.42 (m, 4H), 3.72 (d, 4H, *J* 7.2 Hz).

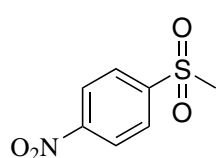


4-Bromophenyl methyl sulfoxide: ¹H NMR (300 MHz, CDCl₃) δ/ppm 7.59 (d, 2H, *J* 8.1 Hz), 7.45 (d, 2H, *J* 8.1 Hz), 2.64 (s, 3H).

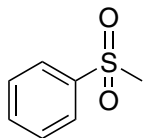


Di-*n*-butyl sulfone: ¹H NMR (300 MHz, CDCl₃) δ/ppm 2.95 (t, 4H, *J* 7.8 Hz), 1.87-1.81 (m, 4H), 1.55-1.43 (m, 4H), 0.97 (t, 6H, *J* 6.5 Hz).

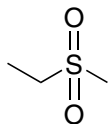
*e-mail: shixy@snnu.edu.cn, weijf@snnu.edu.cn



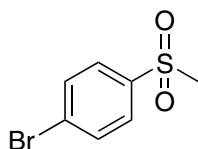
Methyl-4-nitrophenyl sulfone:
 $^1\text{H NMR}$ (300 MHz, CDCl_3) δ /ppm
 8.44 (d, 2H, J 6.0 Hz), 8.18 (d, 2H,
 J 6.3 Hz), 3.14 (s, 3H).



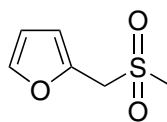
Methyl phenyl sulfone: $^1\text{H NMR}$
 (300 MHz, CDCl_3) δ /ppm 7.96 (d,
 2H, J 7.5 Hz), 7.69-7.55 (m, 3H),
 3.06 (s, 3H)



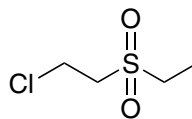
Methyl ethyl sulfone: $^1\text{H NMR}$
 (300 MHz, Acetone- D_6) δ /ppm 3.07
 (q, 2H, J 7.4 Hz), 2.90 (s, 3H), 1.32
 (t, 3H, J 7.4 Hz).



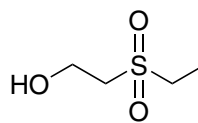
4-Bromophenyl methyl sulfone:
 $^1\text{H NMR}$ (300 MHz, CDCl_3) δ /ppm
 7.82 (d, 2H, J 8.1 Hz), 7.73 (d, 2H,
 J 8.1 Hz), 3.05 (s, 3H).



Methyl furfuryl sulfone:
 $^1\text{H NMR}$ (300 MHz, CDCl_3) δ /ppm
 7.48 (s, 1H), 6.54 (s, 1H), 6.45 (s,
 1H), 4.34 (s, 2H), 2.87 (s, 3H).



2-Chloroethyl ethyl sulfone:
 $^1\text{H NMR}$ (300 MHz, CDCl_3)
 δ /ppm 3.86 (t, 2H, J 3.3 Hz), 3.36 (t,
 2H, J 3.2 Hz), 3.06 (2H, J 6.4 Hz),
 1.37 (t, 3H, J 3.6 Hz).



2-Hydroxyethyl ethyl sulfone:
 $^1\text{H NMR}$ (300 MHz, CDCl_3)
 δ /ppm 4.05 (t, 2H, J 5.3 Hz),
 3.16-3.02 (m, 4H), 1.35 (t, 3H,
 J 7.4 Hz).

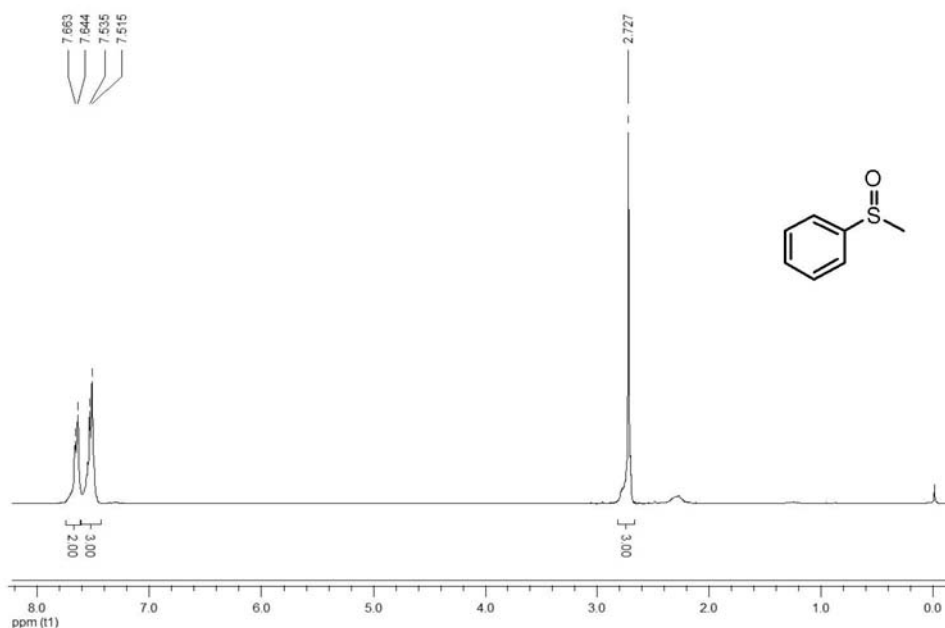


Figure 1. $^1\text{H NMR}$ (300 MHz, CDCl_3) of methyl phenyl sulfoxide.

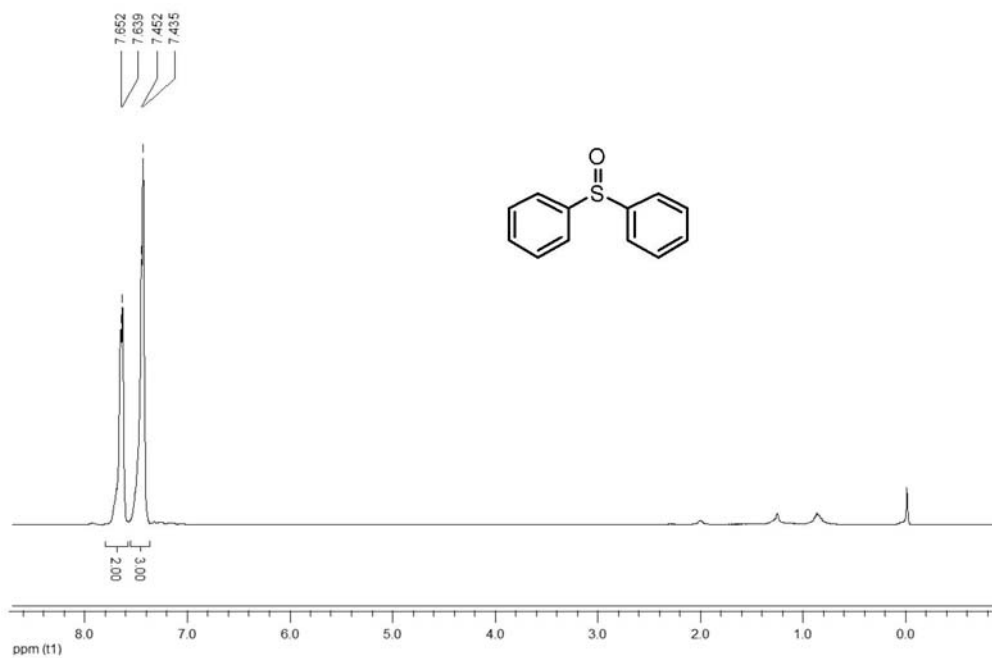


Figure 2. ¹H NMR (300 MHz, CDCl₃) of diphenyl sulfoxide.

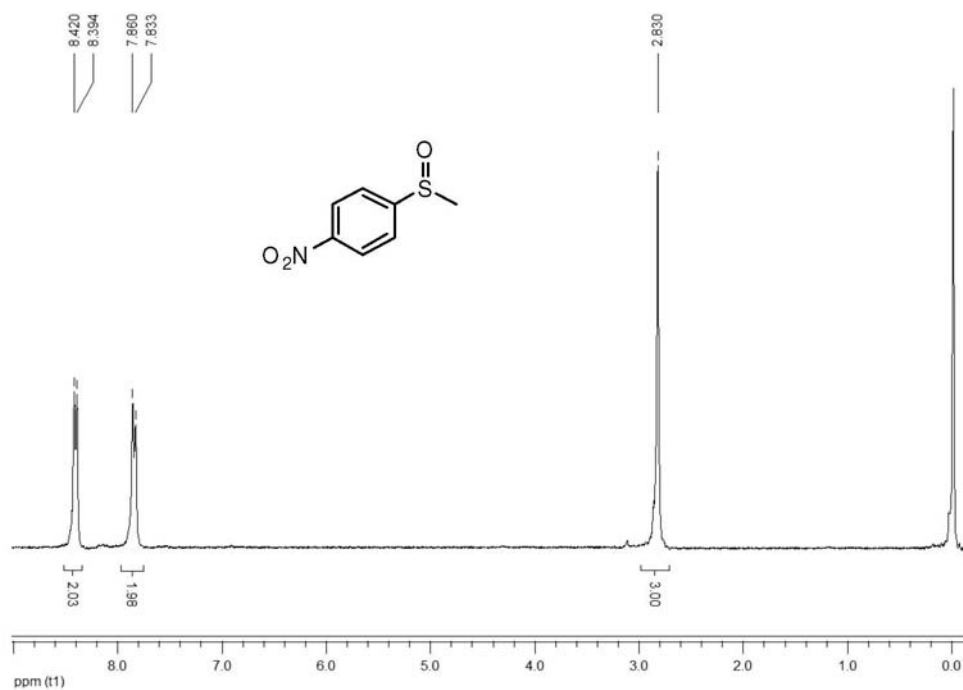


Figure 3. ¹H NMR (300 MHz, CDCl₃) of methyl-4-nitrophenyl.

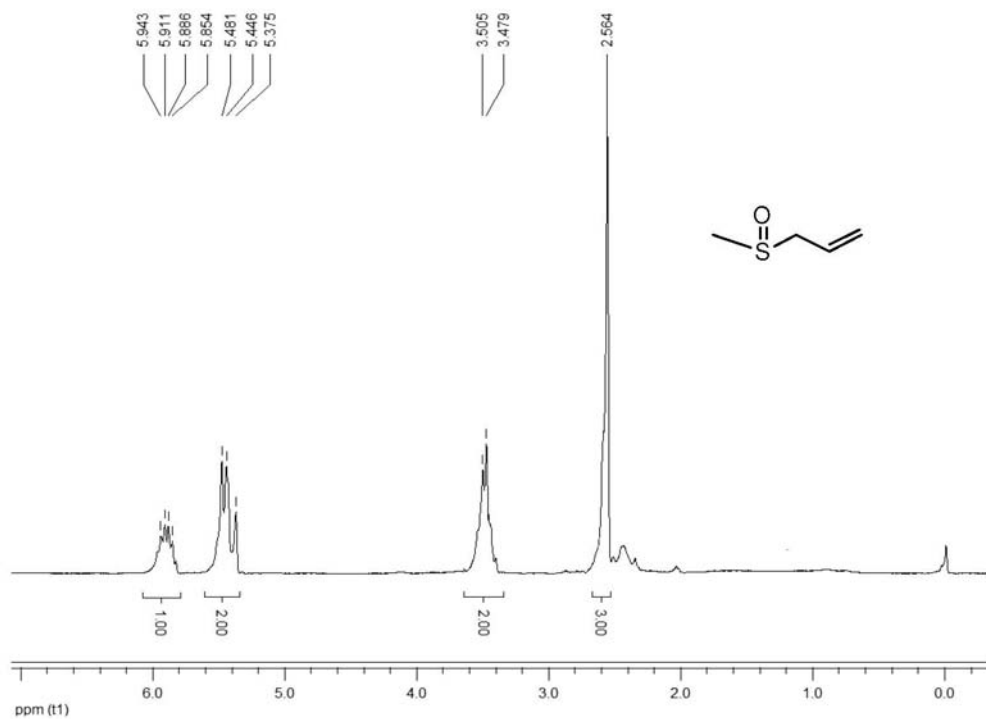


Figure 4. ¹H NMR (300 MHz, CDCl₃) of allyl methyl sulfoxide.

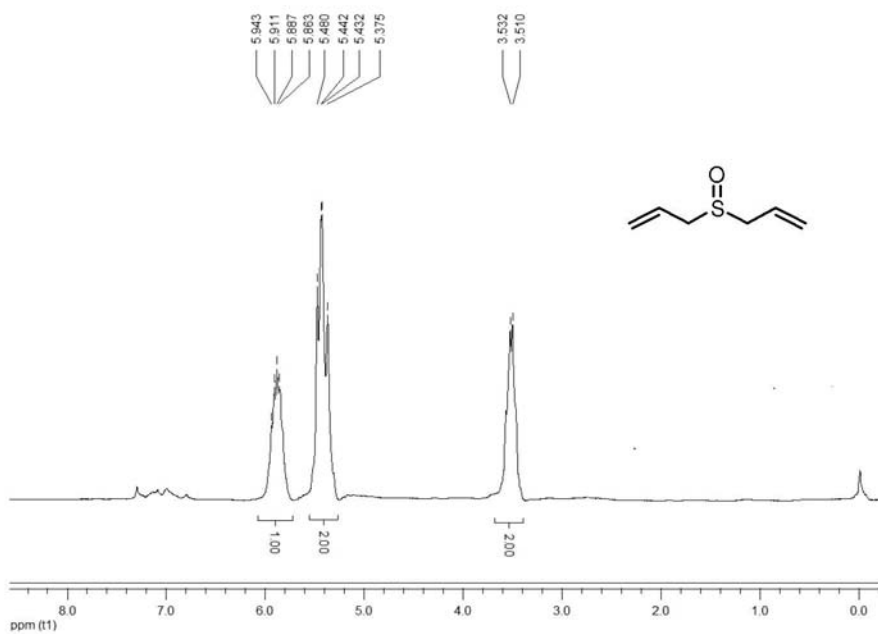


Figure 5. ¹H NMR (300 MHz, CDCl₃) of diallyl sulfoxide.

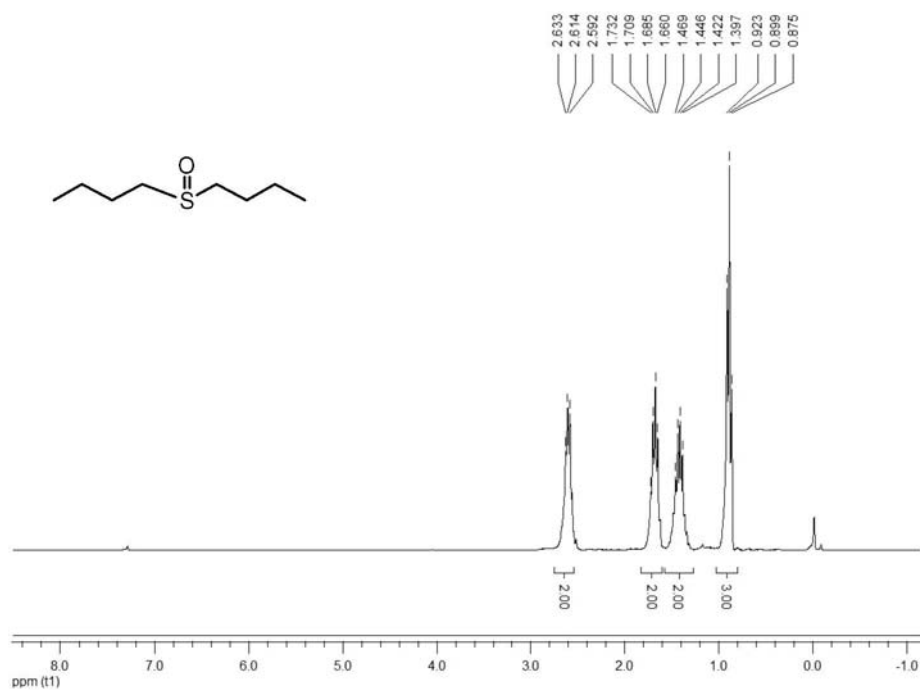


Figure 6. ¹H NMR (300 MHz, CDCl₃) of di-*n*-butyl sulfoxide.

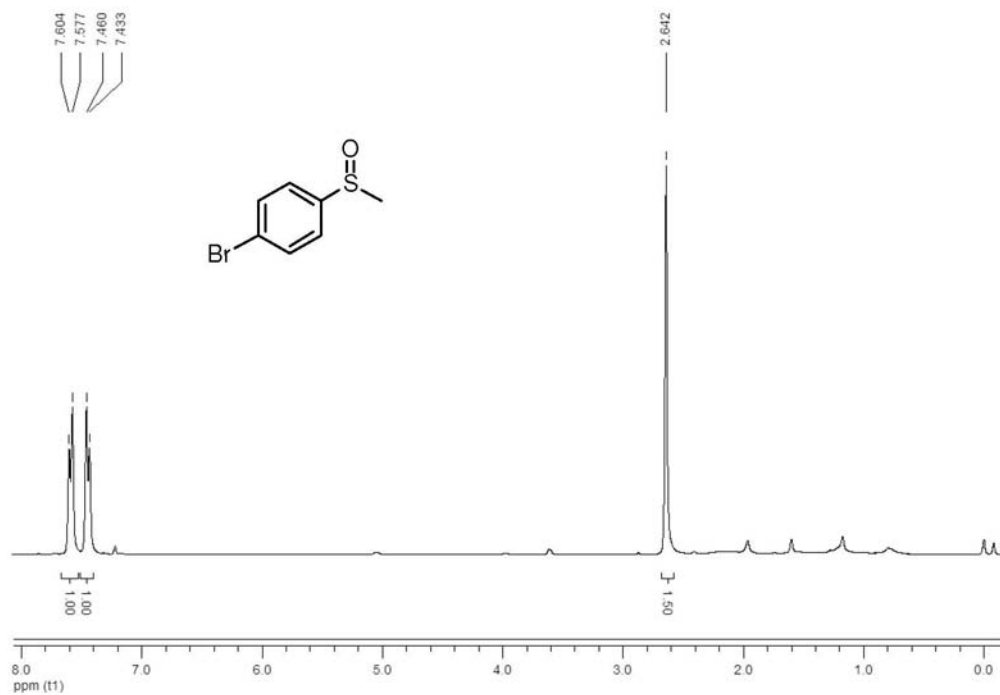


Figure 7. ¹H NMR (300 MHz, CDCl₃) of 4-bromophenyl methyl sulfoxide.

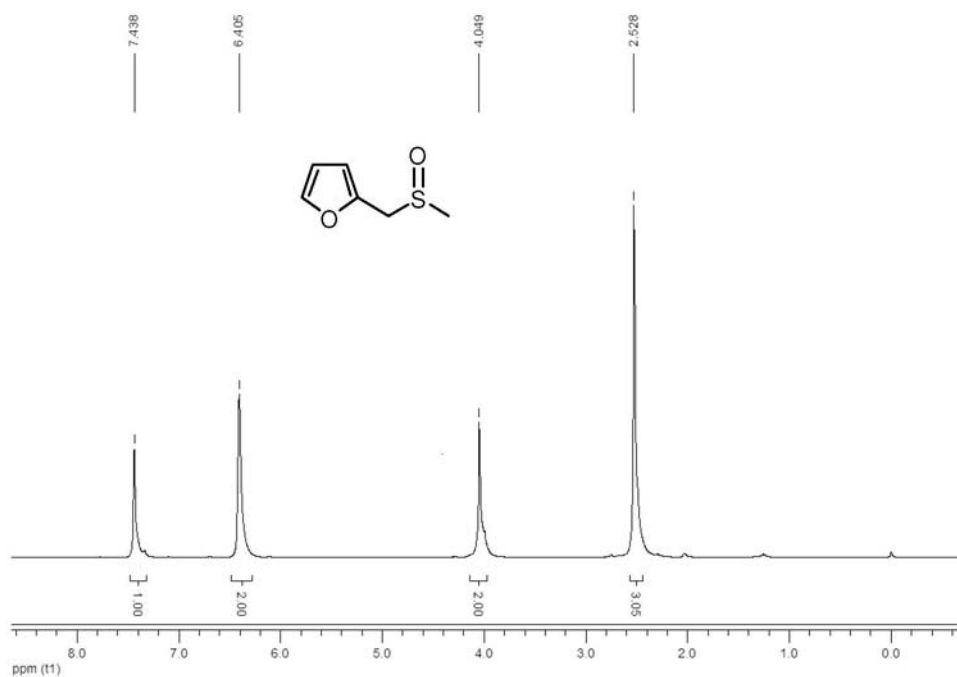


Figure 8. ¹H NMR (300 MHz, CDCl₃) of methyl furfuryl sulfoxide.

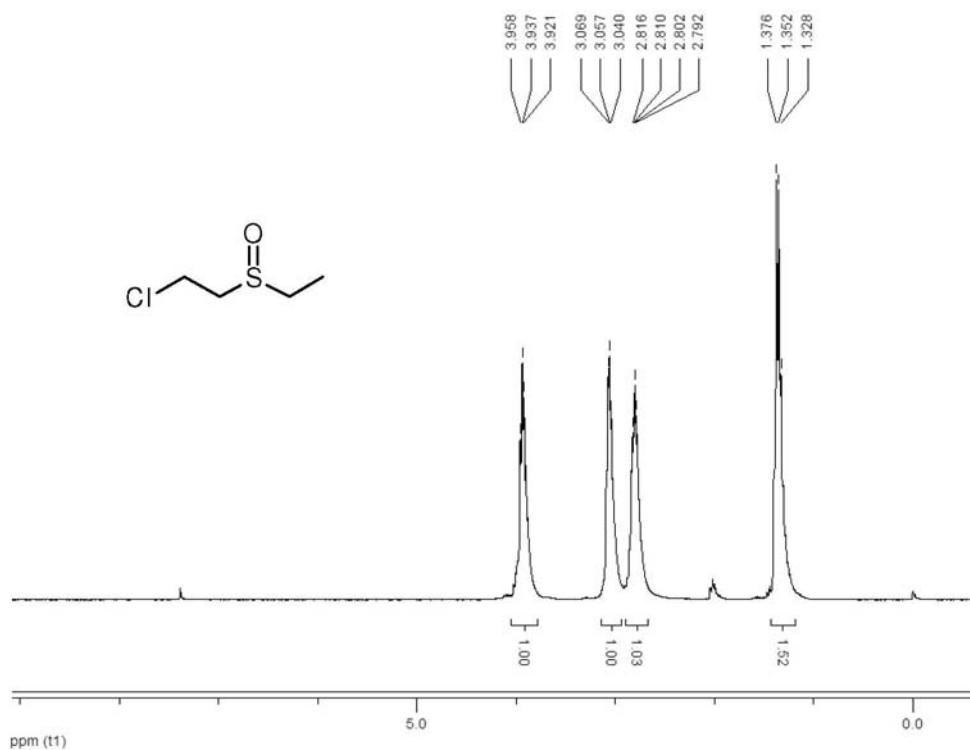


Figure 9. ¹H NMR (300 MHz, CDCl₃) of 2-chloroethyl ethyl sulfoxide.

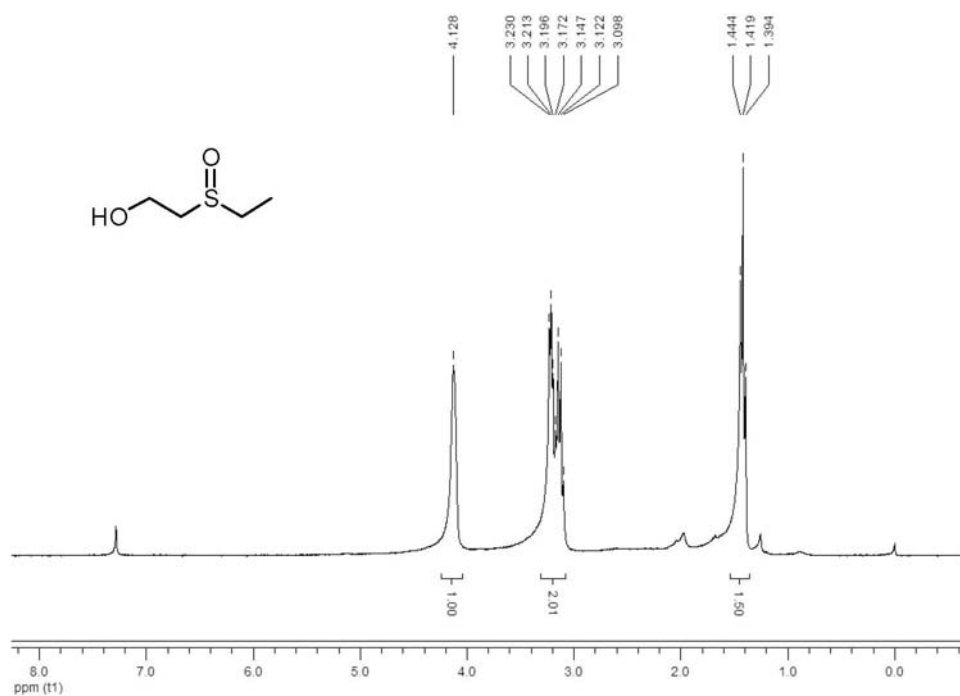


Figure 10. ^1H NMR (300 MHz, CDCl_3) of 2-hydroxyethyl ethyl sulfoxide.

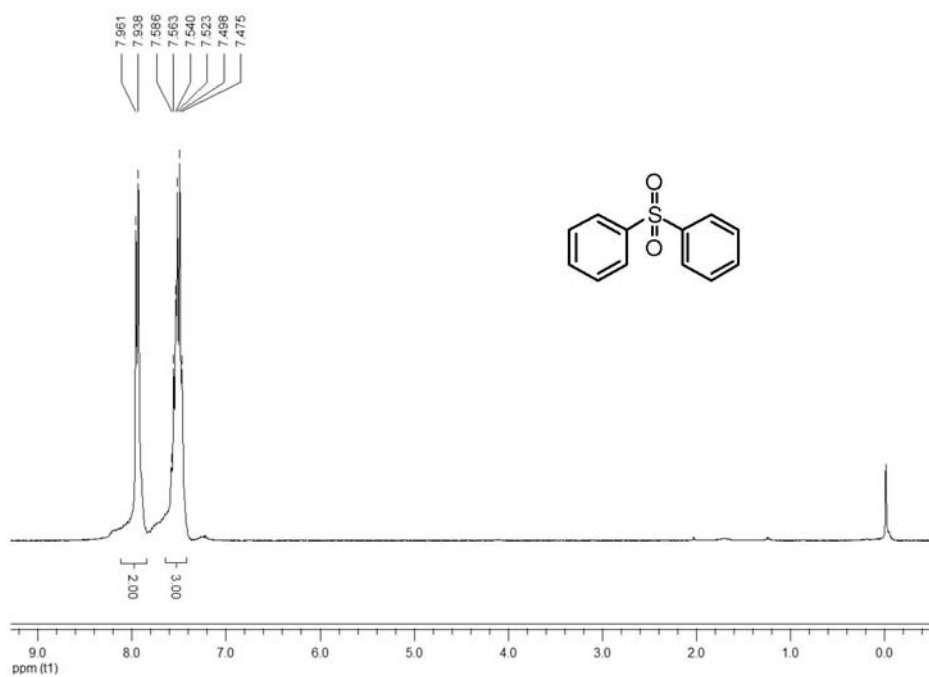


Figure 11. ^1H NMR (300 MHz, CDCl_3) of diphenyl sulfone.

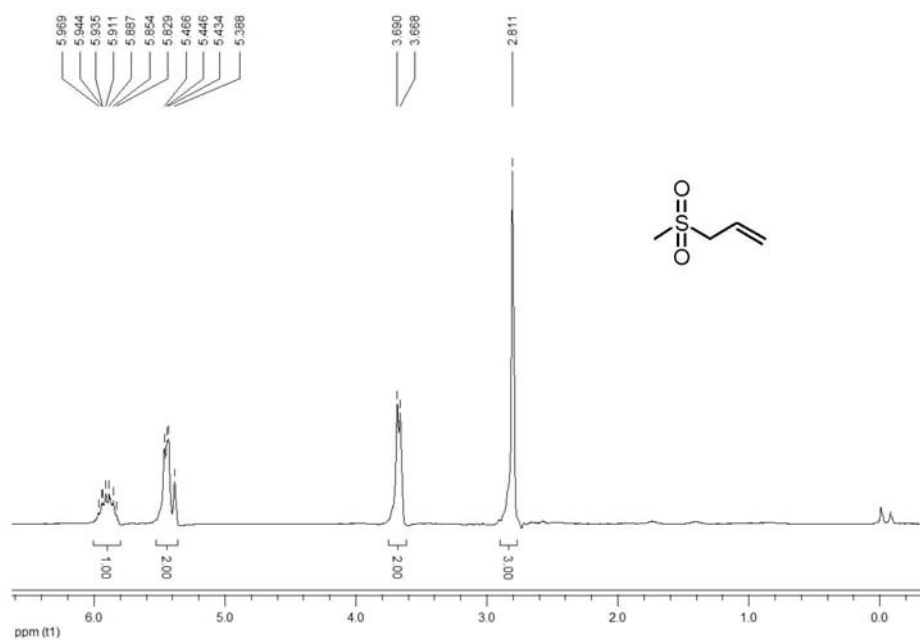


Figure 12. ^1H NMR (300 MHz, CDCl_3) of allyl methyl sulfone.

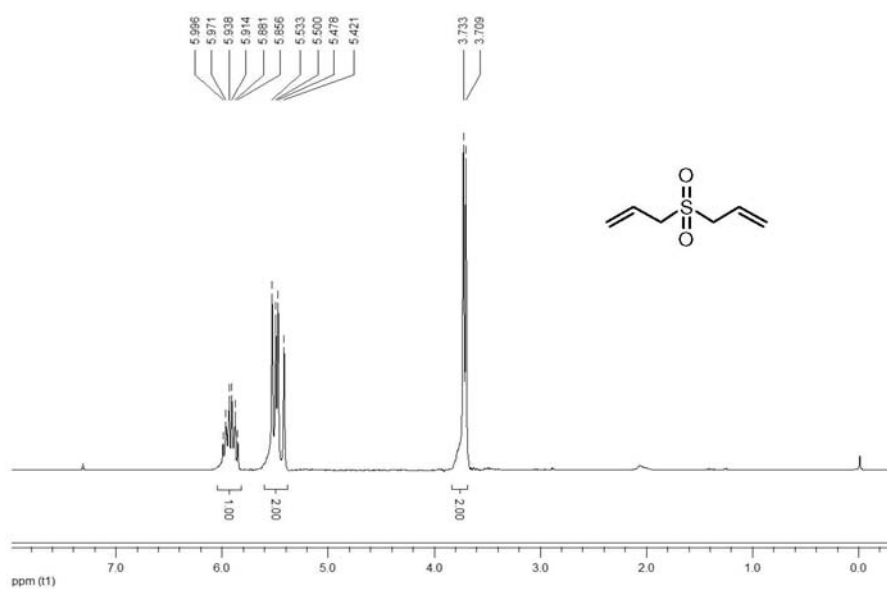


Figure 13. ^1H NMR (300 MHz, CDCl_3) of diallyl sulfone.

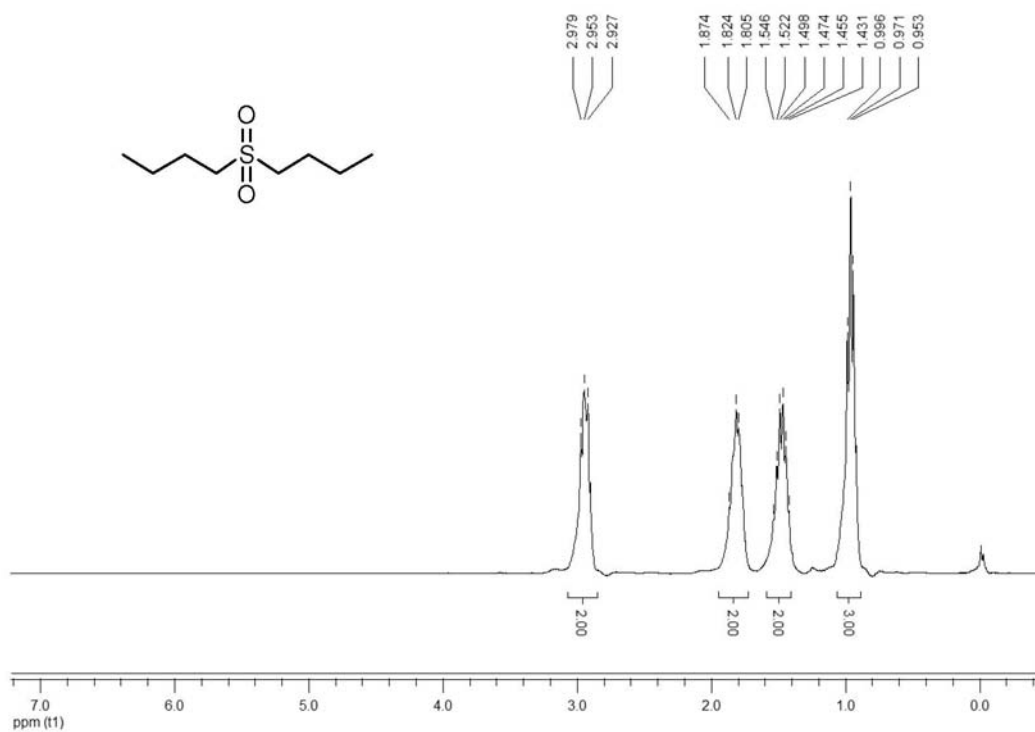


Figure 14. ¹H NMR (300 MHz, CDCl₃) of Ddi-*n*-butyl sulfone.

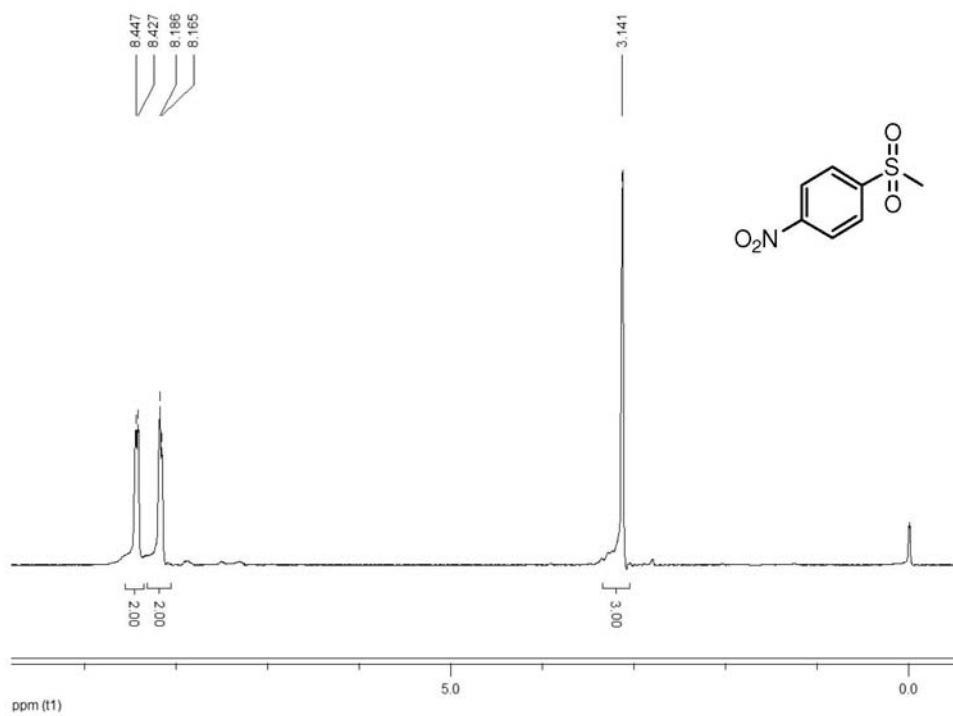


Figure 15. ¹H NMR (300 MHz, CDCl₃) of methyl-4-nitrophenyl sulfone.

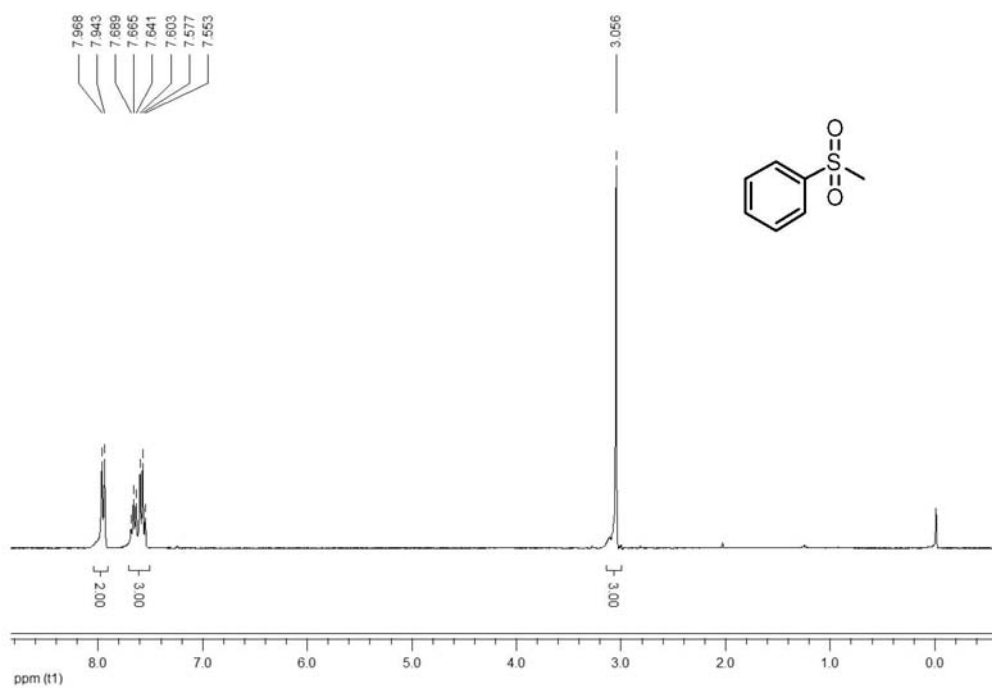


Figure 16. ¹H NMR (300 MHz, CDCl₃) of methyl phenyl sulfone.

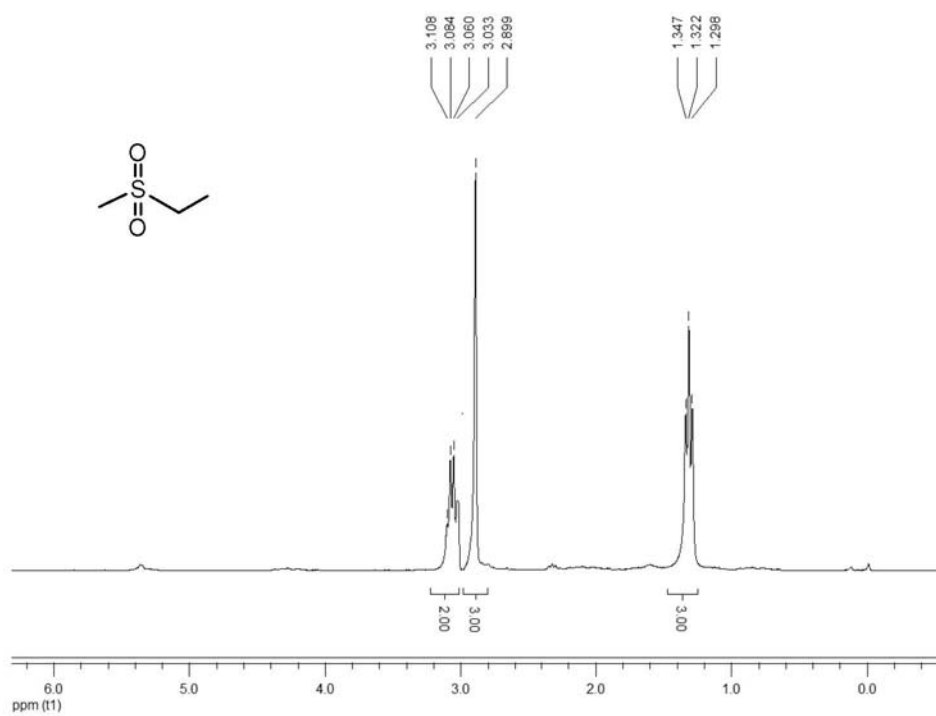


Figure 17. ¹H NMR (300 MHz, CDCl₃) of methyl ethyl sulfone.

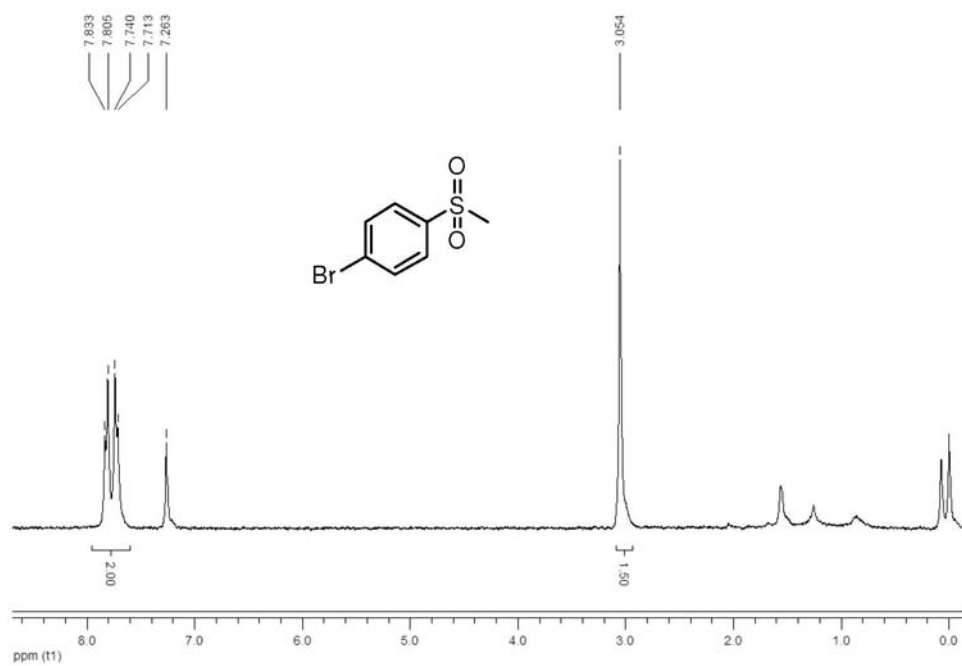


Figure 18. ^1H NMR (300 MHz, CDCl_3) of 4-bromophenyl methyl sulfone.

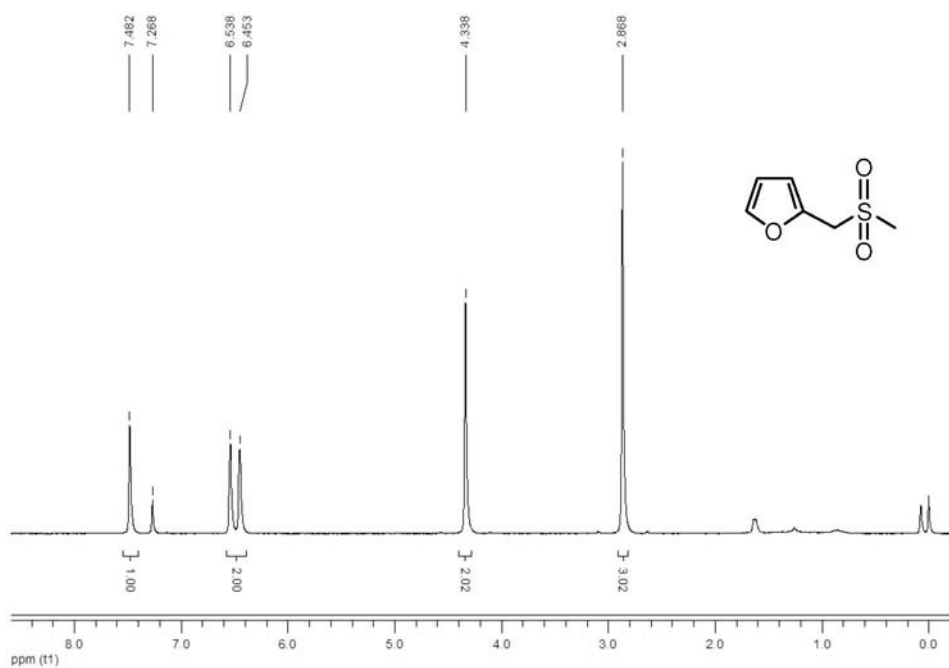


Figure 19. ^1H NMR (300 MHz, CDCl_3) of methyl furfuryl sulfone.

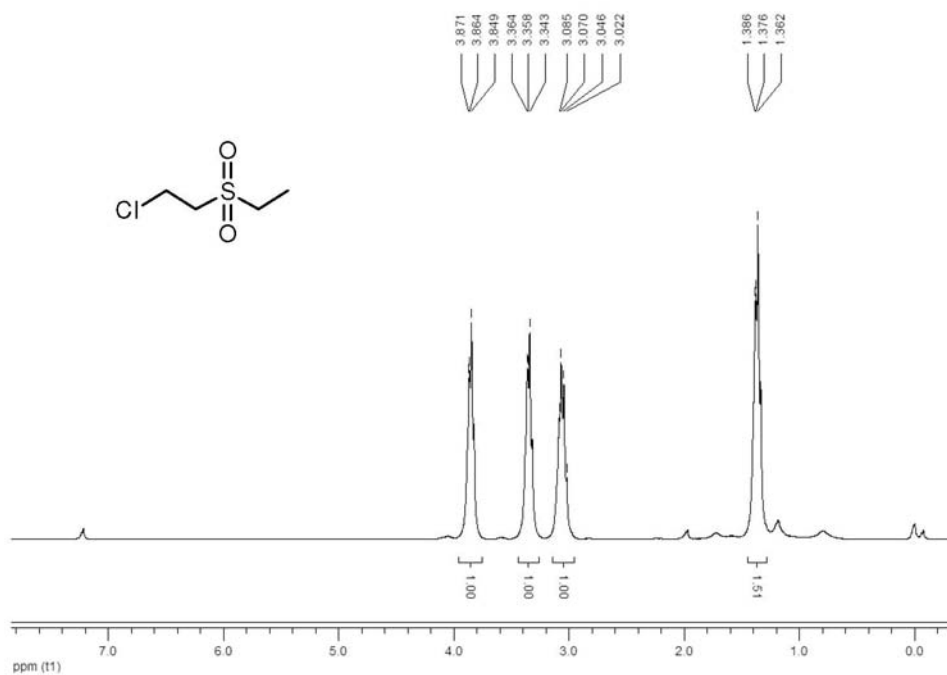


Figure 20. ^1H NMR (300 MHz, CDCl_3) of 2-chloroethyl ethyl sulfone.

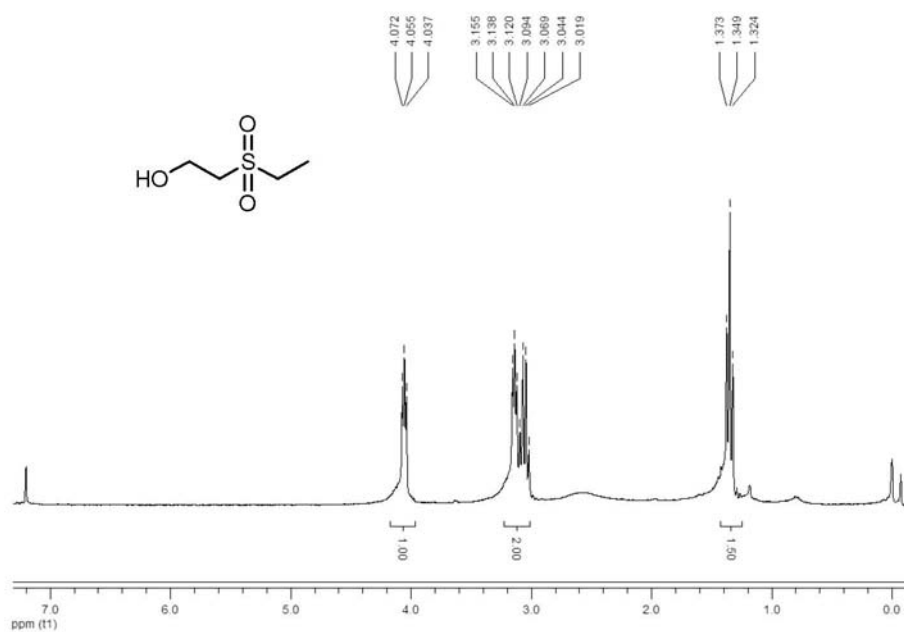


Figure 21. ^1H NMR (300 MHz, CDCl_3) of 2-hydroxyethyl ethyl sulfone.