Figure S1. ESI MS for $[Co(dmgBF_2)_2(H_2O)_2]$.
Low resolution

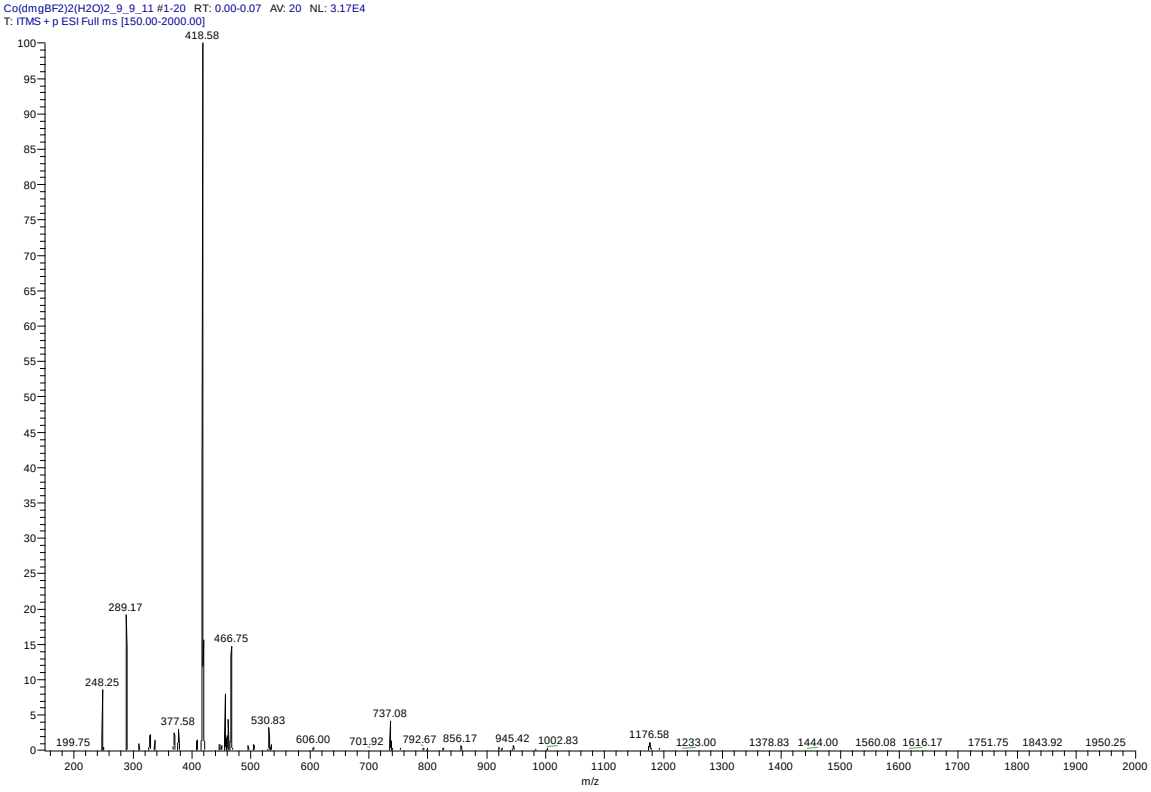
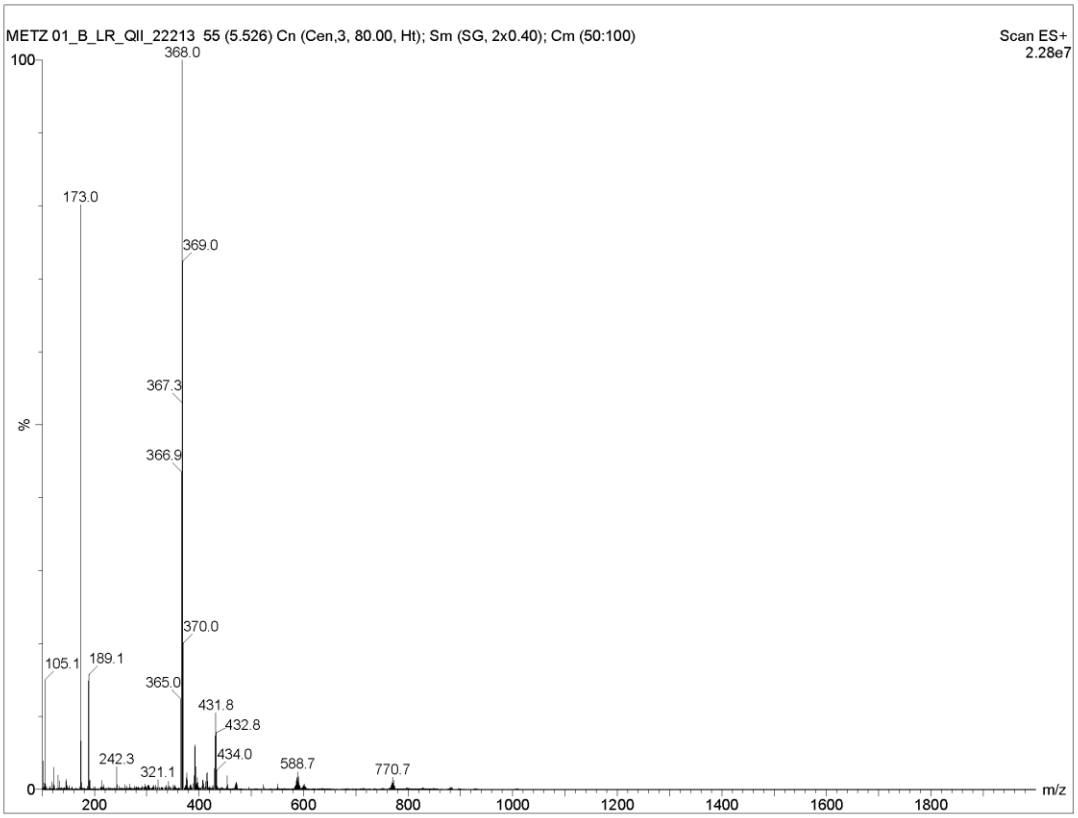
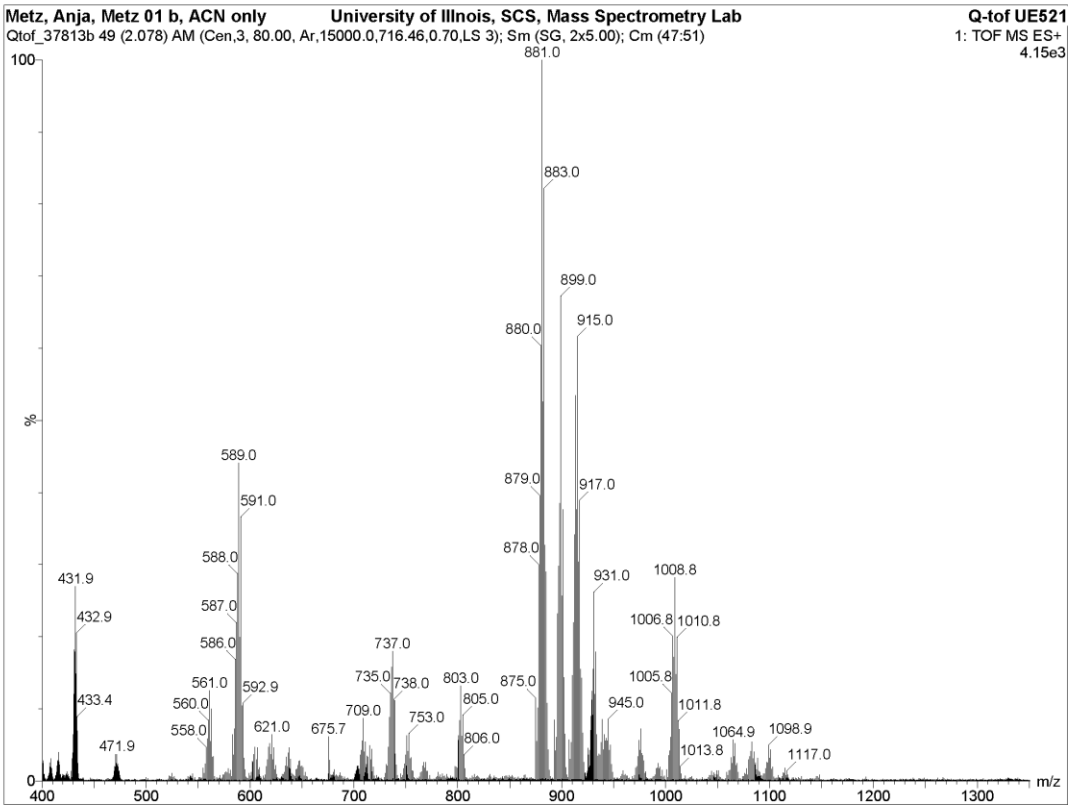


Figure S2. ESI MS for compound **4**.
Low resolution




Metz, Anja, Metz 01 b, ACN only
University of Illnois, SCS, Mass Spectrometry Lab
Q-tof UE521
Qtof_37813b 49 (2.078) AM (Cen,3, 80.00, Ar,15000.0,716.46,0.70,LS 3); Sm (SG, 2x5.00); Cm (47:51)
1: TOF MS ES+
4.15e3
100
%
0
881.0
883.0
899.0
915.0
880.0
589.0
591.0
879.0
917.0
878.0
588.0
931.0
1008.8
431.9
587.0
432.9
1006.8
1010.8
586.0
737.0
735.0
738.0
803.0
875.0
1005.8
561.0
592.9
433.4
560.0
709.0
753.0
805.0
945.0
1011.8
558.0
621.0
675.7
806.0
1064.9
1098.9
471.9
1013.8
1117.0
400
500
600
700
800
900
1000
1100
1200
1300
m/z

High Resolution

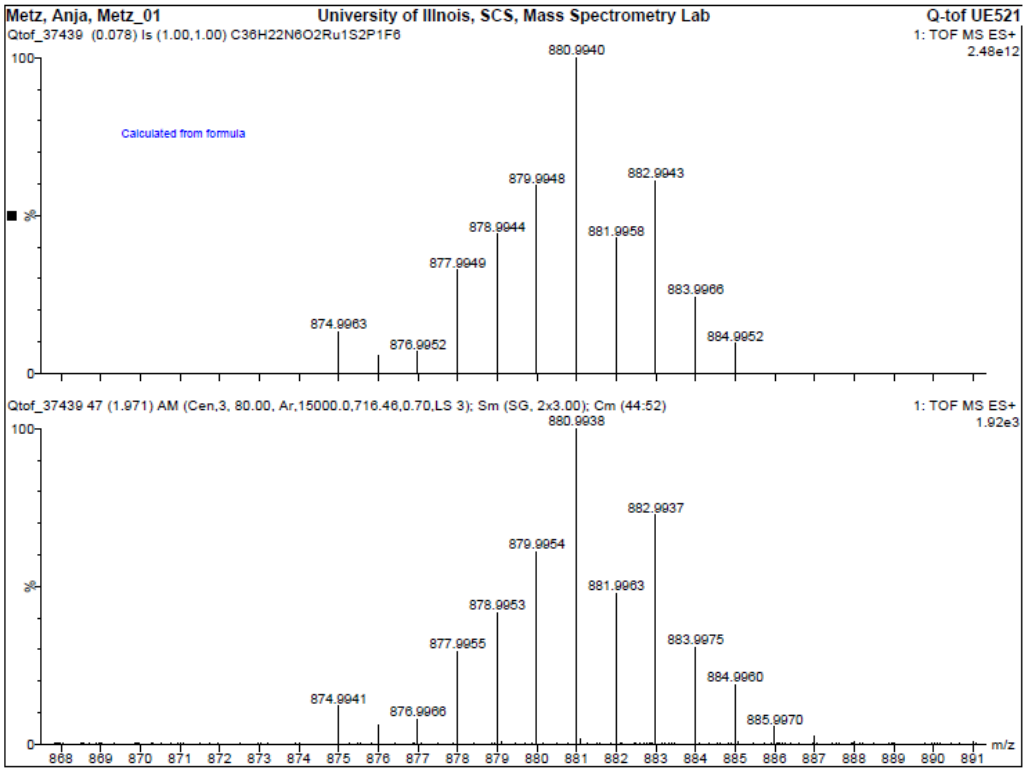
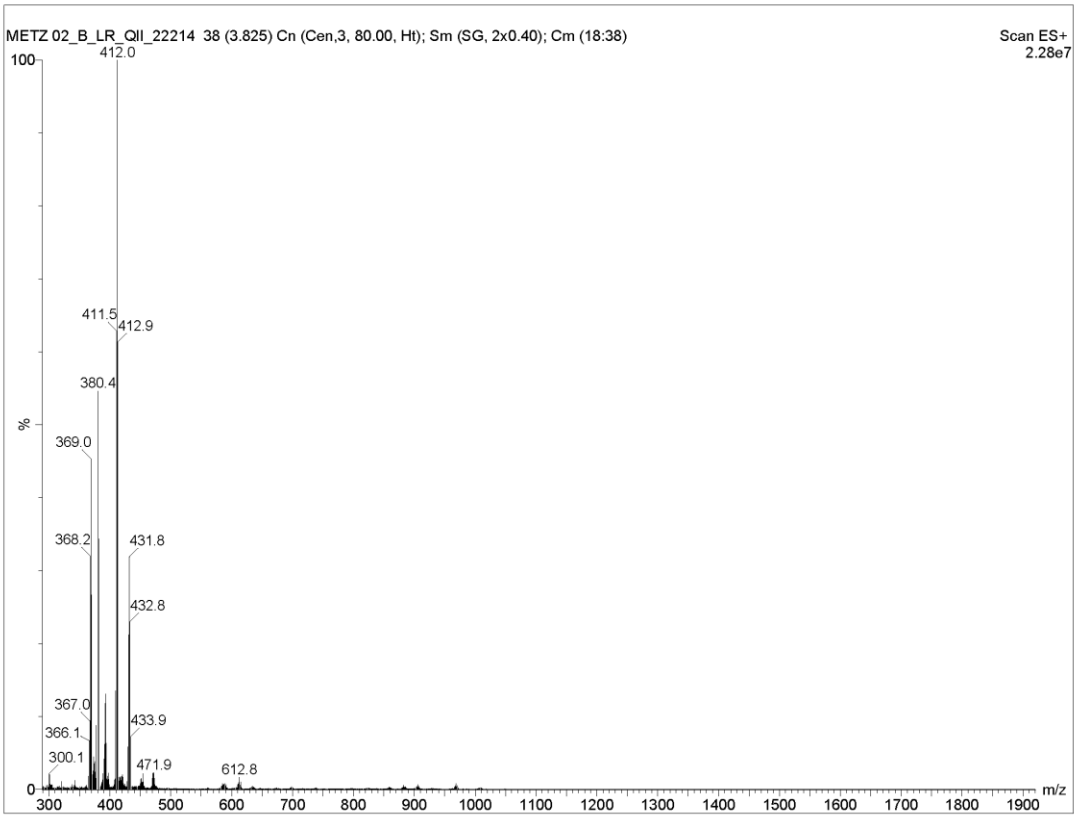
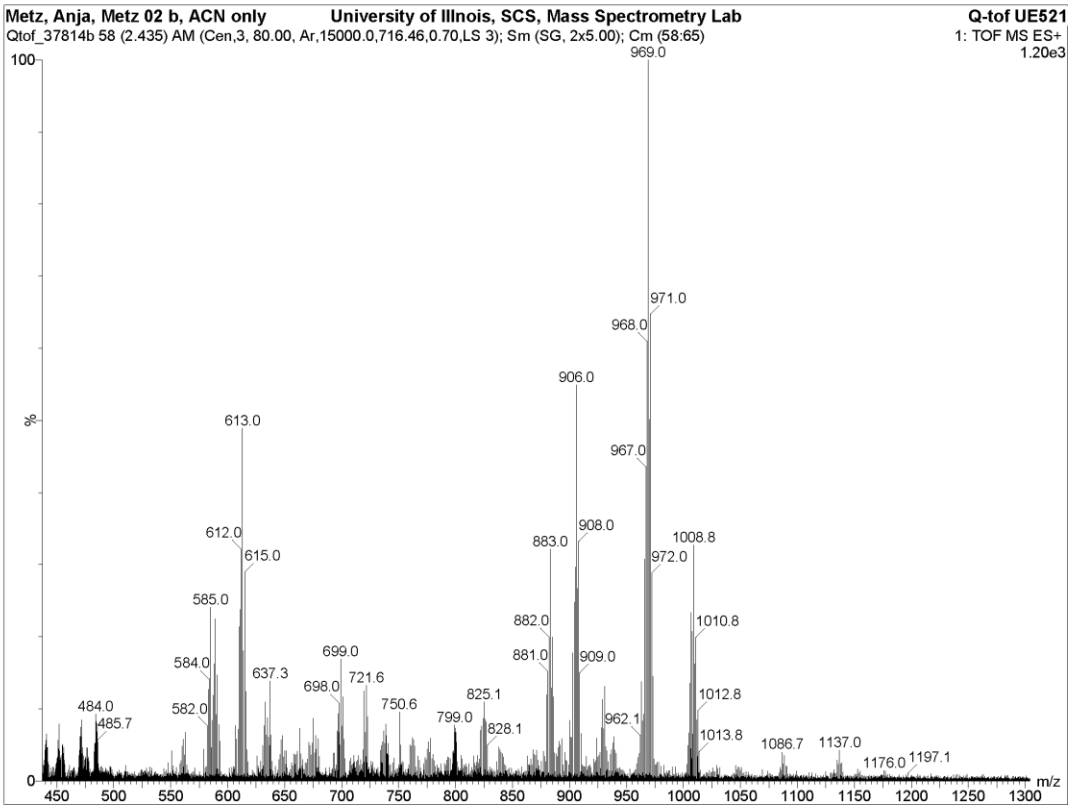


Figure S3. ESI MS for compound **5**.
Low resolution





High resolution

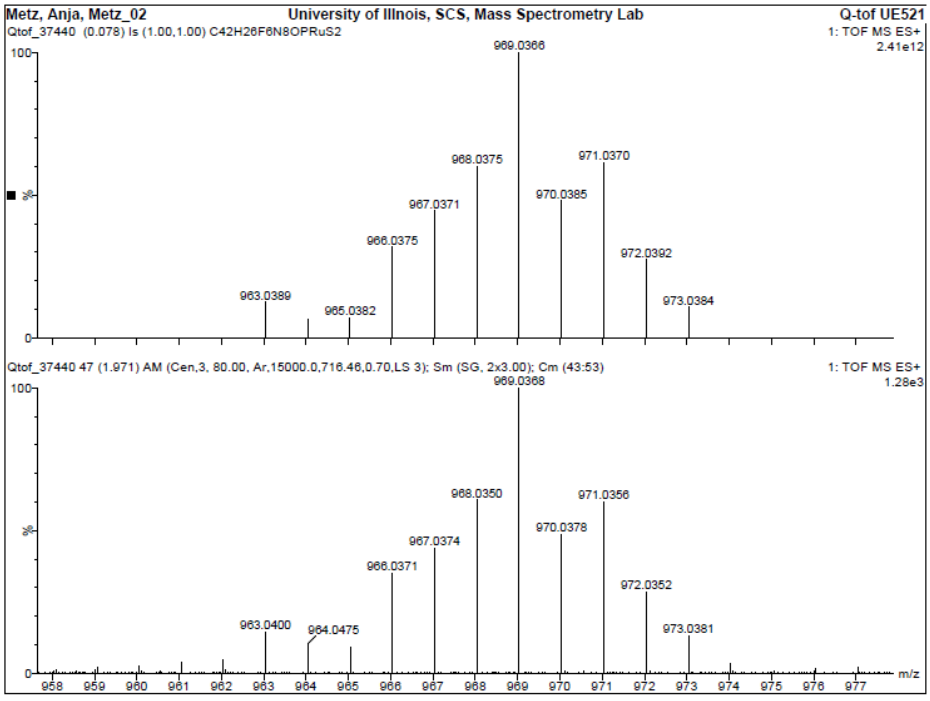
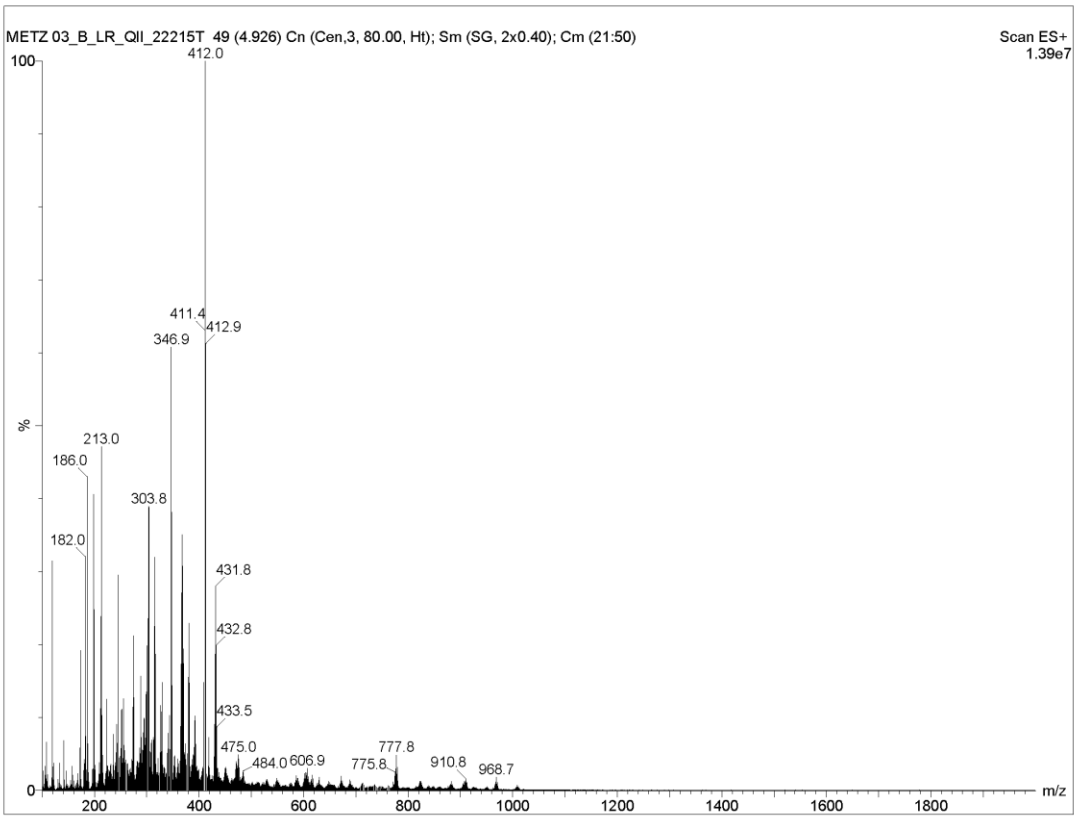
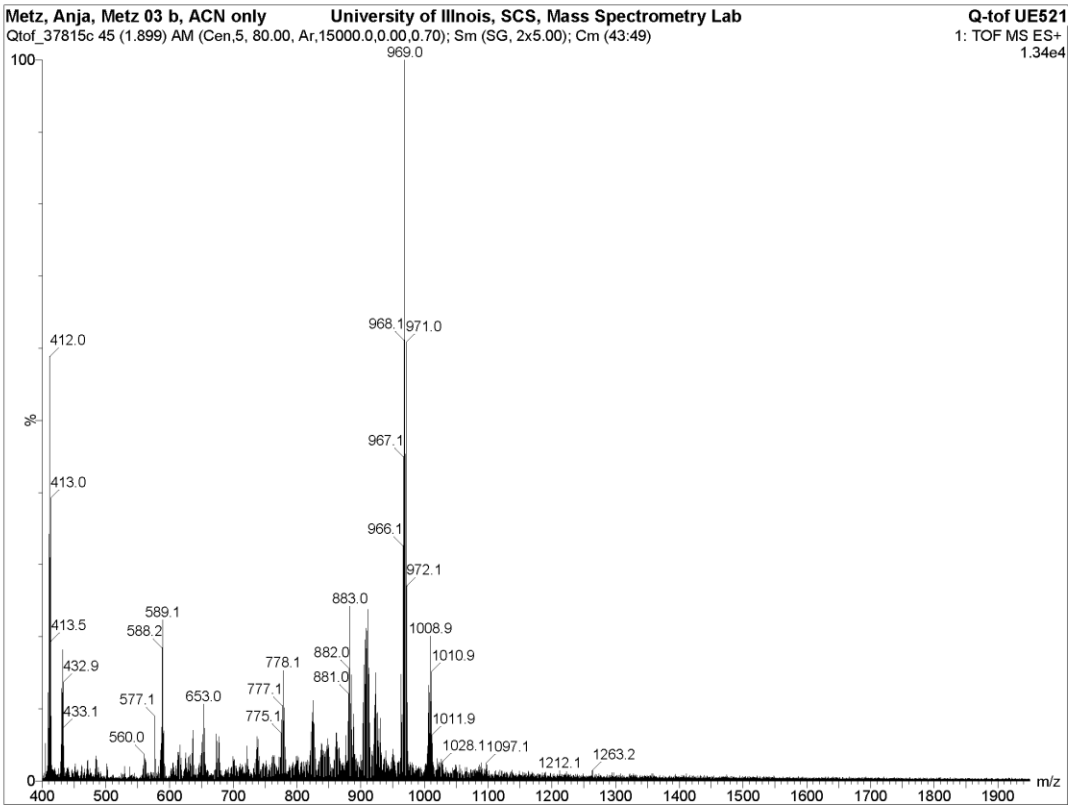


Figure S4. ESI MS for compound **6**.

Low resolution




Metz, Anja, Metz 03 b, ACN only
University of Illnois, SCS, Mass Spectrometry Lab
Q-tof UE521
Qtof_37815c 45 (1.899) AM (Cen,5, 80.00, Ar,15000.0,0.00,0.70); Sm (SG, 2x5.00); Cm (43:49)
1: TOF MS ES+
1.34e4
100
%
0
969.0
968.1
971.0
412.0
967.1
413.0
966.1
972.1
883.0
589.1
413.5
588.2
1008.9
882.0
1010.9
778.1
881.0
432.9
777.1
653.0
577.1
775.1
433.1
1011.9
560.0
1028.1
1097.1
1212.1
1263.2
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
m/z

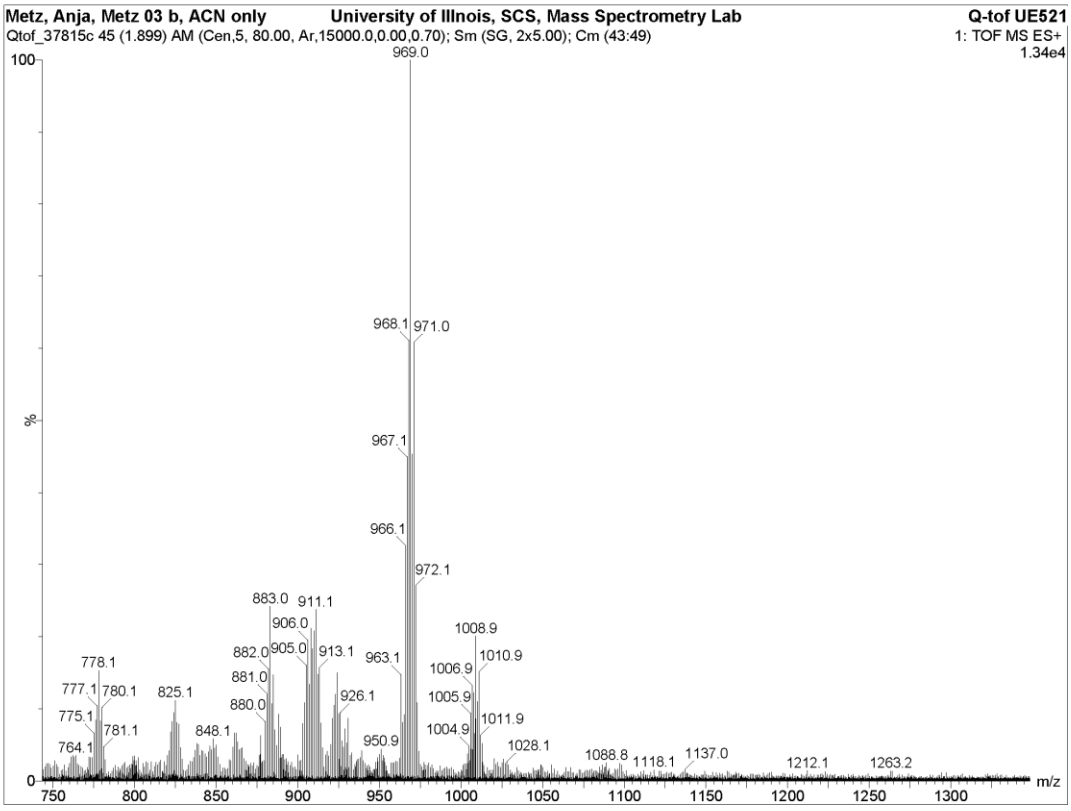

Metz, Anja, Metz 03 b, ACN only
University of Illnois, SCS, Mass Spectrometry Lab
Q-tof UE521
Qtof_37815c 45 (1.899) AM (Cen,5, 80.00, Ar,15000.0,0.00,0.70); Sm (SG, 2x5.00); Cm (43:49)
1: TOF MS ES+
1.34e4
100
%
0
969.0
968.1
971.0
967.1
966.1
972.1
883.0
911.1
906.0
882.0
905.0
913.1
963.1
1008.9
1010.9
1006.9
778.1
881.0
926.1
1005.9
777.1
780.1
825.1
880.0
1011.9
775.1
781.1
848.1
1004.9
764.1
950.9
1028.1
1088.8
1118.1
1137.0
1212.1
1263.2
m/z
750
800
850
900
950
1000
1050
1100
1150
1200
1250
1300

Figure S5. FT IR spectrum of $[Co(dmgBF_2)_2(H_2O)_2]$.

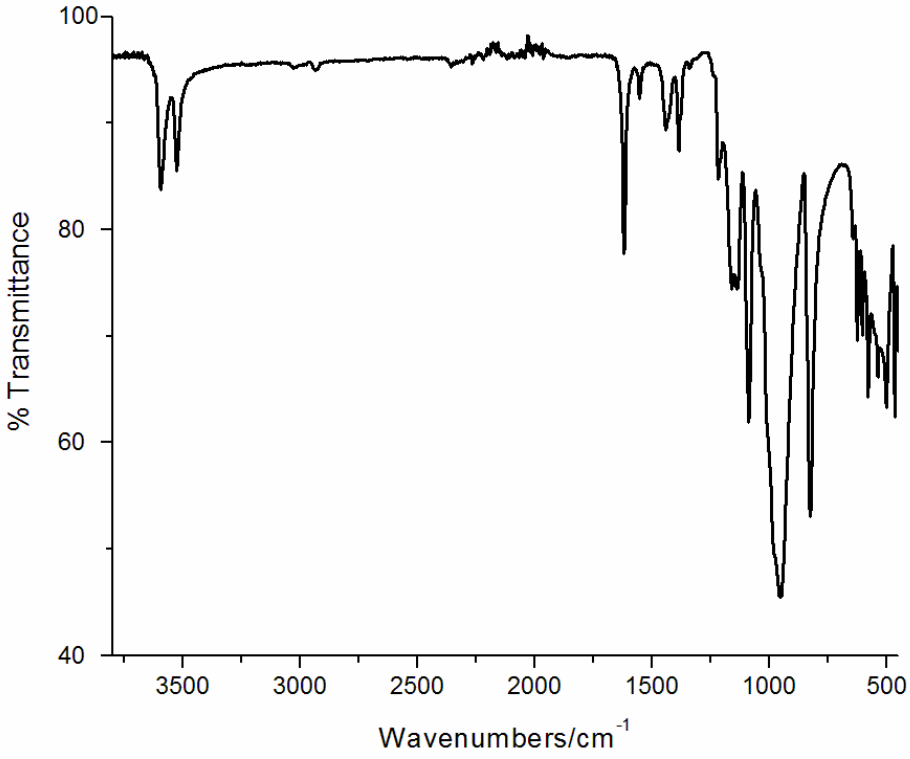


Figure S6. FT IR spectrum of compound **4**.

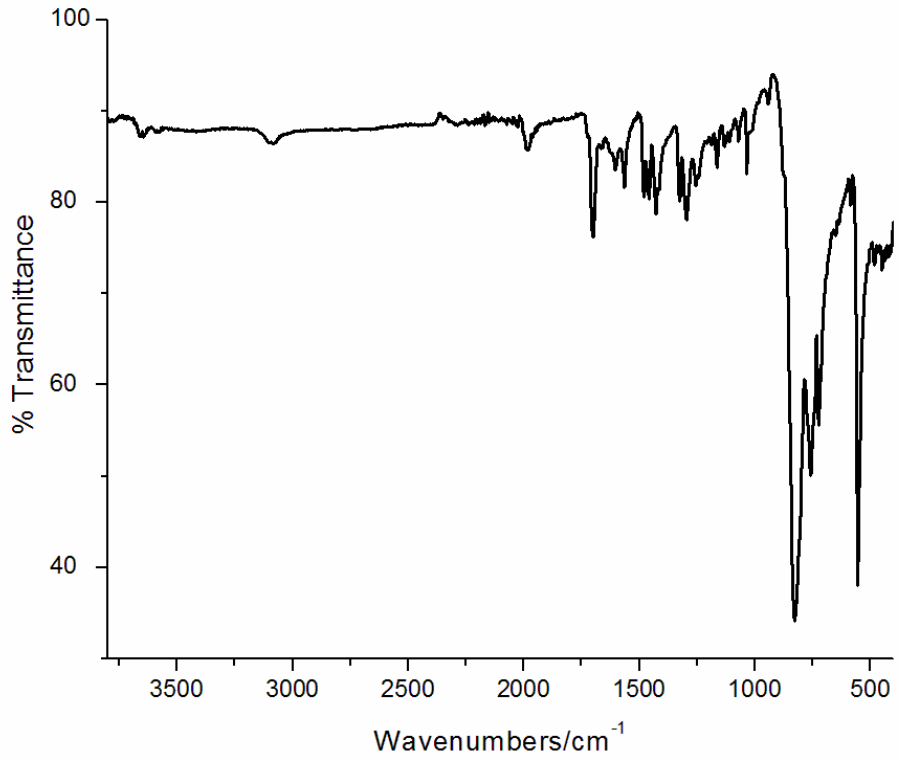


Figure S7. FT IR spectrum of compound **5**.

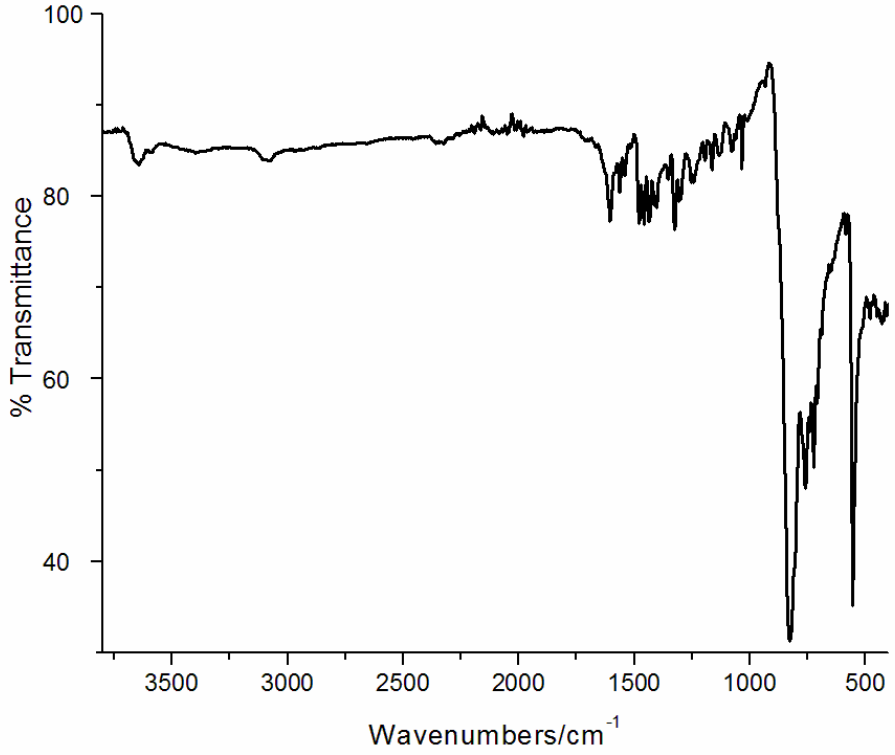


Figure S8. FT IR spectrum of compound **6**.

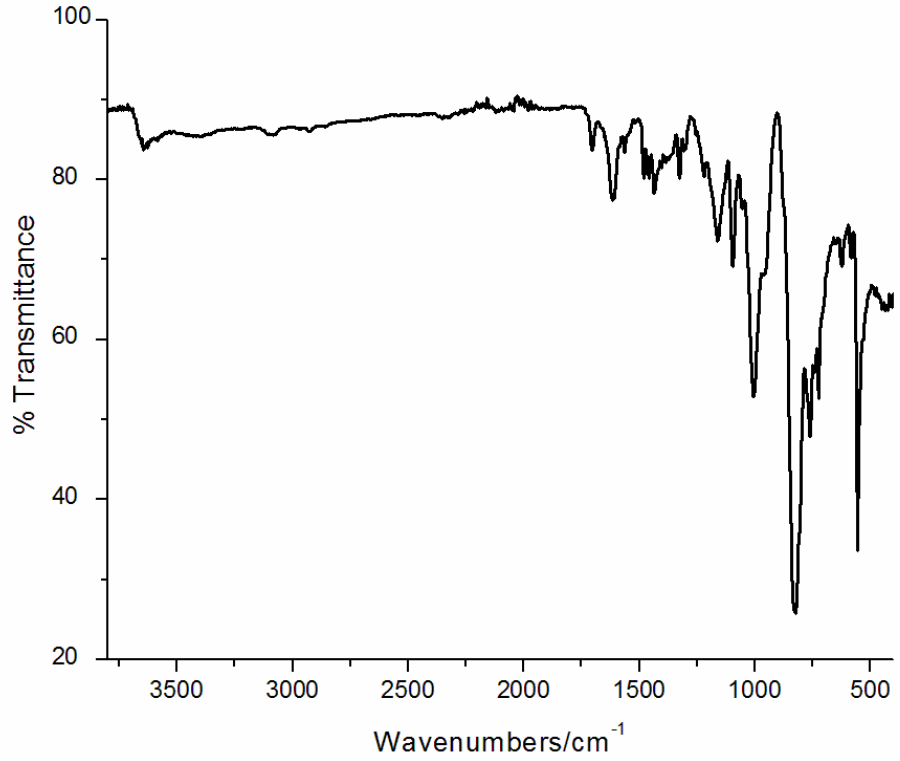
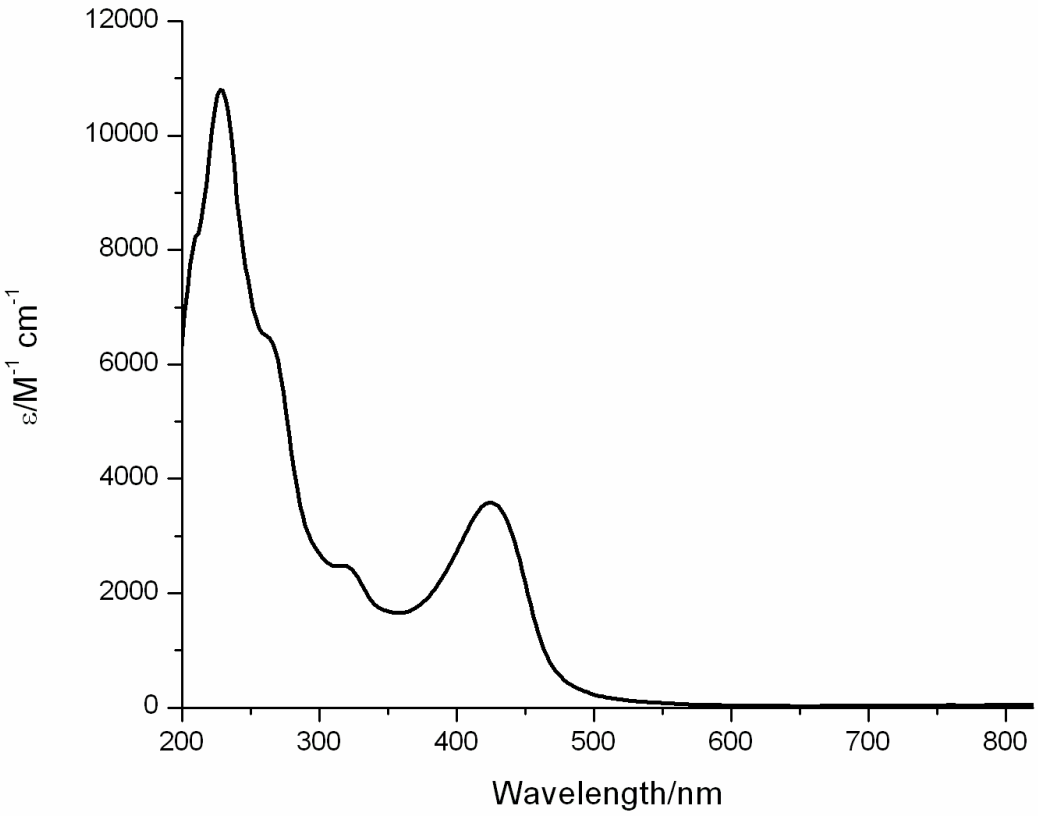


Figure S9. UV-visible spectra of dilute solutions of $[Co(dmgBF_2)_2(H_2O)_2]$, compounds **4**, **5**, and **6** in CH_3CN.
(A) $[Co(dmgBF_2)_2(H_2O)_2]$



(B) Compounds **4**, **5**, and **6**.

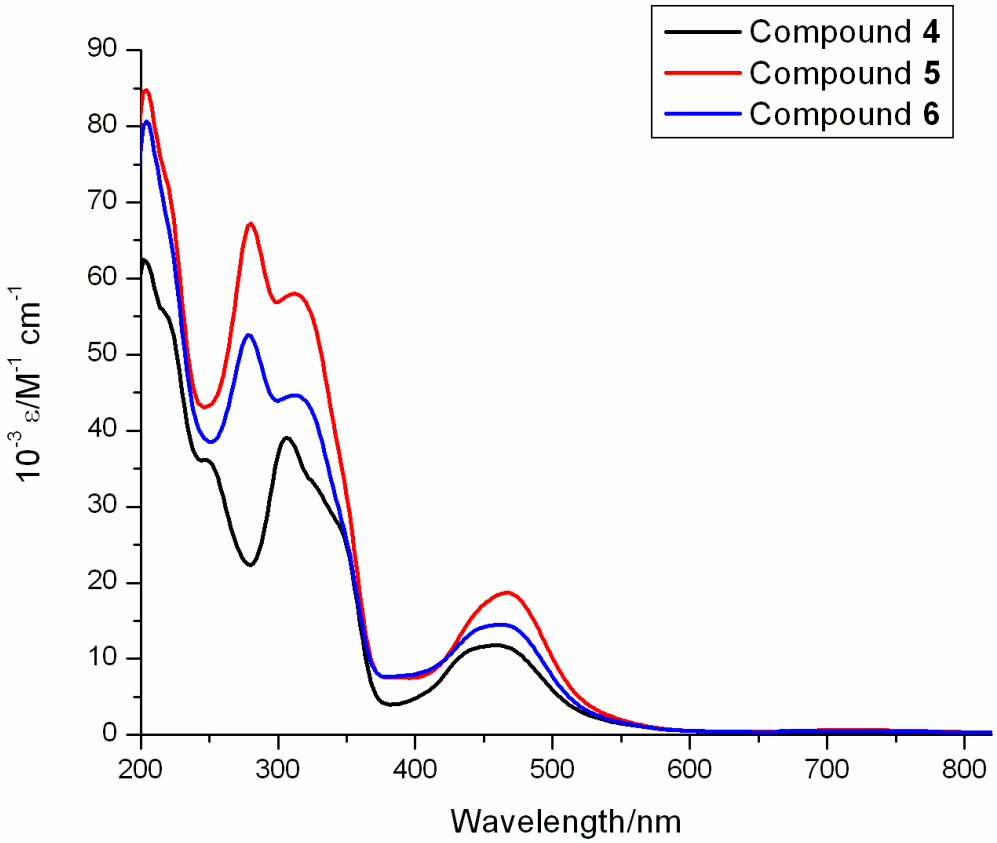


Figure S10. Q-band ESR spectra simulations of $[Co(dmgBF_2)_2(OH_2)_2]$ and compound **6** in DMSO at 100 K. Instrument settings were as follows: centre field = 11.5 kG, sweep width = 3500.00 G, microwave frequency = 34.06 GHz, microwave power = 2.00 mW, modulation frequency = 100 kHz, and modulation amplitude = 10.0 G.

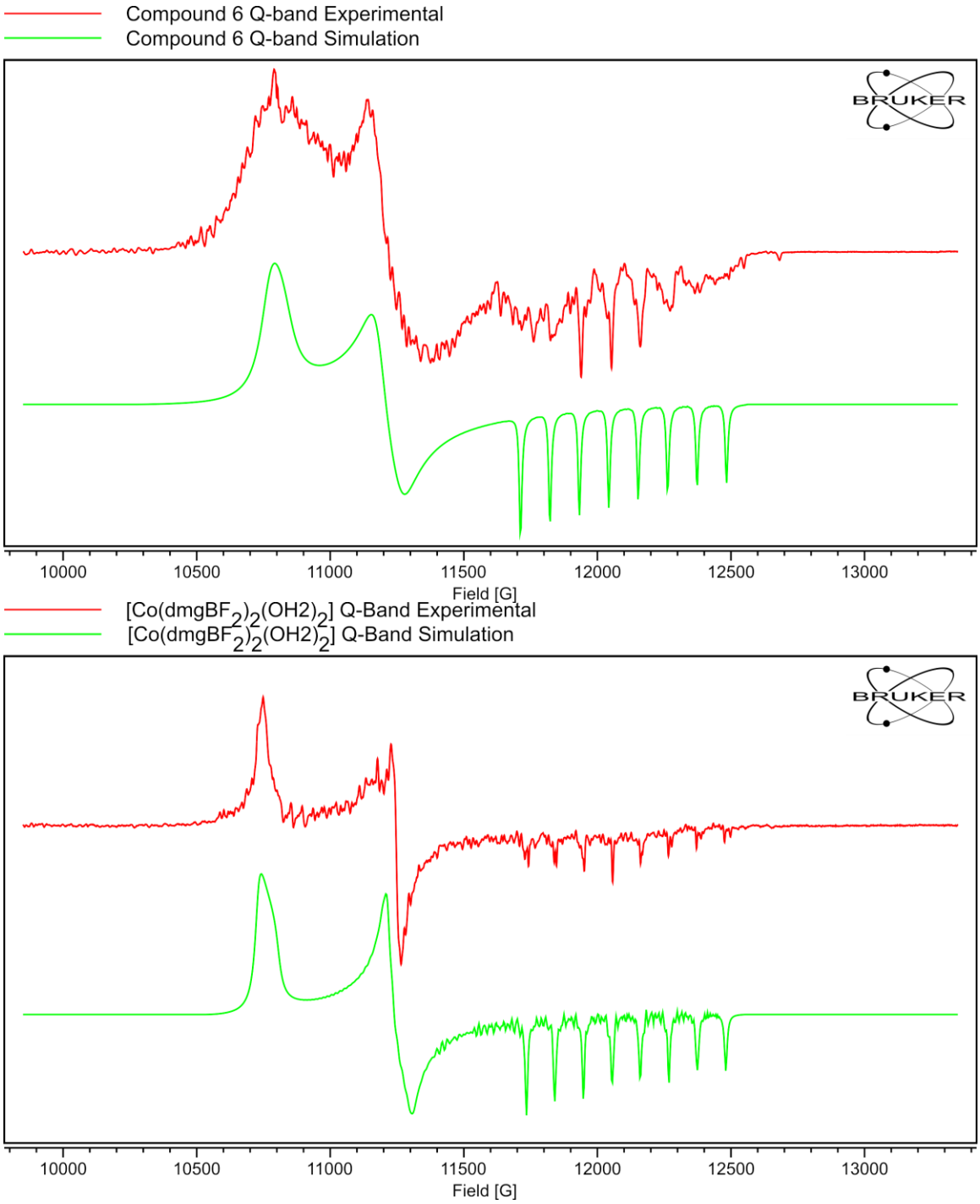


Figure S11. An X-band ESR spectrum and simulation of compound **8** in DMSO at 101 K. Instrument settings were as follows: centre field = 3200.00 G, sweep width = 1500.00 G, static field = 2450 G, microwave frequency = 9.46 GHz, microwave power = 0.22 mW, receiver gain = 5.02 x 10^4, modulation frequency = 100 kHz, modulation amplitude = 2.00 G, modulation phase = 0°, time constant = 40.96 ms, conversion time = 40.00 ms, and sweep time = 96.00 s.