Supplementary Information for

Effect of methoxy substituents on fluorescent Zn^{2+}/Cd^{2+} selectivity of bisquinoline derivatives with a *N,N′*-dimethylalkanediamine skeleton

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Table S1. Crystallographic Data for $[(\mu\text{-}Cl)_2Cd_2(BQDMEN)_2](ClO_4)_2$ and $[Zn(BQDMEN)Cl]ClO_4$

	$[(\mu\text{-}Cl)_2Cd_2(BQ\text{-}DMEN)_2](ClO_4)_2$	$[Zn(BQDMEN)Cl]\text{-}ClO_4$
Formula	$C_{48}H_{52}Cd_2Cl_4N_8O_8$	$C_{24}H_{26}Cl_2N_4O_4Zn$
FW	1235.62	570.78
Crystal system	monoclinic	trigonal
Space group	*C*2/*c*	*R*3*c*
a, Å	45.845(14)	30.1327(13)
b, Å	13.759(4)	30.1327(13)
c, Å	26.417(8)	14.7905(7)
α, deg	90	90
β, deg	107.426(3)	90
γ, deg	90	120
V, Å^3	15899(8)	11630.3(9)
Z	12	18
D_{calc}, g cm^{-3}	1.549	1.467
μ, mm^{-1}	1.0632	1.1942
$2\theta_{max}$, deg	61.5	55
temp, K	153	153
no. reflns collected	91605	39478
no. reflns used	23213	5925
no. of params	998	318
R_{int}	0.0311	0.0371
Final *R*1 ($I > 2\sigma(I)$)[a]	0.0543	0.0248
*wR*2 (all data)[b]	0.1588	0.0559
GOF	1.064	1.098
Flack parameter	-	0.028(4)

[a] $R1 = \Sigma||F_o| - |F_c||/\Sigma|F_o|$. [b] $wR2 = [\Sigma w[(F_o^2 - F_c^2)^2]/\Sigma[w(F_o^2)^2]]^{1/2}$.

Table S2. Interatomic Distances (Å) for $[(\mu\text{-}Cl)_2Cd_2(BQDMEN)_2](ClO_4)_2$ and $[Zn(BQDMEN)Cl]ClO_4$

Bonds[a]	$[(\mu\text{-}Cl)_2Cd_2(BQDMEN)_2](ClO_4)_2$				$[Zn(BQDMEN)Cl]ClO_4$
	Cd1[b]	Cd2[b]	Cd3[c]	Cd4[c]	Zn1
M-Cl1	2.5924(12)	2.5660(12)	2.5849(10)	2.5696(10)	2.2623(7)
M-Cl2	2.5646(12)	2.5823(11)	2.5849(10)[d]	2.5696(10)[d]	-
M-N1	2.345(3)	2.333(3)	2.334(3)	2.346(4)	2.136(2)
M-N2	2.334(3)	2.329(3)	2.334(3)[d]	2.346(4)[d]	2.195(3)
M-N3	2.484(3)	2.527(3)	2.503(3)	2.486(3)	2.218(3)
M-N4	2.464(3)	2.496(3)	2.503(3)[d]	2.486(3)[d]	2.1205(19)
M···O1 (pechlorate)	-	-	-	-	3.588(2)

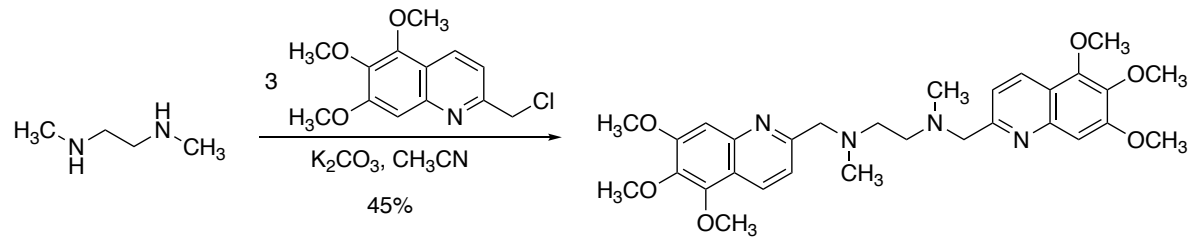
[a] N1 and N2 denote aliphatic nitrogen and N3 and N4 denote aromatic (quinoline) nitrogen atoms.
[b] See Fig. 4.
[c] See Fig. S10a.
[d] Generated by symmetry operation (-X+1, Y, -Z+1/2).

Table S3. Bond Angles (°) for $[(\mu\text{-}Cl)_2Cd_2(BQDMEN)_2](ClO_4)_2$ and $[Zn(BQDMEN)Cl]ClO_4$

Angle[a]	$[(\mu\text{-}Cl)_2Cd_2(BQDMEN)_2](ClO_4)_2$				$[Zn(BQDMEN)Cl]ClO_4$
	Cd1[b]	Cd2[b]	Cd3[c]	Cd4[c]	Zn1
Cl1-M-Cl2	91.18(4)	91.38(4)	88.19(4)	88.86(4)	-
Cl1-M-N1	168.16(10)	95.67(8)	96.93(8)	169.91(8)	149.38(6)
Cl1-M-N2	93.25(9)	170.90(7)	169.67(9)	96.94(10)	96.28(8)
Cl1-M-N3	100.29(7)	90.35(7)	99.22(7)	93.41(7)	95.33(7)
Cl1-M-N4	93.34(8)	101.21(7)	93.64(7)	100.27(7)	104.87(7)
Cl2-M-N1	96.98(8)	168.38(7)	169.67(9)[d]	96.94(10)[d]	-
Cl2-M-N2	173.78(10)	94.56(8)	96.93(8)[d]	169.91(8)[d]	-
Cl2-M-N3	89.82(7)	100.13(6)	93.64(7)[d]	100.27(7)[d]	-
Cl2-M-N4	103.15(8)	94.28(8)	99.22(7)[d]	93.41(7)[d]	-
N1-M-N2	79.31(11)	79.64(10)	79.48(10)	78.58(14)	82.49(11)
N1-M-N3	71.29(11)	70.67(9)	94.38(11)	93.67(12)	76.17(11)
N1-M-N4	93.13(11)	93.40(10)	71.59(11)	71.24(11)	104.99(9)
N2-M-N3	93.67(11)	95.38(10)	71.59(11)[d]	71.24(11)[d]	154.78(10)
N2-M-N4	72.26(12)	71.50(10)	94.38(11)[d]	93.67(12)[d]	79.78(10)
N3-M-N4	161.01(10)	161.31(9)	162.09(10)	160.83(10)	118.50(10)

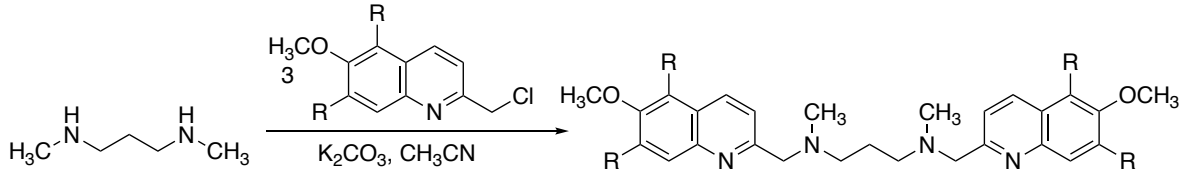
[a] N1 and N2 denote aliphatic nitrogen and N3 and N4 denotes aromatic (quinoline) nitrogen atoms.
[b] See Fig. 4.
[c] See Fig. S10a.
[d] Generated by symmetry operation (-X+1, Y, -Z+1/2).

Scheme S1



TriMeOBQDMEN (**3**)

Scheme S2



R = H : 6-MeOBQDMPN (**5**) (46%)
R = OCH_3 : TriMeOBQDMPN (**6**) (41%)

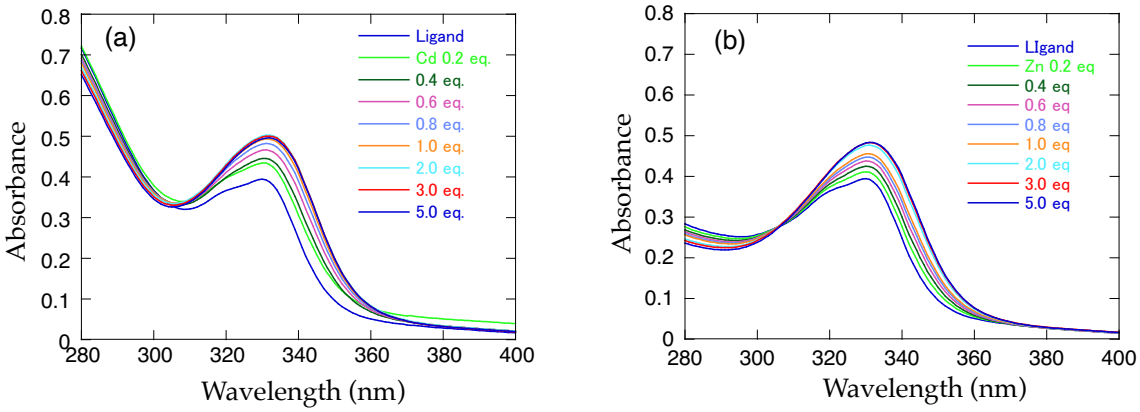
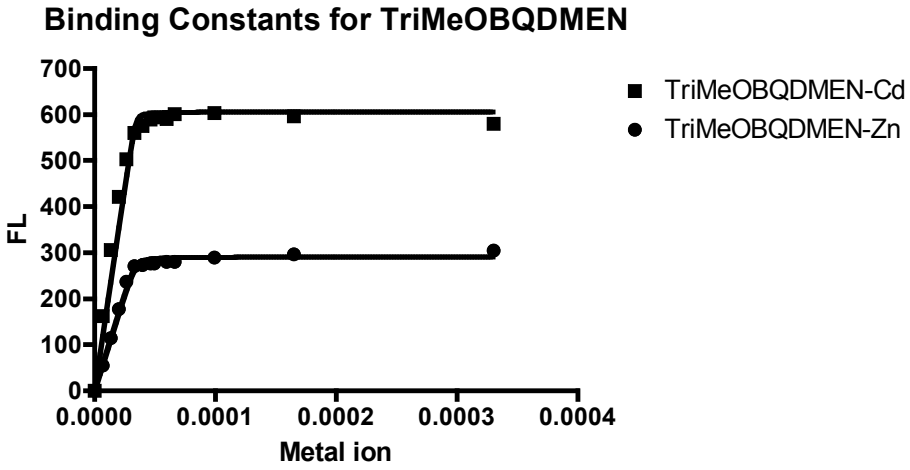


Fig. S1. UV-vis absorption spectra of 34 μM TriMeOBQDMEN (**3**) in DMF-H_2O (1:1) at 25 °C in the presence of increasing amount of (a) Cd^{2+} and (b) Zn^{2+}.



metal ion	TriMeOBQDMEN-Cd	TriMeOBQDMEN-Zn
0.000000	0.0000	0.0000
6.600000e-06	162.3400	54.3300
1.320000e-05	306.0500	114.8000
1.980000e-05	420.6200	177.6800
2.640000e-05	503.2000	236.3700
3.300000e-05	560.2800	270.9100
3.960000e-05	575.2000	272.7600
4.620000e-05	588.7300	275.9200
4.950000e-05	593.8900	276.6700
0.000059	590.6200	279.7100
0.000066	600.9500	280.5400
0.000099	602.7300	289.4500
0.000165	596.5700	296.8500
0.000330	579.5900	304.1100

	TriMeOBQDMEN-Cd	TriMeOBQDMEN-Zn
zinc binding 2/7/2008		
Best-fit values		
BMAX	605.8	290.7
KD	7.7459e-008	2.0873e-007
L0	3.4000e-005	3.4000e-005
Std. Error		
BMAX	15.29	4.609
KD	2.2370e-007	1.9566e-007
95% Confidence Intervals		
BMAX	572.5 to 639.1	280.6 to 300.7
KD	-4.0999e-007 to 5.6490e-007	-2.1762e-007 to 6.3508e-007
Goodness of Fit		
Degrees of Freedom	12	12
R squared	0.9677	0.9913
Absolute Sum of Squares	15225	1098
Sy.x	35.62	9.566
Constraints		
L0	L0 = 3.4000e-005	L0 = 3.4000e-005
Data		
Number of X values	14	14
Number of Y replicates	1	1
Total number of values	14	14
Number of missing values	0	0

Fig. S2. Estimation of dissociation constants (K_d) for TriMeOBQDMEN (**3**) with Cd^{2+} and Zn^{2+} in DMF-H_2O (1:1) at 25°C.

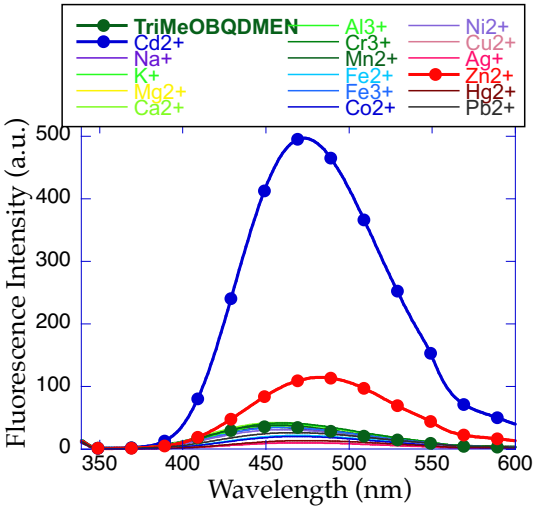


Fig. S3. Fluorescence spectra of 34 μM TriMeOBQDMEN (**3**) in the presence of 1 equiv. of various metal ions in DMF-H_2O (1:1) at 25 °C (λ_{ex} = 339 nm).

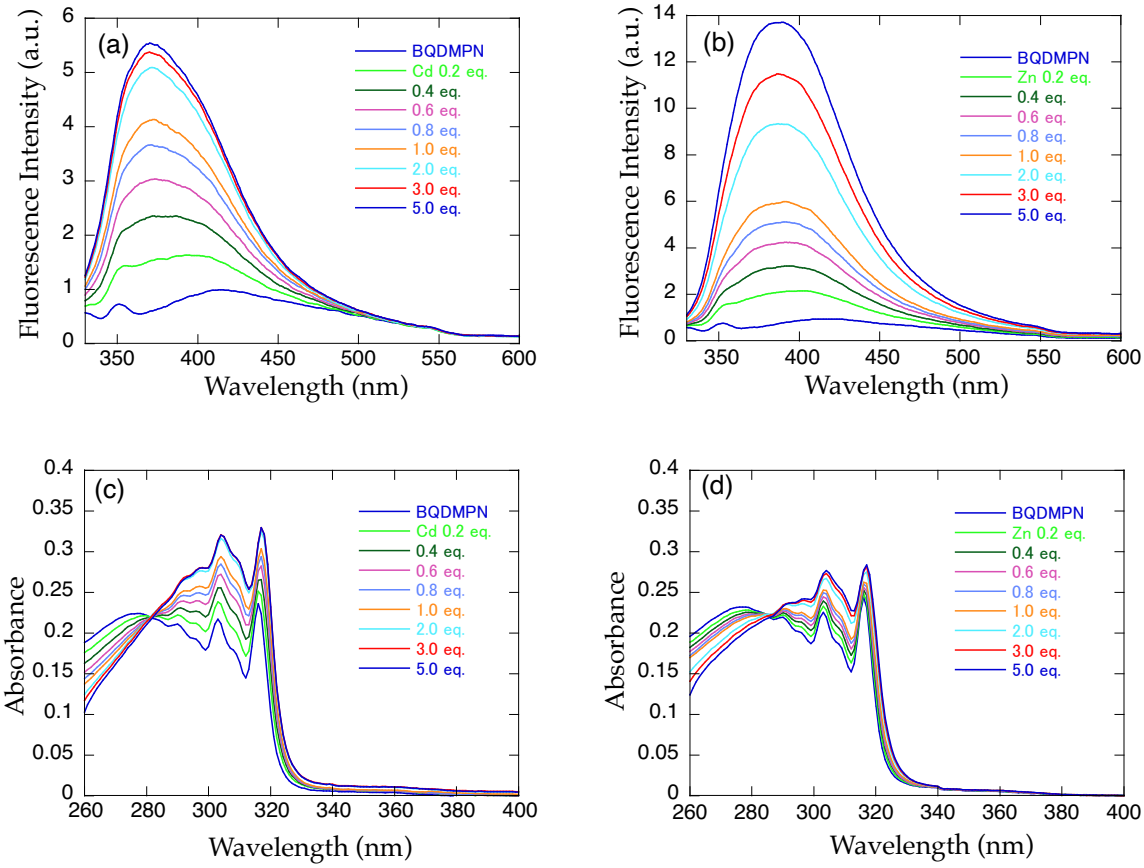


Fig. S4. (a,b) Fluorescence and (c,d) UV-vis spectra of 34 μM BQDMPN (**4**) in DMF-H_2O (1:1) at 25 °C in the presence of increasing amount of (a,c) Cd^{2+} and (b,d) Zn^{2+} (λ_{ex} = 317 nm).

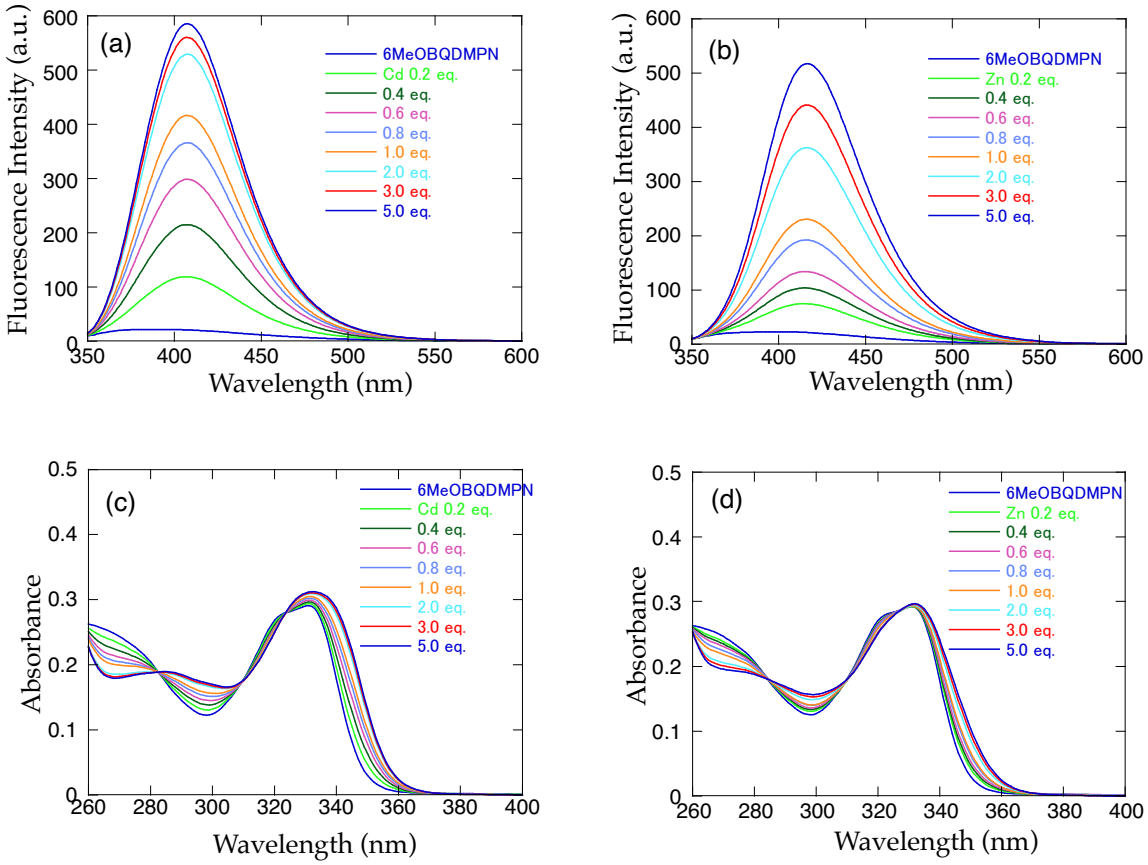


Fig. S5. (a,b) Fluorescence and (c,d) UV-vis spectra of 34 μM 6-MeOBQDMPN (**5**) in DMF-H_2O (1:1) at 25 °C in the presence of increasing amount of (a,c) Cd^{2+} and (b,d) Zn^{2+} (λ_{ex} = 341 nm).

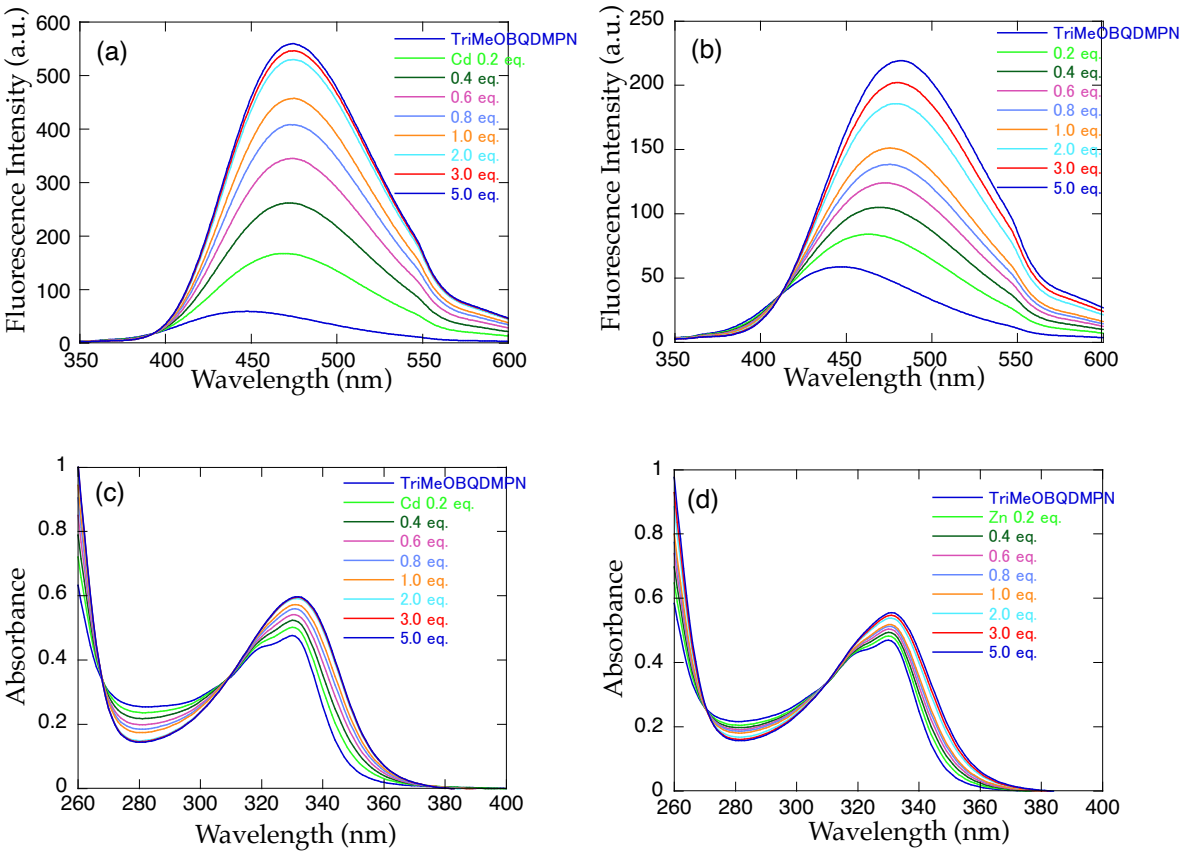


Fig. S6. (a,b) Fluorescence and (c,d) UV-vis spectra of 34 μM TriMeOBQDMPN (**6**) in DMF-H_2O (1:1) at 25 °C in the presence of increasing amount of (a,c) Cd^{2+} and (b,d) Zn^{2+} (λ_{ex} = 337 nm).

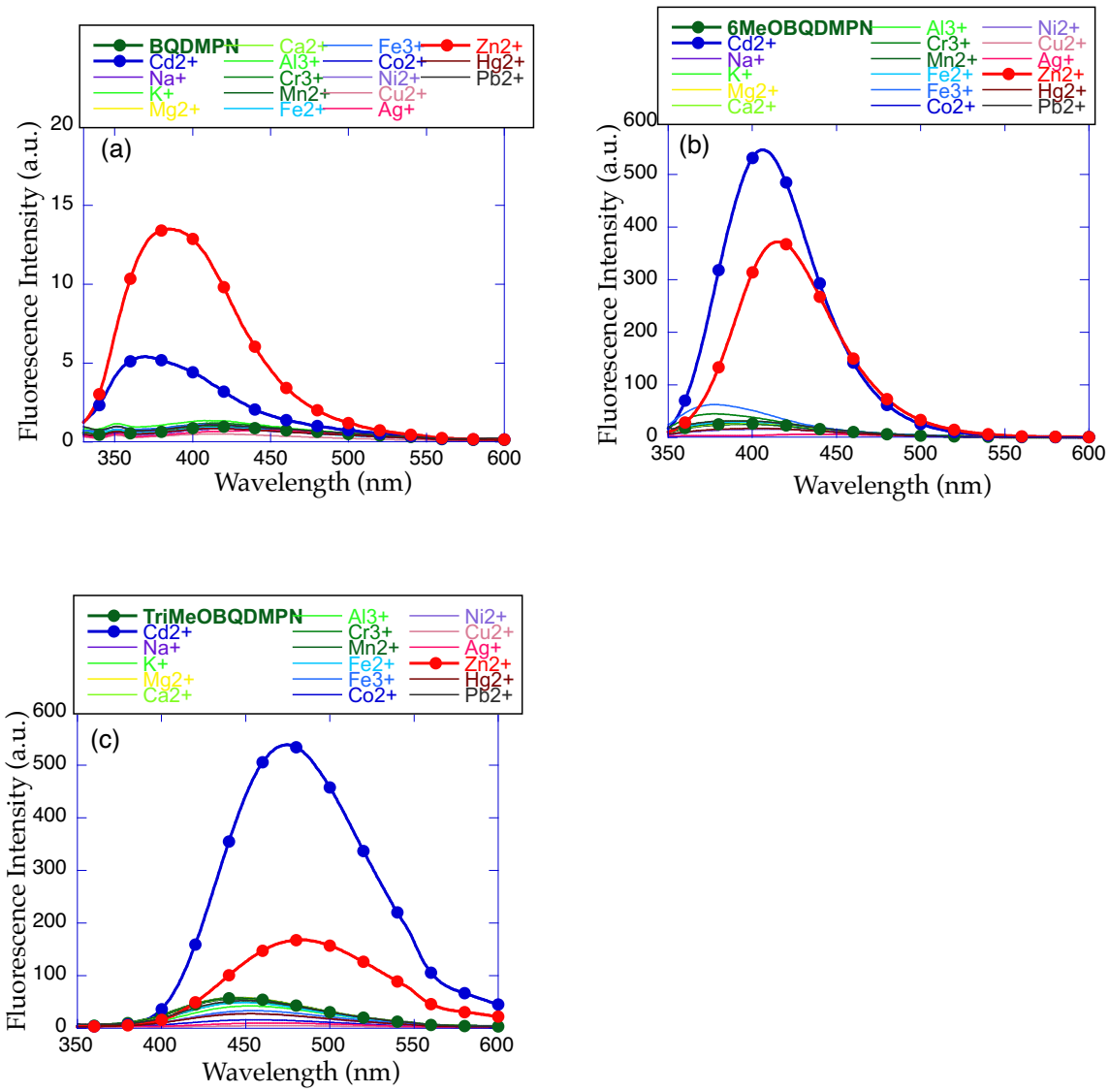
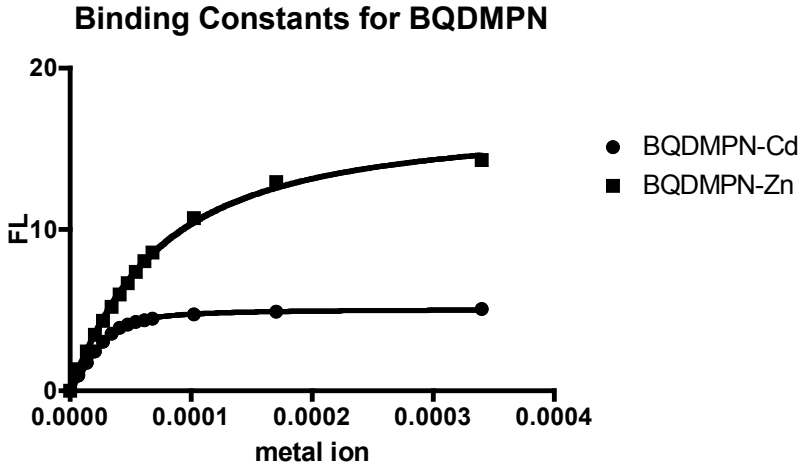


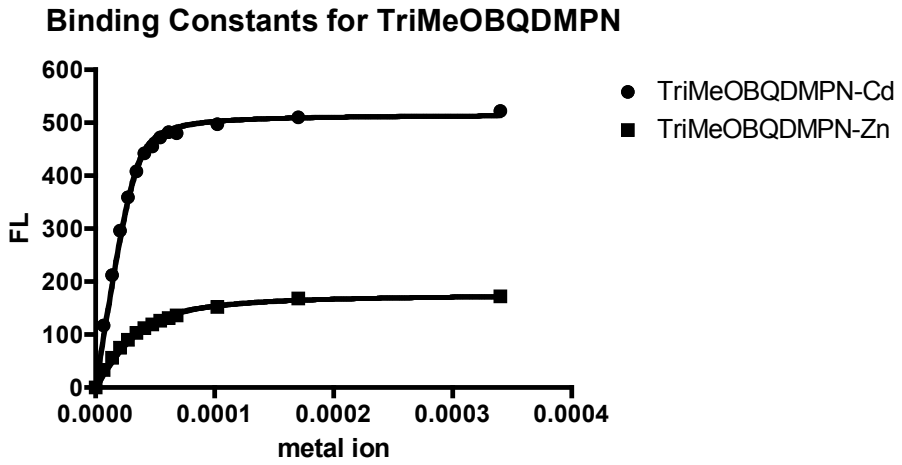
Fig. S7. Fluorescence spectra of 34 μM (a) BQDMPN (**4**) (λ_{ex} = 317 nm), (b) 6-MeOBQDMPN (**5**) (λ_{ex} = 341 nm) and (c) TriMeOBQDMPN (**6**) (λ_{ex} = 337 nm) in the presence of 1 equiv. of various metal ions in DMF-H_2O (1:1) at 25 °C.



metal ion	BQDMPN-Cd	BQDMPN-Zn
0.000000	0.00000	0.0000
0.000007	0.92822	1.3360
0.000014	1.73550	2.4308
0.000020	2.42120	3.4558
0.000027	3.02550	4.3261
0.000034	3.51830	5.1843
0.000041	3.89020	5.9545
0.000048	4.10260	6.6661
0.000054	4.27730	7.3535
0.000061	4.36640	8.0314
0.000068	4.46490	8.5568
0.000102	4.72370	10.6990
0.000170	4.89050	12.9330
0.000340	5.06100	14.2960

	BQDMPN-Cd	BQDMPN-Zn
zinc binding 2/7/2008		
Best-fit values		
BMAX	5.073	17.02
KD	4.7108e-006	5.1306e-005
L0	3.4000e-005	3.4000e-005
Std. Error		
BMAX	0.02865	0.2715
KD	2.2418e-007	2.2804e-006
95% Confidence Intervals		
BMAX	5.010 to 5.135	16.43 to 17.61
KD	4.2224e-006 to 5.1993e-006	4.6337e-005 to 5.6275e-005
Goodness of Fit		
Degrees of Freedom	12	12
R squared	0.9994	0.9983
Absolute Sum of Squares	0.01777	0.3965
Sy.x	0.03849	0.1818
Constraints		
L0	L0 = 3.4000e-005	L0 = 3.4000e-005
Data		
Number of X values	14	14
Number of Y replicates	1	1
Total number of values	14	14
Number of missing values	0	0

Fig. S8. Estimation of dissociation constants (K_d) for BQDMPN (**4**) with Cd^{2+} and Zn^{2+} in DMF-H_2O (1:1) at 25°C.



metal ion	TriMeOBQDMPN-Cd	TriMeOBQDMPN-Zn
0.000000	0.0000	0.0000
0.000007	116.9500	32.9210
0.000014	212.1400	55.7840
0.000020	295.5500	75.4120
0.000027	358.8000	89.8850
0.000034	408.0700	102.7200
0.000041	442.4900	111.7100
0.000048	455.1700	118.9300
0.000054	472.2800	125.8000
0.000061	482.0400	131.1000
0.000068	480.3600	136.4300
0.000102	497.0900	152.1600
0.000170	510.4000	168.1900
0.000340	522.0100	172.3400

	TriMeOBQDMPN-Cd	TriMeOBQDMPN-Zn
zinc binding 2/7/2008		
Best-fit values		
BMAX	515.7	177.6
KD	1.8164e-006	1.1125e-005
L0	3.4000e-005	3.4000e-005
Std. Error		
BMAX	7.412	3.770
KD	3.8540e-007	1.2650e-006
95% Confidence Intervals		
BMAX	499.6 to 531.9	169.4 to 185.8
KD	9.7658e-007 to 2.6562e-006	8.3684e-006 to 1.3881e-005
Goodness of Fit		
Degrees of Freedom	12	12
R squared	0.9952	0.9934
Absolute Sum of Squares	1642	215.7
Sy.x	11.70	4.240
Constraints		
L0	L0 = 3.4000e-005	L0 = 3.4000e-005
Data		
Number of X values	14	14
Number of Y replicates	1	1
Total number of values	14	14
Number of missing values	0	0

Fig. S9. Estimation of dissociation constants (K_d) for TriMeOBQDMPN (**6**) with Cd^{2+} and Zn^{2+} in DMF-H_2O (1:1) at 25°C.

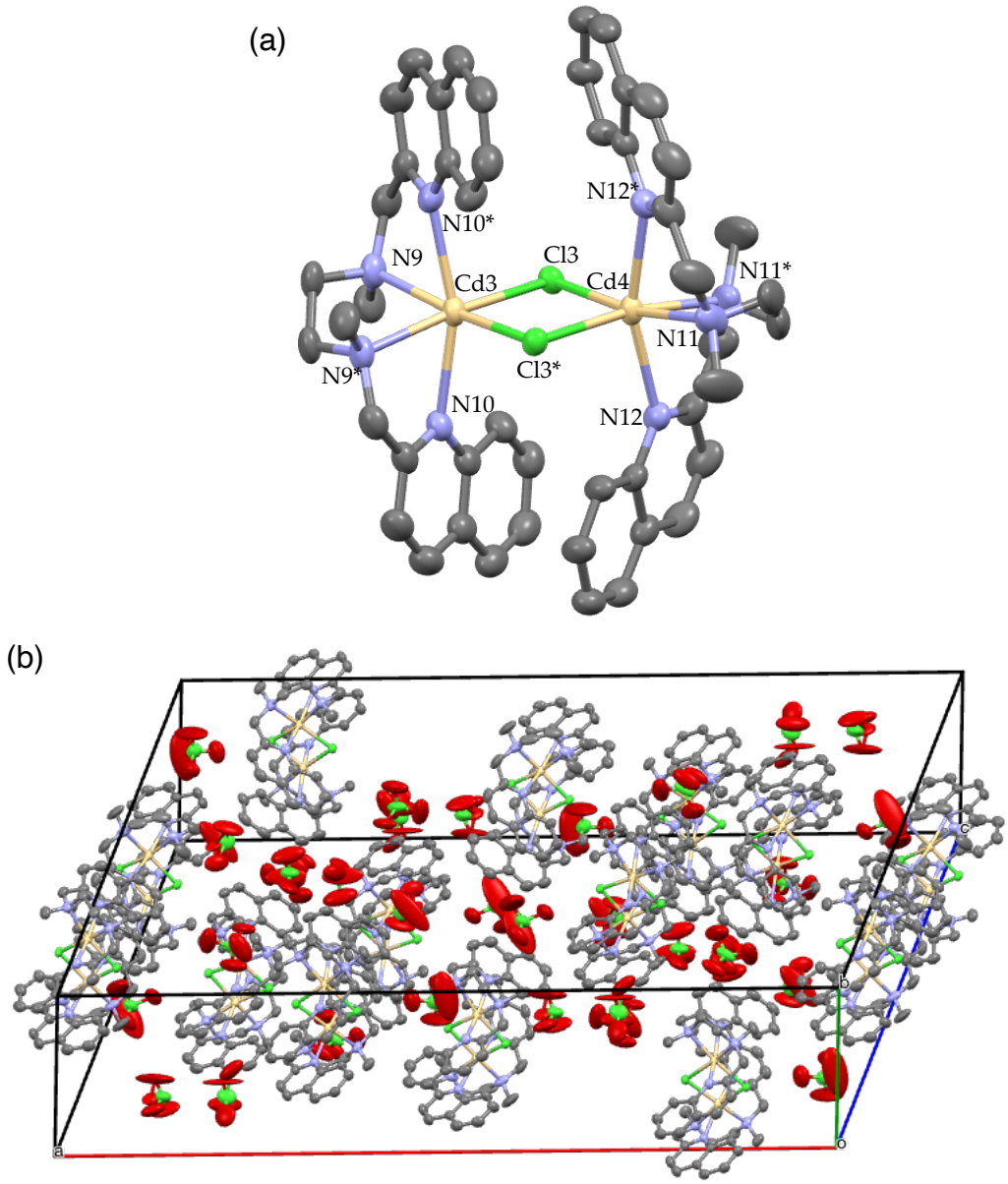


Fig. S10. (a) Perspective view of crystallographically independent molecule showing atom numbering (See also Fig. 4) for $[(\mu\text{-}Cl)_2Cd_2(BQDMEN)_2](ClO_4)_2$ with 50% probability. Hydrogen atoms and counter anions were omitted for clarity. Atoms with asterisks were generated by symmetry operation (-X+1, Y, -Z+1/2). (b) Unit cell packing.

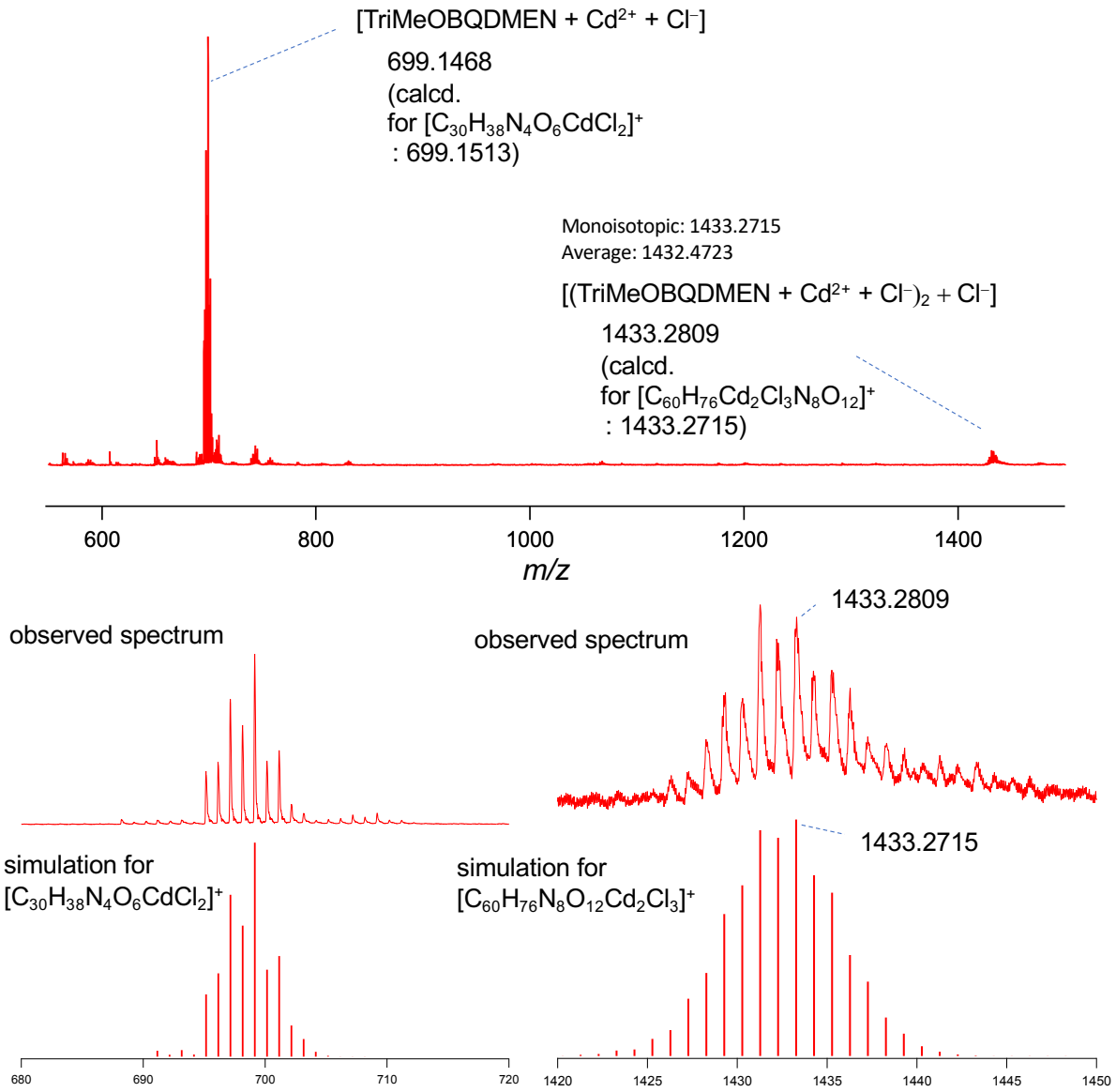
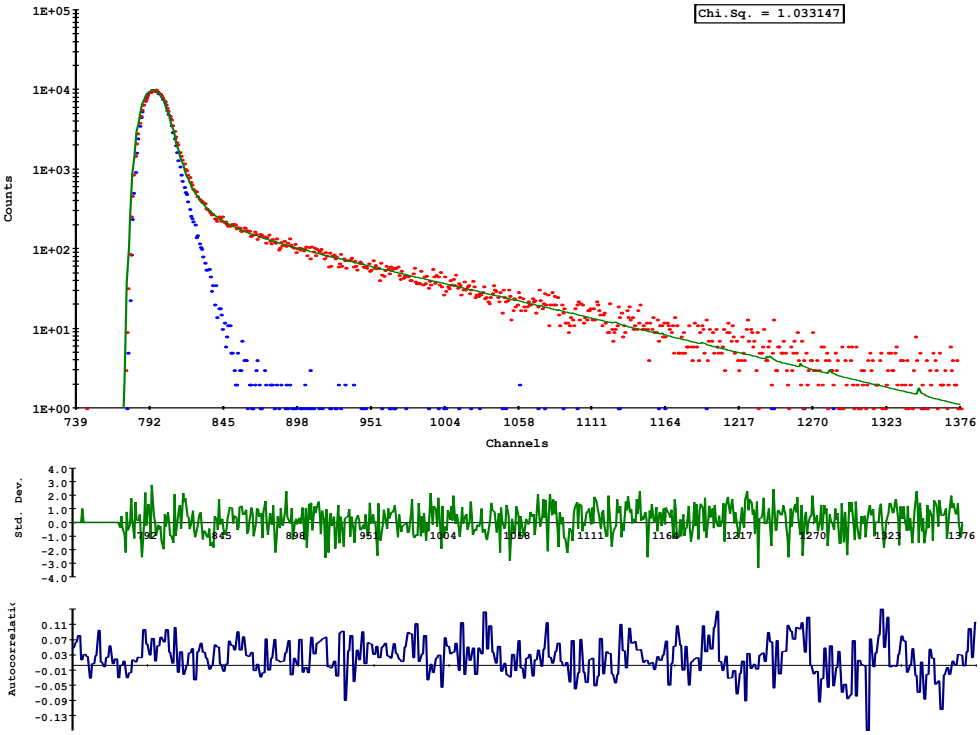


Fig. S11. ESI-MS spectrum of 34 μM TriMeOBQDMEN (**3**) in DMF-H_2O (1:1) in the presence of 3 equiv. of $Cd(ClO_4)_2$.

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Calculated using 3 exponentials

Prompt data : Prompt
Decay data : BQDMEN(370)

The initial paramters are:

 Shift Value = 0         ch;          0              sec
 Shift Limit = 40        ch;          2.194787E-09   sec

 T1 Estimate = 6.321533 ch;           3.468605E-10   sec
 T2 Estimate = 12.64307 ch;           6.937211E-10   sec
 T3 Estimate = 25.28613 ch;           1.387442E-09   sec

 A Free
 B1 Free
 B2 Free
 B3 Free

 Prompt and decay LO = 739    ch;    4.05487E-08    sec
 Prompt and decay HI = 1416   ch;    7.769547E-08   sec

 Background on prompt = 0
 Time calibration = 5.486969E-11 sec/ch

The fitted parameters are:

 Hi reduced to: 1376 ch

 SHIFT = -2.058854     ch;    -1.129687E-10 sec     S.Dev = 1.083906E-12  sec
 T1    = 19.9895       ch;    1.096817E-09  sec     S.Dev = 1.420633E-10  sec
 T2    = 2.572635      ch;    1.411597E-10  sec     S.Dev = 2.84237E-12   sec
 T3    = 106.7898      ch;    5.859523E-09  sec     S.Dev = 7.624264E-11  sec
 A     = -2.183464E-02                             S.Dev = 9.720971E-02
 B1    = 2.991585E-03  [ 4.25 Rel.Ampl][ 0.01 Alpha] S.Dev = 1.158314E-04
 B2    = 0.4696873     [ 85.97 Rel.Ampl][ 0.99 Alpha] S.Dev = 1.470682E-03
 B3    = 1.286851E-03  [ 9.78 Rel.Ampl][ 0.00 Alpha] S.Dev = 1.215098E-05
 Average Life Time = 1.627174E-10  sec
 CHISQ = 1.033147            [ 630 degrees of freedom ]

  Chi-squared Probability =   27.40336 percent
  Durbin-Watson Parameter =   1.906936
  Negative residuals      =   41.37931 percent
  Residuals < 1 s.dev     =   65.04702 percent
  Residuals < 2 s.dev     =   95.76803 percent
  Residuals < 3 s.dev     =   99.84326 percent
  Residuals < 4 s.dev     =        100 percent
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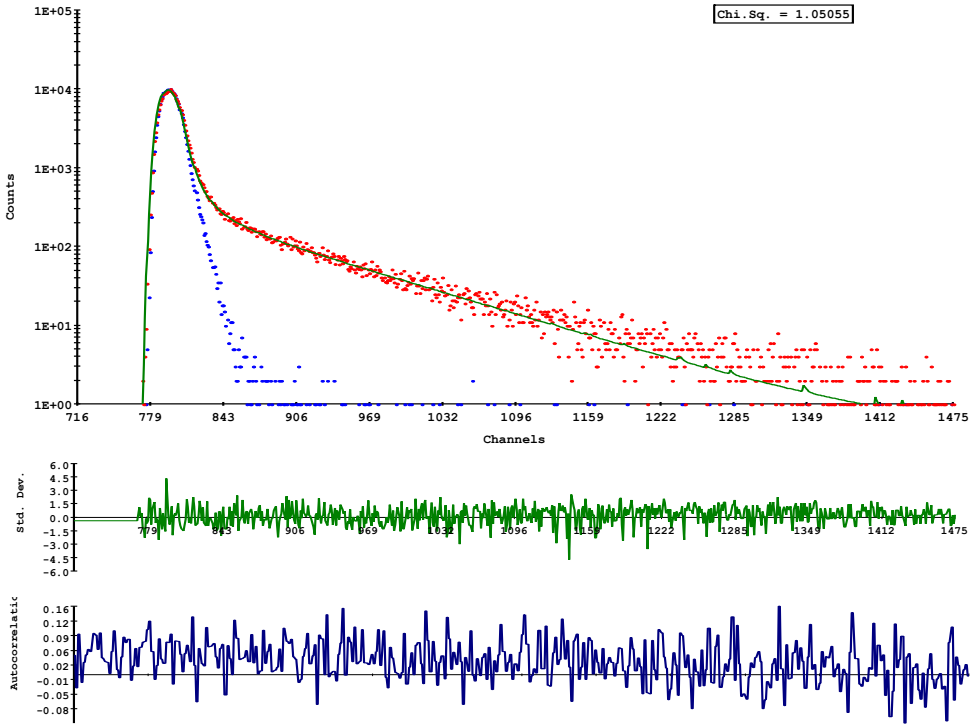
Fig. S12. Fluorescence lifetime measurement of 34 μM BQDMEN (**1**) in DMF-H_2O (1:1) with 370 nm bandpath filter (BPF) at 25 °C (λ_{ex} = 331 nm).

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Calculated using 3 exponentials

Prompt data : Prompt
Decay data : BQDMEN-Cd(370)

The initial paramters are:

 Shift Value = 0        ch;         0              sec
 Shift Limit = 40       ch;         2.194787E-09   sec

 T1 Estimate = 6.396973 ch;         3.509999E-10   sec
 T2 Estimate = 12.79395 ch;         7.019997E-10   sec
 T3 Estimate = 25.58789 ch;         1.403999E-09   sec

 A Free
 B1 Free
 B2 Free
 B3 Free

 Prompt and decay LO = 716    ch;    3.928669E-08   sec
 Prompt and decay HI = 1515   ch;    8.312757E-08   sec

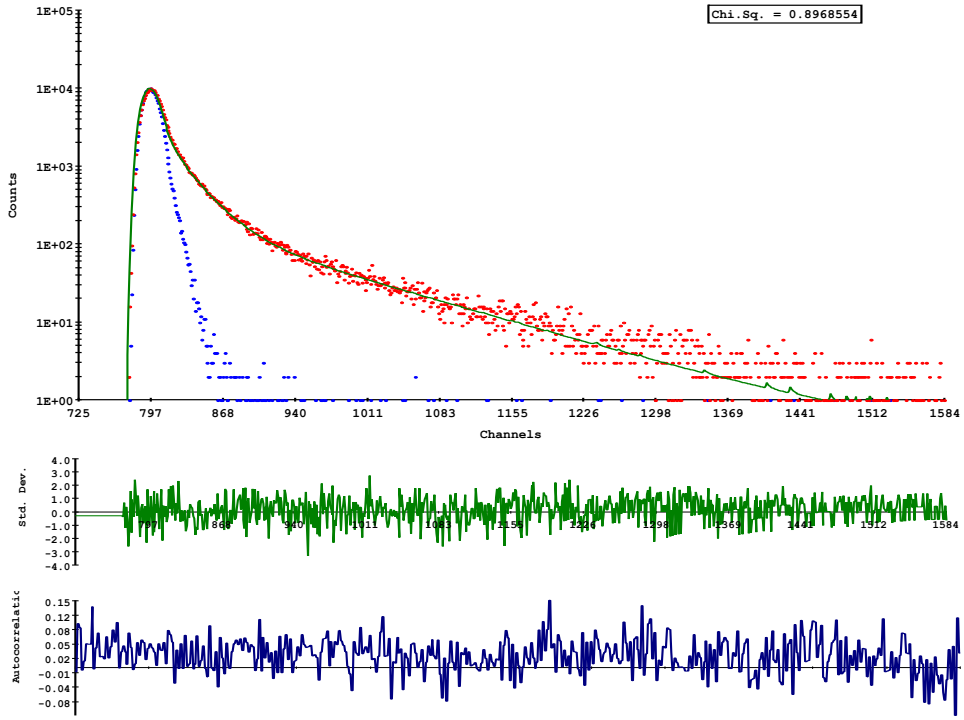
 Background on prompt = 0
 Time calibration = 5.486969E-11 sec/ch

The fitted parameters are:

 Hi reduced to: 1475 ch

 SHIFT = -2.154608     ch;    -1.182227E-10 sec     S.Dev = 1.090123E-12  sec
 T1    = 20.25125      ch;    1.11118E-09   sec     S.Dev = 1.446477E-10  sec
 T2    = 2.629027      ch;    1.442539E-10  sec     S.Dev = 3.138603E-12  sec
 T3    = 98.0094       ch;    5.377745E-09  sec     S.Dev = 6.644517E-11  sec
 A     = 0.3654477                                 S.Dev = 6.951313E-02
 B1    = 3.433938E-03  [ 5.02 Rel.Ampl][ 0.01 Alpha] S.Dev = 1.193745E-04
 B2    = 0.4459012     [ 84.67 Rel.Ampl][ 0.99 Alpha] S.Dev = 1.427966E-03
 B3    = 1.455953E-03  [ 10.31 Rel.Ampl][ 0.00 Alpha] S.Dev = 1.356757E-05
 Average Life Time = 1.685225E-10  sec
 CHISQ = 1.05055             [ 752 degrees of freedom ]
 Chi-squared Probability =   16.32303 percent
 Durbin-Watson Parameter =       1.91
 Negative residuals      =   43.55263 percent
 Residuals < 1 s.dev     =   67.89474 percent
 Residuals < 2 s.dev     =   95.26316 percent
 Residuals < 3 s.dev     =   99.47369 percent
 Residuals < 4 s.dev     =   99.73684 percent
```

Fig. S13. Fluorescence lifetime measurement of 34 μM BQDMEN (**1**) in the presence of 3 equiv. of Cd^{2+} in DMF-H_2O (1:1) with 370 nm bandpath filter (BPF) at 25 °C (λ_{ex} = 331 nm).




```
Calculated using 3 exponentials

Prompt data : Prompt
Decay data : BQDMEN-Zn(370)

The initial paramters are:

 Shift Value = 0        ch;          0              sec
 Shift Limit = 40       ch;          2.194787E-09   sec

 T1 Estimate = 8.863007 ch;          4.863104E-10   sec
 T2 Estimate = 17.72601 ch;          9.726208E-10   sec
 T3 Estimate = 35.45203 ch;          1.945242E-09   sec

 A Free
 B1 Free
 B2 Free
 B3 Free

 Prompt and decay LO = 725    ch;    3.978052E-08   sec
 Prompt and decay HI = 1624   ch;    8.910837E-08   sec

 Background on prompt = 0
 Time calibration = 5.486969E-11 sec/ch

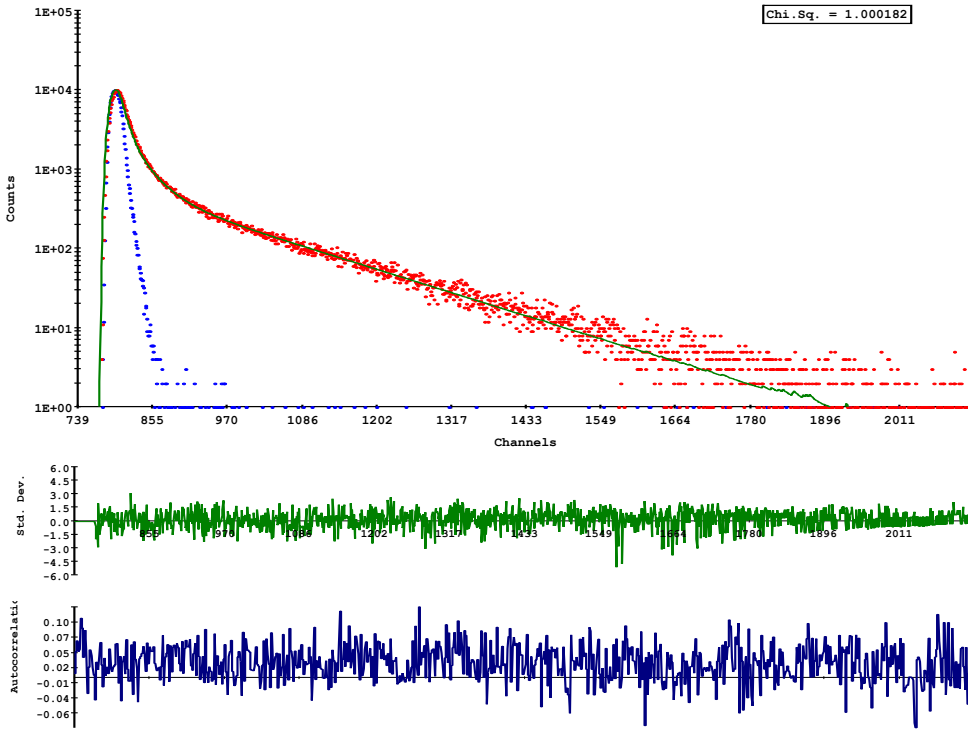
The fitted parameters are:

 Hi reduced to: 1584 ch

 SHIFT = -2.336813     ch;    -1.282202E-10 sec     S.Dev = 1.152248E-12  sec
 T1    = 24.58047      ch;    1.348723E-09  sec     S.Dev = 2.22951E-11   sec
 T2    = 2.97141       ch;    1.630403E-10  sec     S.Dev = 3.840044E-12  sec
 T3    = 116.0096      ch;    6.36541E-09   sec     S.Dev = 8.724914E-11  sec
 A     = 0.3002616                                 S.Dev = 6.465064E-02
 B1    = 1.716668E-02  [ 26.78 Rel.Ampl][ 0.05 Alpha] S.Dev = 1.232532E-04
 B2    = 0.3455937     [ 65.17 Rel.Ampl][ 0.95 Alpha] S.Dev = 1.276148E-03
 B3    = 1.094056E-03  [ 8.05 Rel.Ampl][ 0.00 Alpha] S.Dev = 1.184734E-05
 Average Life Time = 2.376305E-10  sec
 CHISQ = 0.8968554           [ 852 degrees of freedom ]

 Chi-squared Probability =    98.5757 percent
 Durbin-Watson Parameter =    2.01875
 Negative residuals      =   43.72093 percent
 Residuals < 1 s.dev     =   71.16279 percent
 Residuals < 2 s.dev     =    97.2093 percent
 Residuals < 3 s.dev     =   99.88372 percent
 Residuals < 4 s.dev     =        100 percent
```

Fig. S14. Fluorescence lifetime measurement of 34 μM BQDMEN (**1**) in the presence of 3 equiv. of Zn^{2+} in DMF-H_2O (1:1) with 370 nm bandpath filter (BPF) at 25 °C (λ_{ex} = 331 nm).




```
Calculated using 3 exponentials

Prompt data : Prompt
Decay data : 6MeOBQDMEN(400)

The initial paramters are:

 Shift Value = 0        ch;          0              sec
 Shift Limit = 40       ch;          2.194787E-09   sec

 T1 Estimate = 26.065   ch;          1.430179E-09   sec
 T2 Estimate = 52.13    ch;          2.860357E-09   sec
 T3 Estimate = 104.26   ch;          5.720714E-09   sec

 A Free
 B1 Free
 B2 Free
 B3 Free

 Prompt and decay LO = 739    ch;    4.05487E-08    sec
 Prompt and decay HI = 2167   ch;    1.189026E-07   sec

 Background on prompt = 0
 Time calibration = 5.486969E-11 sec/ch

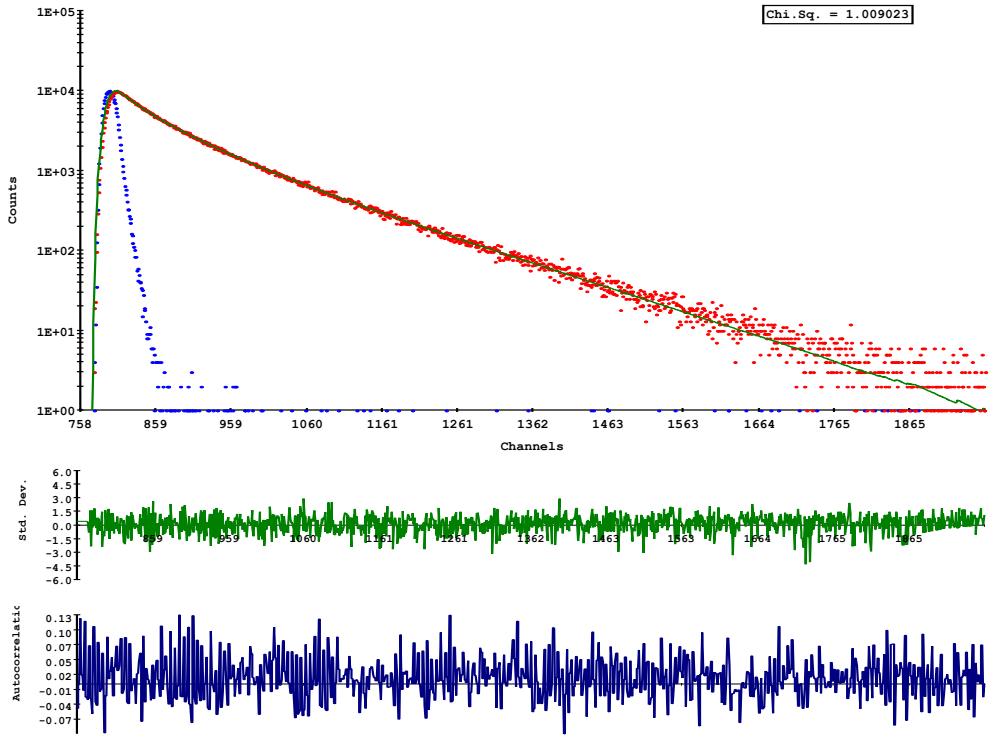
The fitted parameters are:

 Hi reduced to: 2127 ch

 SHIFT = -3.890543     ch;    -2.134729E-10 sec     S.Dev = 1.494274E-12  sec
 T1    = 30.32877      ch;    1.66413E-09   sec     S.Dev = 4.721755E-11  sec
 T2    = 8.101191      ch;    4.445098E-10  sec     S.Dev = 6.387385E-12  sec
 T3    = 170.5184      ch;    9.356294E-09  sec     S.Dev = 5.271822E-11  sec
 A     = 6.281438E-02                              S.Dev = 5.216248E-02
 B1    = 0.0187077     [ 27.18 Rel.Ampl][ 0.13 Alpha] S.Dev = 1.543823E-04
 B2    = 0.1252533     [ 48.62 Rel.Ampl][ 0.85 Alpha] S.Dev = 5.516689E-04
 B3    = 2.962186E-03  [ 24.20 Rel.Ampl][ 0.02 Alpha] S.Dev = 1.38906E-05
 Average Life Time = 7.794783E-10  sec
 CHISQ = 1.000182           [ 1381 degrees of freedom ]

 Chi-squared Probability =   49.30325 percent
 Durbin-Watson Parameter =   1.986441
 Negative residuals      =   41.82866 percent
 Residuals < 1 s.dev     =   69.11447 percent
 Residuals < 2 s.dev     =   95.89633 percent
 Residuals < 3 s.dev     =   99.42405 percent
 Residuals < 4 s.dev     =   99.85601 percent
```

Fig. S15. Fluorescence lifetime measurement of 34 μM 6-MeOBQDMEN (**2**) in DMF-H_2O (1:1) with 400 nm bandpath filter (BPF) at 25 °C (λ_{ex} = 331 nm).




```
Calculated using 3 exponentials

Prompt data : Prompt
Decay data : 6MeOBQDMEN+Cd(400)

The initial paramters are:

 Shift Value = 0        ch;         0              sec
 Shift Limit = 40       ch;         2.194787E-09   sec

 T1 Estimate = 47.91016 ch;         2.628815E-09   sec
 T2 Estimate = 95.82031 ch;         5.25763E-09    sec
 T3 Estimate = 191.6406 ch;         1.051526E-08   sec

 A Free
 B1 Free
 B2 Free
 B3 Free

 Prompt and decay LO = 758    ch;    4.159122E-08   sec
 Prompt and decay HI = 2006   ch;    1.100686E-07   sec

 Background on prompt = 0
 Time calibration = 5.486969E-11 sec/ch

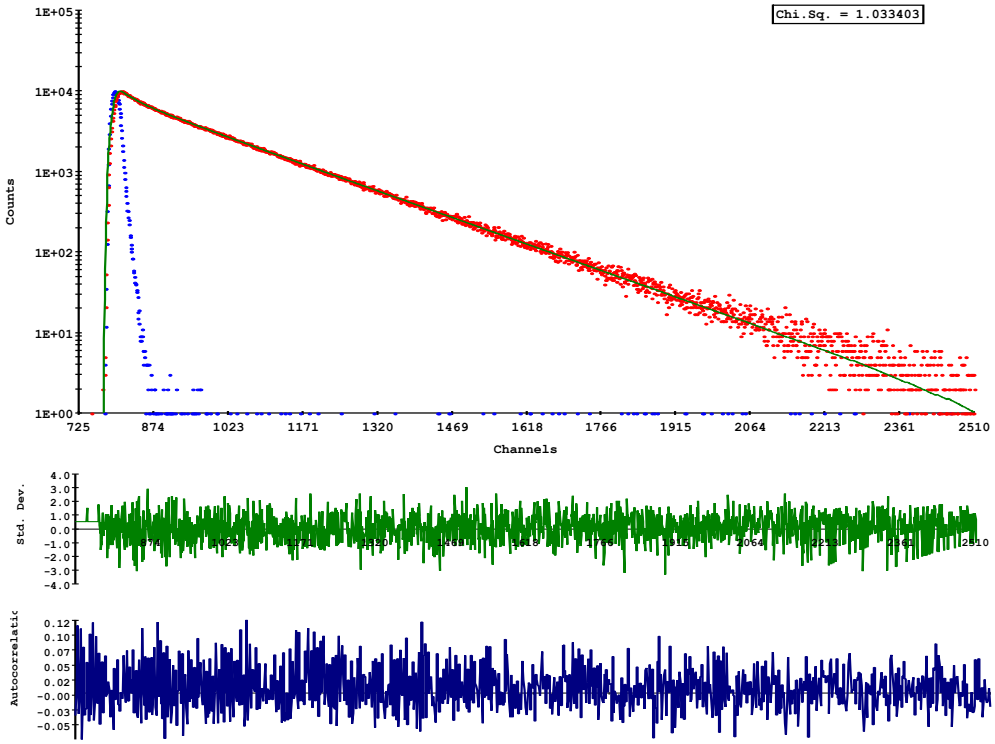
The fitted parameters are:

 Hi reduced to: 1966 ch

 SHIFT = -3.009        ch;    -1.651029E-10 sec     S.Dev = 1.874002E-12  sec
 T1    = 63.20514      ch;    3.468046E-09  sec     S.Dev = 1.135419E-10  sec
 T2    = 19.66989      ch;    1.079281E-09  sec     S.Dev = 4.894529E-11  sec
 T3    = 145.0516      ch;    7.958933E-09  sec     S.Dev = 3.371416E-11  sec
 A     = -0.372374                                 S.Dev = 8.383728E-02
 B1    = 3.281699E-02  [ 41.63 Rel.Ampl][ 0.46 Alpha] S.Dev = 2.132983E-04
 B2    = 2.075356E-02  [ 8.19 Rel.Ampl][ 0.29 Alpha] S.Dev = 3.579872E-04
 B3    = 0.0172335     [ 50.17 Rel.Ampl][ 0.24 Alpha] S.Dev = 6.107619E-05
 Average Life Time = 3.860938E-09  sec
 CHISQ = 1.009023            [ 1201 degrees of freedom ]

Chi-squared Probability =   40.75129 percent
Durbin-Watson Parameter =   2.095915
Negative residuals      =   40.94293 percent
Residuals < 1 s.dev     =   68.81721 percent
Residuals < 2 s.dev     =   95.94707 percent
Residuals < 3 s.dev     =   99.58643 percent
Residuals < 4 s.dev     =   99.83457 percent
```

Fig. S16. Fluorescence lifetime measurement of 34 μM 6-MeOBQDMEN (**2**) in the presence of 3 equiv. of Cd^{2+} in DMF-H_2O (1:1) with 400 nm bandpath filter (BPF) at 25 °C (λ_{ex} = 331 nm).




```
Calculated using 3 exponentials

Prompt data : Prompt
Decay data : 6MeOBQDMEN+Zn(400)

The initial paramters are:

 Shift Value = 0        ch;          0              sec
 Shift Limit = 40       ch;          2.194787E-09   sec

 T1 Estimate = 90.2103  ch;          4.949811E-09   sec
 T2 Estimate = 180.4206 ch;          9.899622E-09   sec
 T3 Estimate = 360.8412 ch;          1.979924E-08   sec

 A Free
 B1 Free
 B2 Free
 B3 Free

 Prompt and decay LO = 725    ch;    3.978052E-08   sec
 Prompt and decay HI = 2550   ch;    1.399177E-07   sec

 Background on prompt = 0
 Time calibration = 5.486969E-11 sec/ch

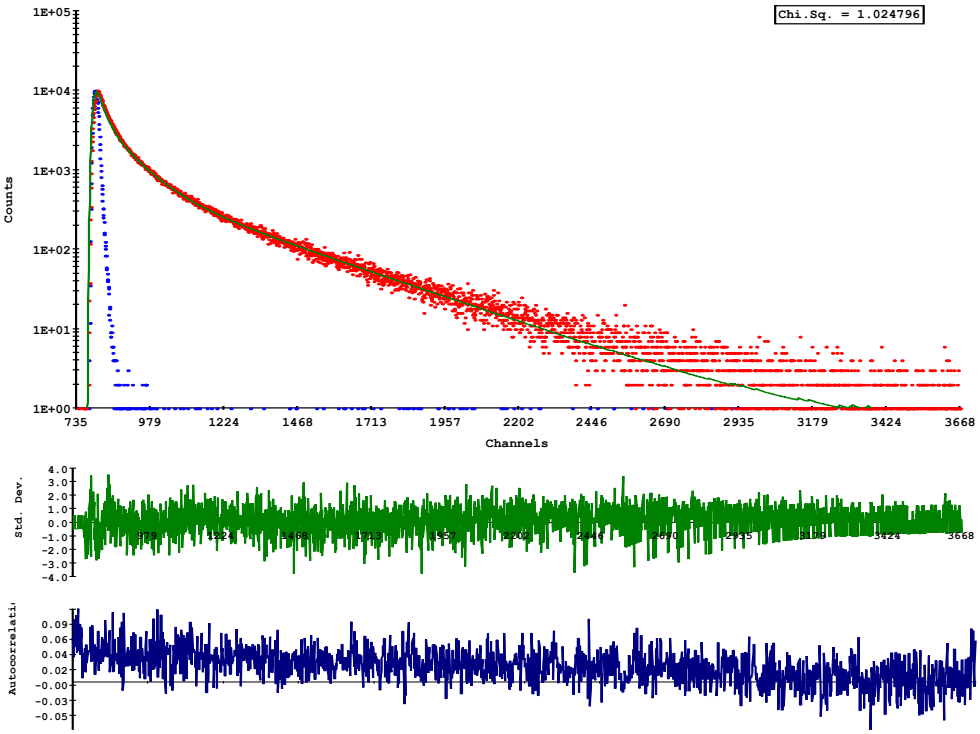
The fitted parameters are:

 Hi reduced to: 2510 ch

 SHIFT = -2.716218     ch;    -1.49038E-10  sec     S.Dev = 1.961694E-12  sec
 T1    = 81.62655      ch;    4.478823E-09  sec     S.Dev = 7.581209E-10  sec
 T2    = 196.2167      ch;    1.076635E-08  sec     S.Dev = 2.363335E-11  sec
 T3    = 22.98573      ch;    1.26122E-09   sec     S.Dev = 5.844236E-11  sec
 A     = -0.5201862                                 S.Dev = 7.006758E-02
 B1    = 4.838324E-03  [ 4.39 Rel.Ampl][ 0.08 Alpha] S.Dev = 2.137139E-04
 B2    = 4.181635E-02  [ 91.15 Rel.Ampl][ 0.65 Alpha] S.Dev = 7.030841E-05
 B3    = 1.749571E-02  [ 4.47 Rel.Ampl][ 0.27 Alpha] S.Dev = 3.323509E-04
 Average Life Time = 7.699802E-09  sec
 CHISQ = 1.033403            [ 1778 degrees of freedom ]

 Chi-squared Probability =   15.95741 percent
 Durbin-Watson Parameter =   2.074491
 Negative residuals      =   42.94513 percent
 Residuals < 1 s.dev     =   65.84547 percent
 Residuals < 2 s.dev     =   95.35275 percent
 Residuals < 3 s.dev     =   99.60806 percent
 Residuals < 4 s.dev     =         100 percent
```

Fig. S17. Fluorescence lifetime measurement of 34 μM 6-MeOBQDMEN (**2**) in the presence of 3 equiv. of Zn^{2+} in DMF-H_2O (1:1) with 400 nm bandpath filter (BPF) at 25 °C (λ_{ex} = 331 nm).




```
Calculated using 3 exponentials

Prompt data : Prompt
Decay data : TriMeOBQDMEN(460)

The initial paramters are:

 Shift Value = 0         ch;          0              sec
 Shift Limit = 40        ch;          2.194787E-09   sec

 T1 Estimate = 71.69888 ch;           3.934095E-09   sec
 T2 Estimate = 143.3978 ch;           7.868191E-09   sec
 T3 Estimate = 286.7955 ch;           1.573638E-08   sec

 A Free
 B1 Free
 B2 Free
 B3 Free

 Prompt and decay LO = 735    ch;    4.032922E-08   sec
 Prompt and decay HI = 3708   ch;    2.034568E-07   sec

 Background on prompt = 0
 Time calibration = 5.486969E-11 sec/ch

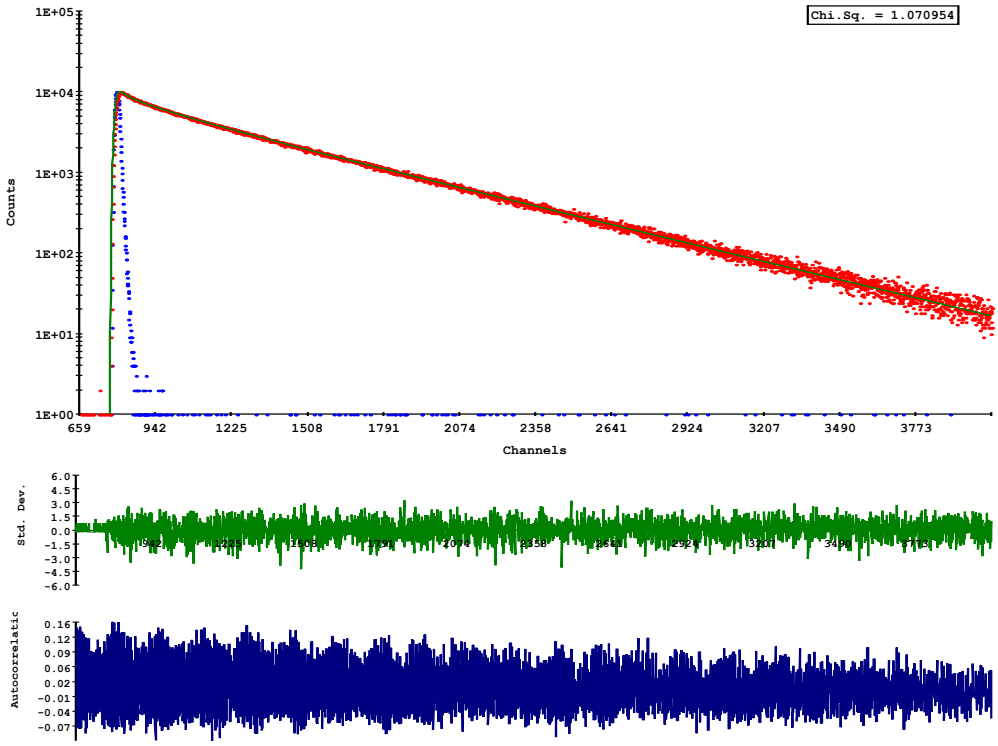
The fitted parameters are:

 Hi reduced to: 3668 ch

 SHIFT = -3.323519     ch;    -1.823605E-10 sec     S.Dev = 1.500537E-12  sec
 T1    = 84.96255      ch;    4.661868E-09  sec     S.Dev = 6.951915E-11  sec
 T2    = 21.45439      ch;    1.177195E-09  sec     S.Dev = 1.299422E-11  sec
 T3    = 331.8786      ch;    1.821007E-08  sec     S.Dev = 7.218948E-11  sec
 A     = 0.5093214                                 S.Dev = 3.690384E-02
 B1    = 2.175961E-02  [ 42.48 Rel.Ampl][ 0.27 Alpha] S.Dev = 8.823608E-05
 B2    = 5.341699E-02  [ 26.33 Rel.Ampl][ 0.67 Alpha] S.Dev = 2.534038E-04
 B3    = 4.089027E-03  [ 31.18 Rel.Ampl][ 0.05 Alpha] S.Dev = 1.343116E-05
 Average Life Time = 3.012455E-09  sec
 CHISQ = 1.024796           [ 2926 degrees of freedom ]

 Chi-squared Probability =   17.12076 percent
 Durbin-Watson Parameter =   1.872714
 Negative residuals      =   41.95638 percent
 Residuals < 1 s.dev     =   67.75732 percent
 Residuals < 2 s.dev     =   95.60327 percent
 Residuals < 3 s.dev     =   99.62508 percent
 Residuals < 4 s.dev     =         100 percent
```

Fig. S18. Fluorescence lifetime measurement of 34 μM TriMeOBQDMEN (**3**) in DMF-H_2O (1:1) with 460 nm bandpath filter (BPF) at 25 °C (λ_{ex} = 331 nm).




```
Calculated using 3 exponentials

Prompt data : Prompt
Decay data : TriMeOBQDMEN+Cd(460)

The initial paramters are:

 Shift Value = 0        ch;          0              sec
 Shift Limit = 40       ch;          2.194787E-09   sec

 T1 Estimate = 235.1392 ch;          1.290202E-08   sec
 T2 Estimate = 470.2784 ch;          2.580403E-08   sec
 T3 Estimate = 940.5569 ch;          5.160806E-08   sec

 A Free
 B1 Free
 B2 Free
 B3 Free

 Prompt and decay LO = 659    ch;    3.615912E-08   sec
 Prompt and decay HI = 4096   ch;    2.247462E-07   sec

 Background on prompt = 0
 Time calibration = 5.486969E-11 sec/ch

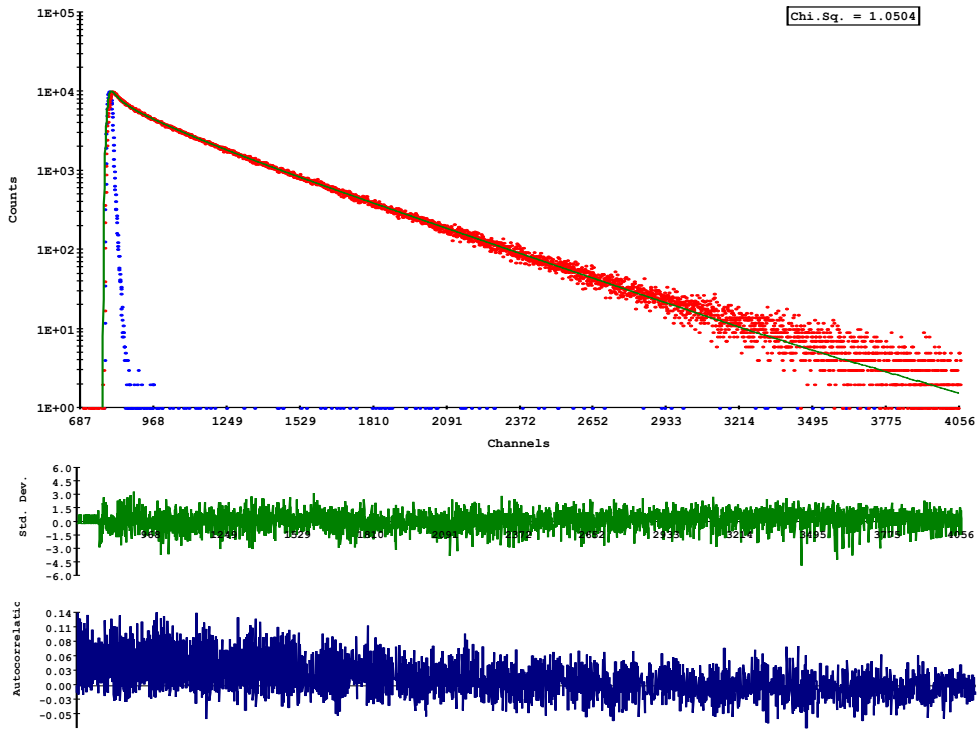
The fitted parameters are:

 Hi reduced to: 4056 ch

 SHIFT = -4.005629     ch;    -2.197876E-10 sec     S.Dev = 1.708427E-12  sec
 T1    = 196.6236      ch;    1.078867E-08  sec     S.Dev = 3.835714E-10  sec
 T2    = 536.0114      ch;    2.941078E-08  sec     S.Dev = 3.744392E-11  sec
 T3    = 38.75535      ch;    2.126494E-09  sec     S.Dev = 9.225194E-11  sec
 A     = 0.2298146                                 S.Dev = 8.424354E-02
 B1    = 1.164026E-02  [ 10.66 Rel.Ampl][ 0.20 Alpha] S.Dev = 1.038497E-04
 B2    = 3.504145E-02  [ 87.46 Rel.Ampl][ 0.61 Alpha] S.Dev = 3.462121E-05
 B3    = 1.045492E-02  [ 1.89 Rel.Ampl][ 0.18 Alpha] S.Dev = 1.99125E-04
 Average Life Time = 2.062445E-08  sec
 CHISQ = 1.070954            [ 3390 degrees of freedom ]

 Chi-squared Probability =  0.2099041 percent
 Durbin-Watson Parameter =   2.129112
 Negative residuals      =   47.93996 percent
 Residuals < 1 s.dev     =   66.53914 percent
 Residuals < 2 s.dev     =   94.73219 percent
 Residuals < 3 s.dev     =   99.67628 percent
 Residuals < 4 s.dev     =   99.94114 percent
```

Fig. S19. Fluorescence lifetime measurement of 34 μM TriMeOBQDMEN (**3**) in the presence of 3 equiv. of Cd^{2+} in DMF-H_2O (1:1) with 460 nm bandpath filter (BPF) at 25 °C (λ_{ex} = 331 nm).




```
Calculated using 3 exponentials

Prompt data : Prompt
Decay data : TriMeOBQDMEN+Zn(460)

The initial paramters are:

 Shift Value = 0        ch;          0              sec
 Shift Limit = 40       ch;          2.194787E-09   sec

 T1 Estimate = 158.8361 ch;          8.715284E-09   sec
 T2 Estimate = 317.6721 ch;          1.743057E-08   sec
 T3 Estimate = 635.3442 ch;          3.486114E-08   sec

 A Free
 B1 Free
 B2 Free
 B3 Free

 Prompt and decay LO = 687    ch;    3.769548E-08   sec
 Prompt and decay HI = 4096   ch;    2.247462E-07   sec

 Background on prompt = 0
 Time calibration = 5.486969E-11 sec/ch

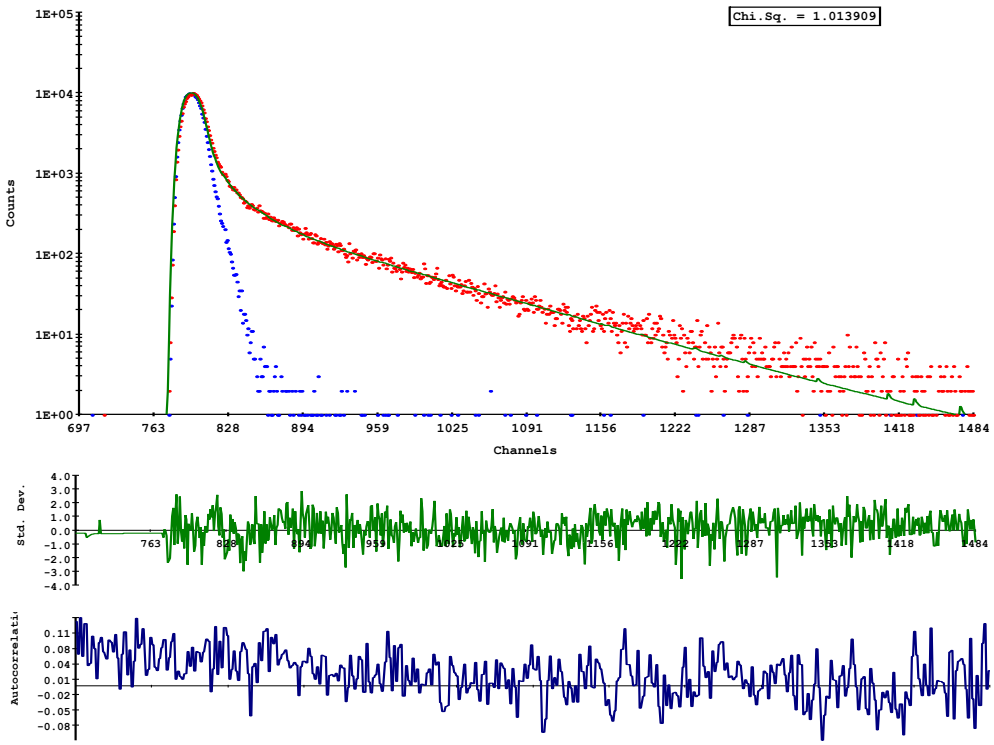
The fitted parameters are:

 Hi reduced to: 4056 ch

 SHIFT = -3.575563     ch;    -1.9619E-10   sec     S.Dev = 1.766694E-12  sec
 T1    = 157.0574      ch;    8.617693E-09  sec     S.Dev = 3.452446E-10  sec
 T2    = 384.715       ch;    2.110919E-08  sec     S.Dev = 3.870911E-11  sec
 T3    = 28.31529      ch;    1.553651E-09  sec     S.Dev = 4.039898E-11  sec
 A     = 0.2480554                                  S.Dev = 0.0529433
 B1    = 1.561505E-02  [ 18.44 Rel.Ampl][ 0.24 Alpha] S.Dev = 1.075282E-04
 B2    = 2.660358E-02  [ 76.96 Rel.Ampl][ 0.42 Alpha] S.Dev = 3.846521E-05
 B3    = 2.157576E-02  [ 4.59 Rel.Ampl][ 0.34 Alpha] S.Dev = 2.260056E-04
 Average Life Time = 1.143779E-08  sec
 CHISQ = 1.0504              [ 3362 degrees of freedom ]

Chi-squared Probability =   2.063783 percent
Durbin-Watson Parameter =   2.024117
Negative residuals      =   44.33234 percent
Residuals < 1 s.dev     =   67.12166 percent
Residuals < 2 s.dev     =   95.04451 percent
Residuals < 3 s.dev     =   99.52522 percent
Residuals < 4 s.dev     =   99.94065 percent
```

Fig. S20. Fluorescence lifetime measurement of 34 μM TriMeOBQDMEN (**3**) in the presence of 3 equiv. of Zn^{2+} in DMF-H_2O (1:1) with 460 nm bandpath filter (BPF) at 25 °C (λ_{ex} = 331 nm).




```
Calculated using 3 exponentials

Prompt data : Prompt
Decay data : BQDMPN(370)

The initial paramters are:

 Shift Value = 0        ch;          0              sec
 Shift Limit = 40       ch;          2.194787E-09   sec

 T1 Estimate = 10.12097 ch;          5.553346E-10   sec
 T2 Estimate = 20.24194 ch;          1.110669E-09   sec
 T3 Estimate = 40.48389 ch;          2.221338E-09   sec

 A Free
 B1 Free
 B2 Free
 B3 Free

 Prompt and decay LO = 697    ch;    3.824417E-08   sec
 Prompt and decay HI = 1524   ch;    8.36214E-08    sec

 Background on prompt = 1.298701E-02
 Time calibration = 5.486969E-11 sec/ch

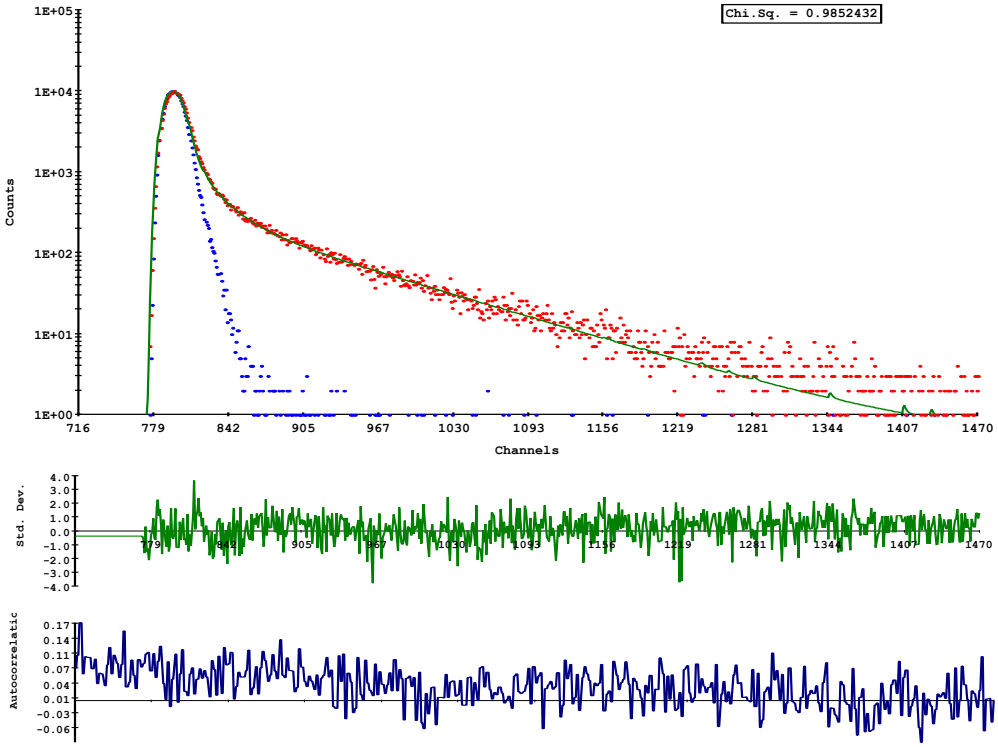
The fitted parameters are:

 Hi reduced to: 1484 ch

 SHIFT = -0.8064182    ch;    -4.424791E-11 sec     S.Dev = 1.210901E-12  sec
 T1    = 25.43094      ch;    1.395388E-09  sec     S.Dev = 6.649837E-11  sec
 T2    = 2.203921      ch;    1.209284E-10  sec     S.Dev = 5.048008E-12  sec
 T3    = 109.8176      ch;    6.025657E-09  sec     S.Dev = 6.593334E-11  sec
 A     = 0.2356746                                 S.Dev = 7.477585E-02
 B1    = 6.829942E-03  [ 11.11 Rel.Ampl][ 0.01 Alpha] S.Dev = 1.016135E-04
 B2    = 0.5451438     [ 76.82 Rel.Ampl][ 0.98 Alpha] S.Dev = 0.0017402
 B3    = 1.720164E-03  [ 12.08 Rel.Ampl][ 0.00 Alpha] S.Dev = 1.45503E-05
 Average Life Time = 1.549934E-10  sec
 CHISQ = 1.013909            [ 780 degrees of freedom ]

 Chi-squared Probability =    38.5802 percent
 Durbin-Watson Parameter =   1.741592
 Negative residuals      =    46.5736 percent
 Residuals < 1 s.dev     =   68.65482 percent
 Residuals < 2 s.dev     =   95.17767 percent
 Residuals < 3 s.dev     =   99.61929 percent
 Residuals < 4 s.dev     =        100 percent
```

Fig. S21. Fluorescence lifetime measurement of 34 μM BQDMPN (**4**) in DMF-H_2O (1:1) with 370 nm bandpath filter (BPF) at 25 °C (λ_{ex} = 331 nm).




```
Calculated using 3 exponentials

Prompt data : Prompt
Decay data : BDQMPN-Cd(370)

The initial paramters are:

 Shift Value = 0        ch;          0              sec
 Shift Limit = 40       ch;          2.194787E-09   sec

 T1 Estimate = 6.74707  ch;          3.702096E-10   sec
 T2 Estimate = 13.49414 ch;          7.404192E-10   sec
 T3 Estimate = 26.98828 ch;          1.480838E-09   sec

 A Free
 B1 Free
 B2 Free
 B3 Free

 Prompt and decay LO = 716    ch;    3.928669E-08   sec
 Prompt and decay HI = 1510   ch;    8.285323E-08   sec

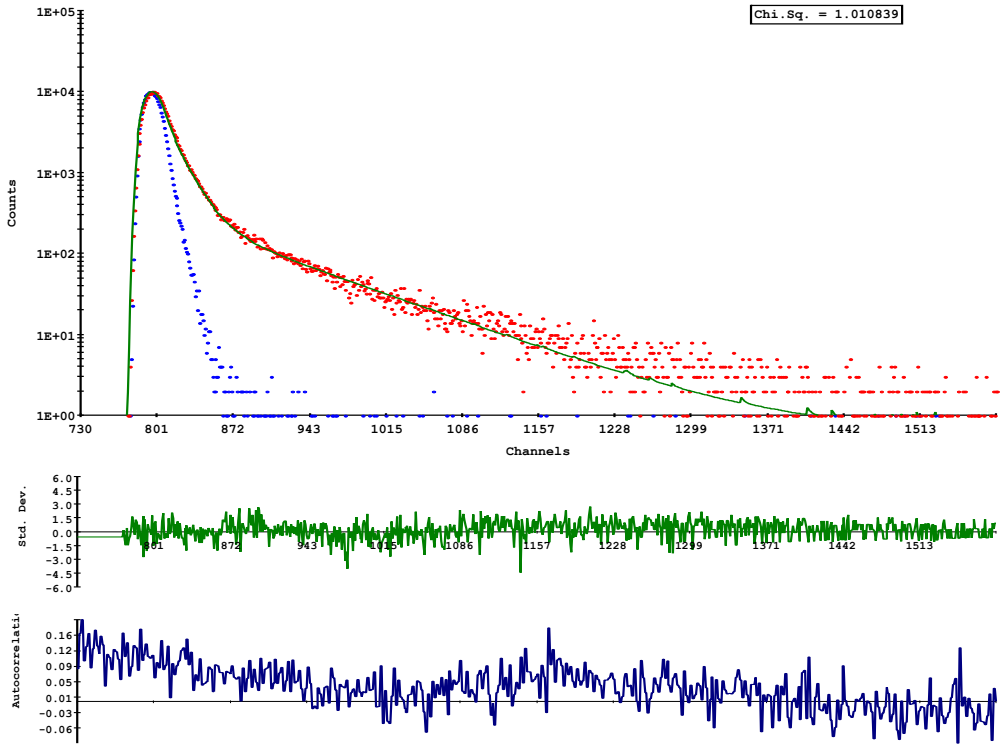
 Background on prompt = 0
 Time calibration = 5.486969E-11 sec/ch

The fitted parameters are:

 Hi reduced to: 1470 ch

 SHIFT = -1.578295     ch;    -8.660053E-11 sec     S.Dev = 1.178928E-12  sec
 T1    = 21.4226       ch;    1.175451E-09  sec     S.Dev = 6.20445E-11   sec
 T2    = 2.451454      ch;    1.345105E-10  sec     S.Dev = 4.269618E-12  sec
 T3    = 98.02299      ch;    5.378491E-09  sec     S.Dev = 6.347883E-11  sec
 A     = 0.3975971                                 S.Dev = 7.349046E-02
 B1    = 7.712066E-03  [ 11.10 Rel.Ampl][ 0.02 Alpha] S.Dev = 1.257634E-04
 B2    = 0.4739313     [ 78.07 Rel.Ampl][ 0.98 Alpha] S.Dev = 1.579873E-03
 B3    = 1.644304E-03  [ 10.83 Rel.Ampl][ 0.00 Alpha] S.Dev = 1.495702E-05
 Average Life Time = 1.689631E-10  sec
 CHISQ = 0.9852432           [ 747 degrees of freedom ]
 Chi-squared Probability =    60.60946 percent
 Durbin-Watson Parameter =      1.8493
 Negative residuals      =    44.10596 percent
 Residuals < 1 s.dev     =    68.60927 percent
 Residuals < 2 s.dev     =    95.89404 percent
 Residuals < 3 s.dev     =     99.4702 percent
 Residuals < 4 s.dev     =         100 percent
```

Fig. S22. Fluorescence lifetime measurement of 34 μM BQDMPN (**4**) in the presence of 3 equiv. of Cd^{2+} in DMF-H_2O (1:1) with 370 nm bandpath filter (BPF) at 25 °C (λ_{ex} = 331 nm).




```
Calculated using 3 exponentials

Prompt data : Prompt
Decay data : BQDMPN-Zn(370)

The initial paramters are:

 Shift Value = 0         ch;          0              sec
 Shift Limit = 40        ch;          2.194787E-09   sec

 T1 Estimate = 7.302277 ch;           4.006736E-10   sec
 T2 Estimate = 14.60455 ch;           8.013472E-10   sec
 T3 Estimate = 29.20911 ch;           1.602694E-09   sec

 A Free
 B1 Free
 B2 Free
 B3 Free

 Prompt and decay LO = 730    ch;     4.005487E-08   sec
 Prompt and decay HI = 1624   ch;     8.910837E-08   sec

 Background on prompt = 0
 Time calibration = 5.486969E-11 sec/ch

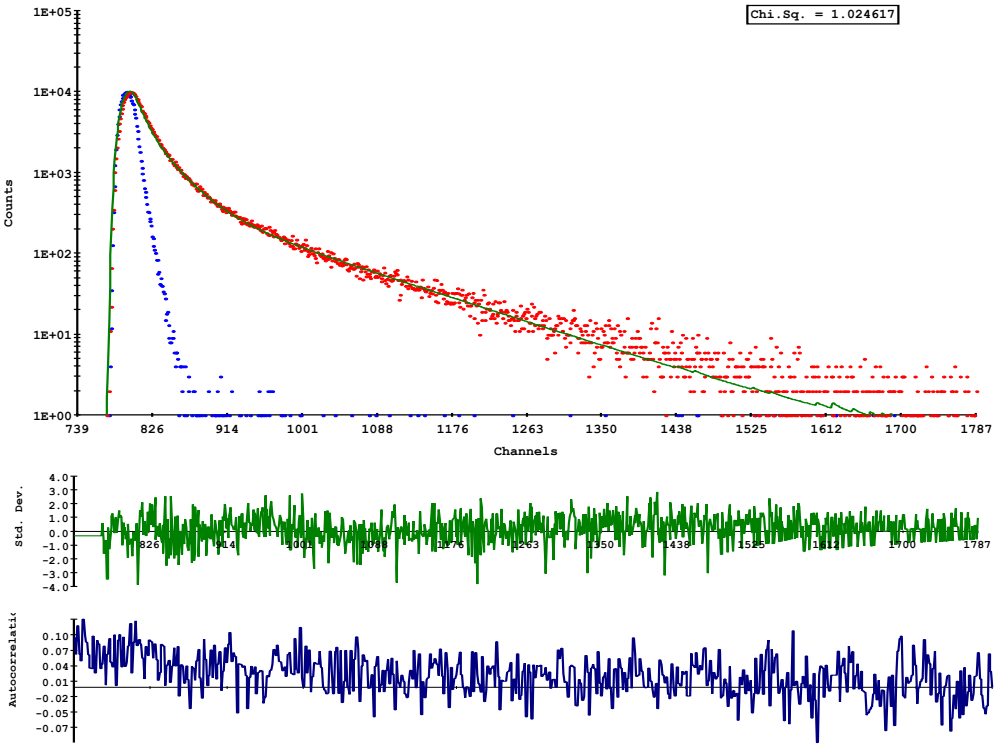
The fitted parameters are:

 Hi reduced to: 1584 ch

 SHIFT = -1.963507     ch;    -1.07737E-10  sec     S.Dev = 1.610158E-12  sec
 T1    = 2.792251      ch;     1.532099E-10  sec     S.Dev = 1.053996E-11  sec
 T2    = 14.86182      ch;     8.154634E-10  sec     S.Dev = 1.042548E-11  sec
 T3    = 91.30961      ch;     5.01013E-09   sec     S.Dev = 5.711912E-11  sec
 A     = 0.5954123                                   S.Dev = 5.970073E-02
 B1    = 0.2783378     [ 48.13 Rel.Ampl][ 0.85 Alpha] S.Dev = 1.679223E-03
 B2    = 4.586871E-02  [ 42.21 Rel.Ampl][ 0.14 Alpha] S.Dev = 2.914995E-04
 B3    = 1.707859E-03  [ 9.66 Rel.Ampl][ 0.01 Alpha] S.Dev = 1.514512E-05
 Average Life Time = 2.718658E-10  sec
 CHISQ = 1.010839            [ 847 degrees of freedom ]

  Chi-squared Probability =    40.5826 percent
  Durbin-Watson Parameter =   1.843063
  Negative residuals      =   41.87135 percent
  Residuals < 1 s.dev     =   69.23977 percent
  Residuals < 2 s.dev     =   95.78947 percent
  Residuals < 3 s.dev     =   99.64912 percent
  Residuals < 4 s.dev     =   99.76608 percent
```

Fig. S23. Fluorescence lifetime measurement of 34 μM BQDMPN (**4**) in the presence of 3 equiv. of Zn^{2+} in DMF-H_2O (1:1) with 370 nm bandpath filter (BPF) at 25 °C (λ_{ex} = 331 nm).




```
Calculated using 3 exponentials

Prompt data : Prompt
Decay data : 6MeOBQDMPN(400)

The initial paramters are:

 Shift Value = 0         ch;          0              sec
 Shift Limit = 40        ch;          2.194787E-09   sec

 T1 Estimate = 17.15479 ch;           9.412776E-10   sec
 T2 Estimate = 34.30957 ch;           1.882555E-09   sec
 T3 Estimate = 68.61914 ch;           3.76511E-09    sec

 A Free
 B1 Free
 B2 Free
 B3 Free

 Prompt and decay LO = 739    ch;    4.05487E-08    sec
 Prompt and decay HI = 1827   ch;    1.002469E-07   sec

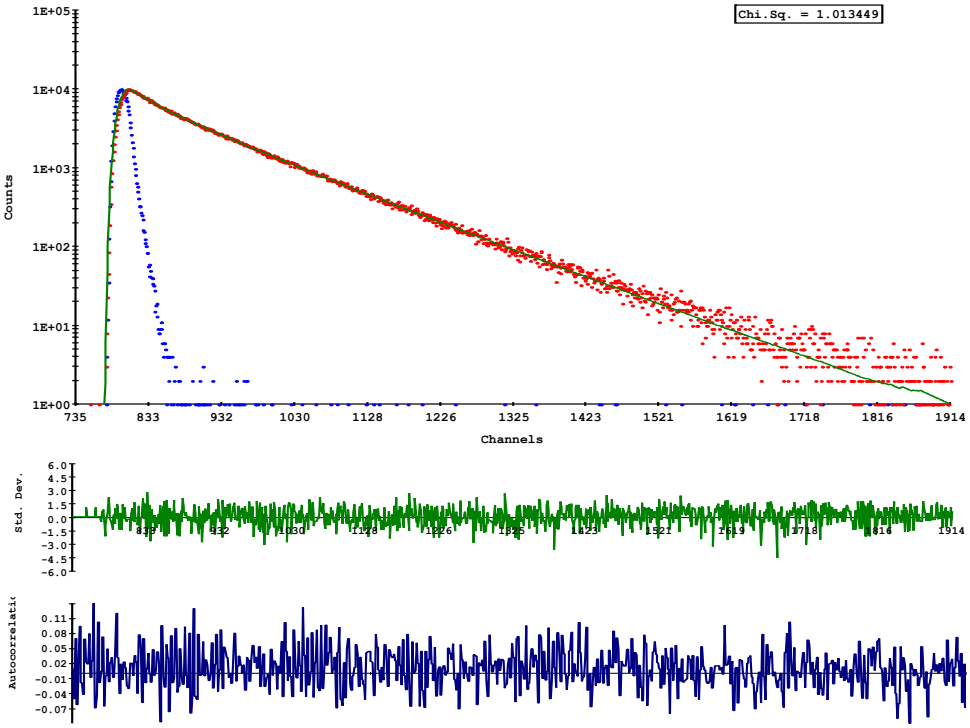
 Background on prompt = 0
 Time calibration = 5.486969E-11 sec/ch

The fitted parameters are:

 Hi reduced to: 1787 ch

 SHIFT = -2.44339      ch;    -1.34068E-10  sec     S.Dev = 1.46784E-12   sec
 T1    = 8.192328      ch;    4.495105E-10  sec     S.Dev = 1.593177E-11  sec
 T2    = 29.20401      ch;    1.602415E-09  sec     S.Dev = 2.156081E-11  sec
 T3    = 125.4298      ch;    6.882292E-09  sec     S.Dev = 5.625533E-11  sec
 A     = 0.3542998                                 S.Dev = 6.170324E-02
 B1    = 0.1029654     [ 40.13 Rel.Ampl][ 0.75 Alpha] S.Dev = 5.797698E-04
 B2    = 3.058379E-02  [ 42.49 Rel.Ampl][ 0.22 Alpha] S.Dev = 1.852779E-04
 B3    = 2.912044E-03  [ 17.38 Rel.Ampl][ 0.02 Alpha] S.Dev = 1.879831E-05
 Average Life Time = 8.451738E-10  sec
 CHISQ = 1.024617            [ 1041 degrees of freedom ]
 Chi-squared Probability =    28.3864 percent
 Durbin-Watson Parameter =   1.812145
 Negative residuals      =   43.08866 percent
 Residuals < 1 s.dev     =   69.49476 percent
 Residuals < 2 s.dev     =   95.61487 percent
 Residuals < 3 s.dev     =   99.14204 percent
 Residuals < 4 s.dev     =        100 percent
```

Fig. S24. Fluorescence lifetime measurement of 34 μM 6-MeOBQDMPN (**5**) in DMF-H_2O (1:1) with 400 nm bandpath filter (BPF) at 25 °C (λ_{ex} = 331 nm).




```
Calculated using 3 exponentials

Prompt data : Prompt
Decay data : 6MeOBQDMPN+Cd(400)

The initial paramters are:

 Shift Value = 0        ch;          0              sec
 Shift Limit = 40       ch;          2.194787E-09   sec

 T1 Estimate = 50.9483  ch;          2.795517E-09   sec
 T2 Estimate = 101.8966 ch;          5.591035E-09   sec
 T3 Estimate = 203.7932 ch;          1.118207E-08   sec

 A Free
 B1 Free
 B2 Free
 B3 Free

 Prompt and decay LO = 735    ch;    4.032922E-08   sec
 Prompt and decay HI = 1954   ch;    1.072154E-07   sec

 Background on prompt = 0
 Time calibration = 5.486969E-11 sec/ch

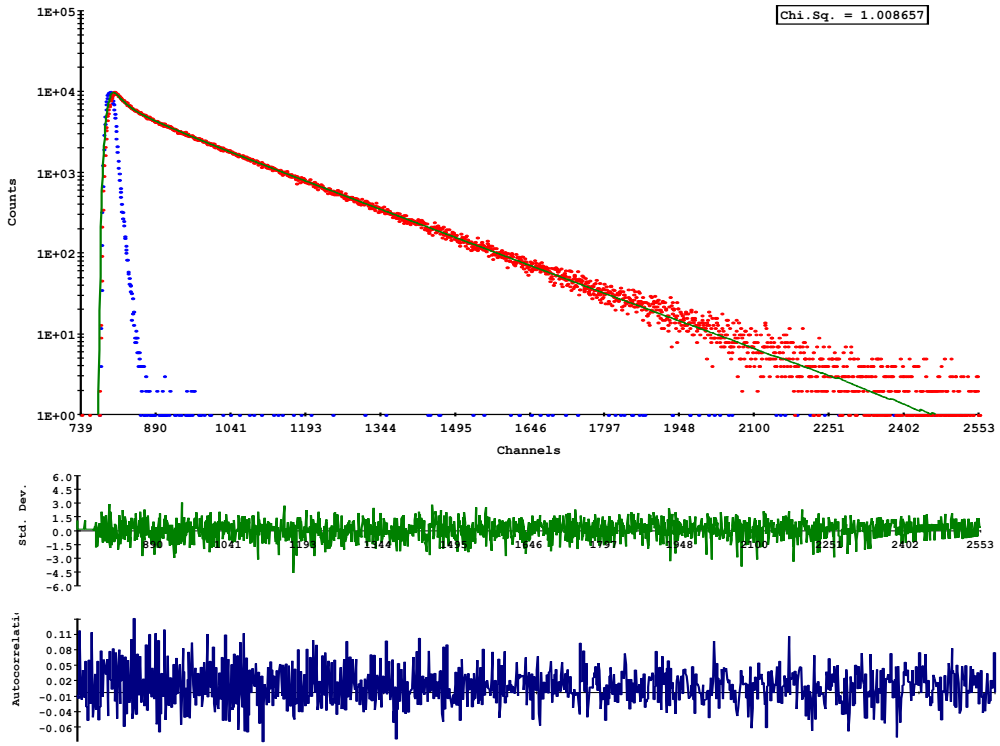
The fitted parameters are:

 Hi reduced to: 1914 ch

 SHIFT = -2.324281     ch;    -1.275326E-10 sec     S.Dev = 1.74503E-12   sec
 T1    = 76.03949      ch;    4.172263E-09  sec     S.Dev = 3.383254E-10  sec
 T2    = 126.2669      ch;    6.928227E-09  sec     S.Dev = 4.088469E-11  sec
 T3    = 20.19334      ch;    1.108002E-09  sec     S.Dev = 4.289861E-11  sec
 A     = -0.1022718                                S.Dev = 7.874002E-02
 B1    = 1.934554E-02  [ 26.48 Rel.Ampl][ 0.28 Alpha] S.Dev = 2.573188E-04
 B2    = 2.913029E-02  [ 66.21 Rel.Ampl][ 0.42 Alpha] S.Dev = 1.2183E-04
 B3    = 2.011764E-02  [ 7.31 Rel.Ampl][ 0.29 Alpha] S.Dev = 3.391925E-04
 Average Life Time = 4.443955E-09  sec
 CHISQ = 1.013449            [ 1172 degrees of freedom ]

Chi-squared Probability =   36.77269 percent
Durbin-Watson Parameter =   1.981979
Negative residuals      =   43.98305 percent
Residuals < 1 s.dev     =   67.28814 percent
Residuals < 2 s.dev     =   95.59322 percent
Residuals < 3 s.dev     =   99.49152 percent
Residuals < 4 s.dev     =   99.91525 percent
```

Fig. S25. Fluorescence lifetime measurement of 34 μM 6-MeOBQDMPN (**5**) in the presence of 3 equiv. of Cd^{2+} in DMF-H_2O (1:1) with 400 nm bandpath filter (BPF) at 25 °C (λ_{ex} = 331 nm).




```
Calculated using 3 exponentials

Prompt data : Prompt
Decay data : 6MeOBQDMPN+Zn(400)

The initial paramters are:

 Shift Value = 0        ch;          0              sec
 Shift Limit = 40       ch;          2.194787E-09   sec

 T1 Estimate = 81.45502 ch;          4.469411E-09   sec
 T2 Estimate = 162.91   ch;          8.938822E-09   sec
 T3 Estimate = 325.8201 ch;          1.787764E-08   sec

 A Free
 B1 Free
 B2 Free
 B3 Free

 Prompt and decay LO = 739    ch;    4.05487E-08    sec
 Prompt and decay HI = 2593   ch;    1.422771E-07   sec

 Background on prompt = 0
 Time calibration = 5.486969E-11 sec/ch

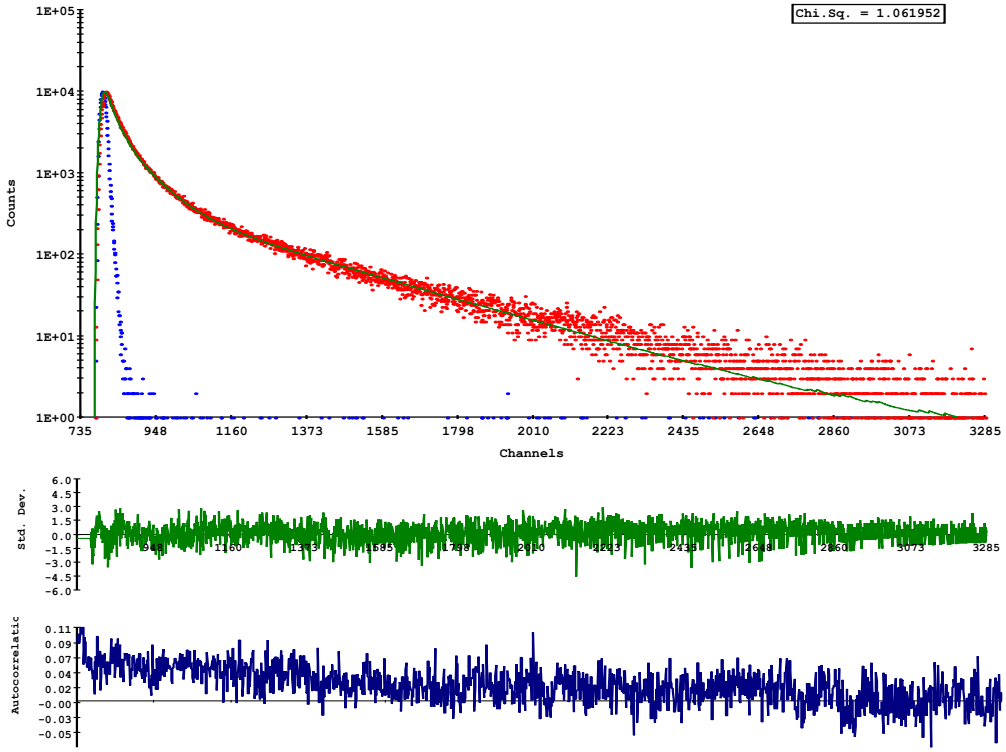
The fitted parameters are:

 Hi reduced to: 2553 ch

 SHIFT = -2.299327     ch;    -1.261633E-10 sec     S.Dev = 1.704955E-12  sec
 T1    = 71.85535      ch;    3.942681E-09  sec     S.Dev = 4.207865E-10  sec
 T2    = 188.7077      ch;    1.035433E-08  sec     S.Dev = 2.262315E-11  sec
 T3    = 16.13852      ch;    8.855155E-10  sec     S.Dev = 2.377771E-11  sec
 A     = -0.1349691                                S.Dev = 0.0589117
 B1    = 8.173217E-03  [ 8.18 Rel.Ampl][ 0.11 Alpha] S.Dev = 1.804499E-04
 B2    = 3.195285E-02  [ 84.03 Rel.Ampl][ 0.43 Alpha] S.Dev = 5.73721E-05
 B3    = 3.459183E-02  [ 7.78 Rel.Ampl][ 0.46 Alpha] S.Dev = 3.587711E-04
 Average Life Time = 5.26924E-09   sec
 CHISQ = 1.008657            [ 1807 degrees of freedom ]

 Chi-squared Probability =   39.33976 percent
 Durbin-Watson Parameter =   2.009442
 Negative residuals      =   43.25069 percent
 Residuals < 1 s.dev     =   67.76859 percent
 Residuals < 2 s.dev     =   96.03306 percent
 Residuals < 3 s.dev     =   99.55923 percent
 Residuals < 4 s.dev     =    99.9449 percent
```

Fig. S26. Fluorescence lifetime measurement of 34 μM 6-MeOBQDMPN (**5**) in the presence of 3 equiv. of Zn^{2+} in DMF-H_2O (1:1) with 400 nm bandpath filter (BPF) at 25 °C (λ_{ex} = 331 nm).




```
Calculated using 3 exponentials

Prompt data : Prompt
Decay data : TriMeOBQDMPN(460)

The initial paramters are:

 Shift Value = 0         ch;          0              sec
 Shift Limit = 40        ch;          2.194787E-09   sec

 T1 Estimate = 58.95563 ch;           3.234877E-09   sec
 T2 Estimate = 117.9113 ch;           6.469754E-09   sec
 T3 Estimate = 235.8225 ch;           1.293951E-08   sec

 A Free
 B1 Free
 B2 Free
 B3 Free

 Prompt and decay LO = 735     ch;    4.032922E-08   sec
 Prompt and decay HI = 3325    ch;    1.824417E-07   sec

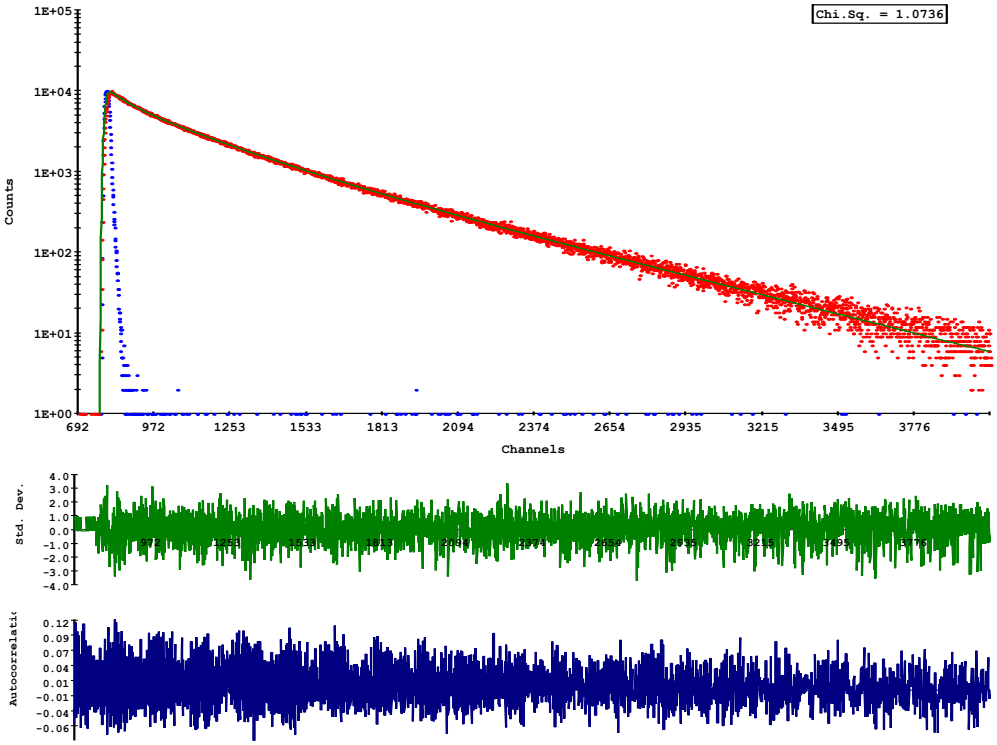
 Background on prompt = 0
 Time calibration = 5.486969E-11 sec/ch

The fitted parameters are:

 Hi reduced to: 3285 ch

 SHIFT = -1.852206      ch;    -1.016299E-10 sec      S.Dev = 1.630483E-12  sec
 T1    = 73.86161       ch;    4.052763E-09  sec      S.Dev = 7.636283E-11  sec
 T2    = 23.1508        ch;    1.270277E-09  sec      S.Dev = 1.330892E-11  sec
 T3    = 345.2584       ch;    1.894422E-08  sec      S.Dev = 1.019326E-10  sec
 A     = 0.47133                                     S.Dev = 4.511932E-02
 B1    = 2.146125E-02   [ 42.37 Rel.Ampl][ 0.27 Alpha] S.Dev = 9.526328E-05
 B2    = 5.609271E-02   [ 34.71 Rel.Ampl][ 0.70 Alpha] S.Dev = 2.533723E-04
 B3    = 2.484279E-03   [ 22.92 Rel.Ampl][ 0.03 Alpha] S.Dev = 9.895746E-06
 Average Life Time = 2.564942E-09  sec
 CHISQ = 1.061952              [ 2543 degrees of freedom ]
 Chi-squared Probability =    1.485473 percent
 Durbin-Watson Parameter =    1.805697
 Negative residuals      =    42.17954 percent
 Residuals < 1 s.dev     =    65.77813 percent
 Residuals < 2 s.dev     =    95.17836 percent
 Residuals < 3 s.dev     =    99.56879 percent
 Residuals < 4 s.dev     =     99.9608 percent
```

Fig. S27. Fluorescence lifetime measurement of 34 μM TriMeOBQDMPN (**6**) in DMF-H_2O (1:1) with 460 nm bandpath filter (BPF) at 25 °C (λ_{ex} = 331 nm).




```
Calculated using 3 exponentials

Prompt data : Prompt
Decay data : TriMeOBQDMPN-Cd(460)

The initial paramters are:

 Shift Value = 0         ch;          0              sec
 Shift Limit = 40        ch;          2.194787E-09   sec

 T1 Estimate = 184.4599 ch;           1.012126E-08   sec
 T2 Estimate = 368.9199 ch;           2.024252E-08   sec
 T3 Estimate = 737.8397 ch;           4.048503E-08   sec

 A Free
 B1 Free
 B2 Free
 B3 Free

 Prompt and decay LO = 692    ch;     3.796982E-08   sec
 Prompt and decay HI = 4096   ch;     2.247462E-07   sec

 Background on prompt = 1.219512E-02
 Time calibration = 5.486969E-11 sec/ch

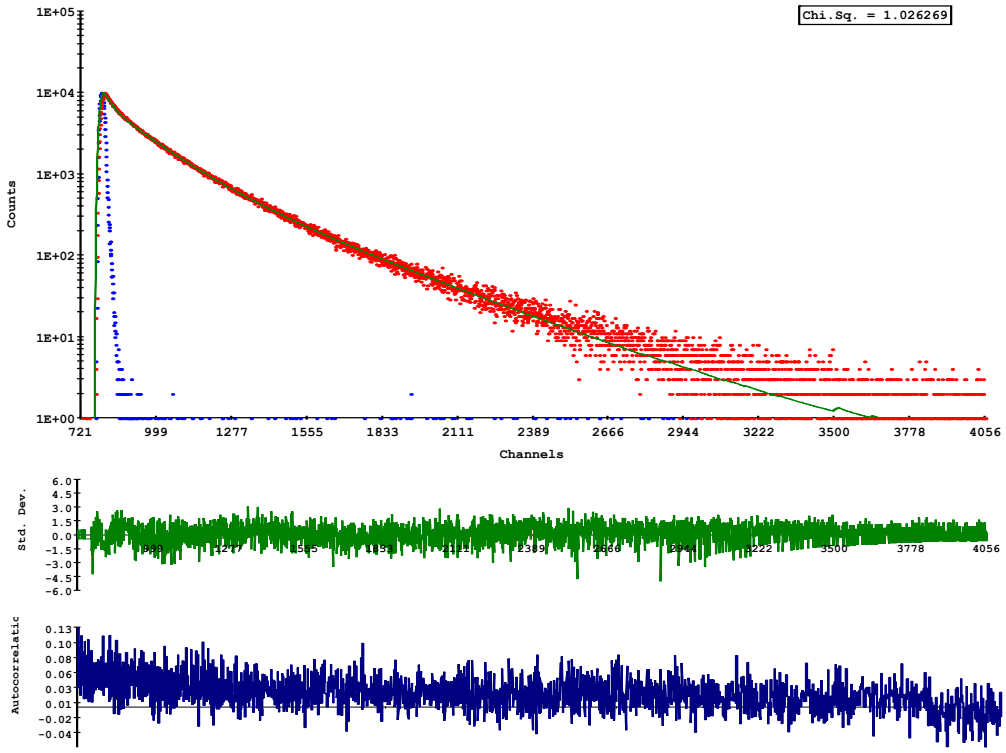
The fitted parameters are:

 Hi reduced to: 4056 ch

 SHIFT = -2.609949     ch;    -1.432071E-10 sec     S.Dev = 1.775269E-12  sec
 T1    = 244.7231      ch;    1.342788E-08  sec     S.Dev = 2.651276E-10  sec
 T2    = 61.38607      ch;    3.368234E-09  sec     S.Dev = 9.448889E-11  sec
 T3    = 511.4449      ch;    2.806282E-08  sec     S.Dev = 7.316742E-11  sec
 A     = 3.668435E-02                               S.Dev = 8.102692E-02
 B1    = 2.517539E-02  [ 40.18 Rel.Ampl][ 0.46 Alpha] S.Dev = 9.35765E-05
 B2    = 1.340181E-02  [ 5.37 Rel.Ampl][ 0.24 Alpha] S.Dev = 1.55628E-04
 B3    = 1.632542E-02  [ 54.45 Rel.Ampl][ 0.30 Alpha] S.Dev = 3.42707E-05
 Average Life Time = 1.532404E-08  sec
 CHISQ = 1.0736              [ 3357 degrees of freedom ]

 Chi-squared Probability =  0.1578351 percent
 Durbin-Watson Parameter =    2.119035
 Negative residuals      =    46.18128 percent
 Residuals < 1 s.dev     =    66.86478 percent
 Residuals < 2 s.dev     =    94.44279 percent
 Residuals < 3 s.dev     =    99.52452 percent
 Residuals < 4 s.dev     =         100 percent
```

Fig. S28. Fluorescence lifetime measurement of 34 μM TriMeOBQDMPN (**6**) in the presence of 3 equiv. of Cd^{2+} in DMF-H_2O (1:1) with 460 nm bandpath filter (BPF) at 25 °C (λ_{ex} = 331 nm).




```
Calculated using 3 exponentials

Prompt data : Prompt
Decay data : TriMeOBQDMPN-Zn(460)

The initial paramters are:

 Shift Value = 0        ch;          0              sec
 Shift Limit = 40       ch;          2.194787E-09   sec

 T1 Estimate = 102.8708 ch;          5.644489E-09   sec
 T2 Estimate = 205.7416 ch;          1.128898E-08   sec
 T3 Estimate = 411.4833 ch;          2.257796E-08   sec

 A Free
 B1 Free
 B2 Free
 B3 Free

 Prompt and decay LO = 721    ch;    3.956104E-08   sec
 Prompt and decay HI = 4096   ch;    2.247462E-07   sec

 Background on prompt = 0
 Time calibration = 5.486969E-11 sec/ch

The fitted parameters are:

 Hi reduced to: 4056 ch

 SHIFT = -2.910367     ch;    -1.596909E-10 sec     S.Dev = 1.800588E-12  sec
 T1    = 25.99478      ch;    1.426325E-09  sec     S.Dev = 3.899757E-11  sec
 T2    = 151.8205      ch;    8.330341E-09  sec     S.Dev = 6.623673E-11  sec
 T3    = 350.3177      ch;    1.922182E-08  sec     S.Dev = 7.313324E-11  sec
 A     = 0.4343736                                 S.Dev = 3.566461E-02
 B1    = 2.850029E-02  [ 9.07 Rel.Ampl][ 0.43 Alpha] S.Dev = 2.161963E-04
 B2    = 3.055456E-02  [ 56.80 Rel.Ampl][ 0.46 Alpha] S.Dev = 8.253834E-05
 B3    = 7.955964E-03  [ 34.13 Rel.Ampl][ 0.12 Alpha] S.Dev = 2.627613E-05
 Average Life Time = 6.68711E-09   sec
 CHISQ = 1.026269            [ 3328 degrees of freedom ]
 Chi-squared Probability =   14.22037 percent
 Durbin-Watson Parameter =   1.940549
 Negative residuals      =   42.20623 percent
 Residuals < 1 s.dev     =   66.57674 percent
 Residuals < 2 s.dev     =   96.34293 percent
 Residuals < 3 s.dev     =   99.61031 percent
 Residuals < 4 s.dev     =   99.91007 percent
```

Fig. S29. Fluorescence lifetime measurement of 34 μM TriMeOBQDMPN (**6**) in the presence of 3 equiv. of Zn^{2+} in DMF-H_2O (1:1) with 460 nm bandpath filter (BPF) at 25 °C (λ_{ex} = 331 nm).

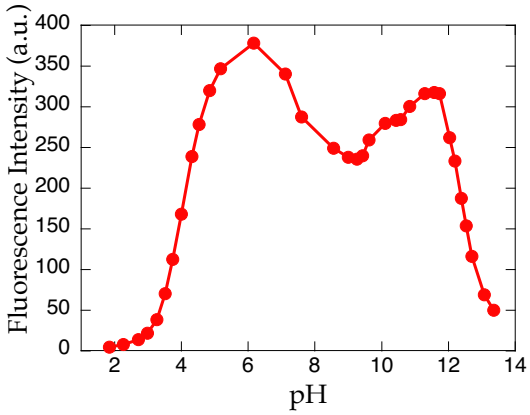


Fig. S30. Effect of pH on fluorescence intensity of TriMeOBQDMEN (**3**) at 485 nm in the presence of 1 equiv. of Zn^{2+} in DMF-H_2O (1:1) at 25 °C. Condition: H_2SO_4 or NaOH was added to the neutral solution.

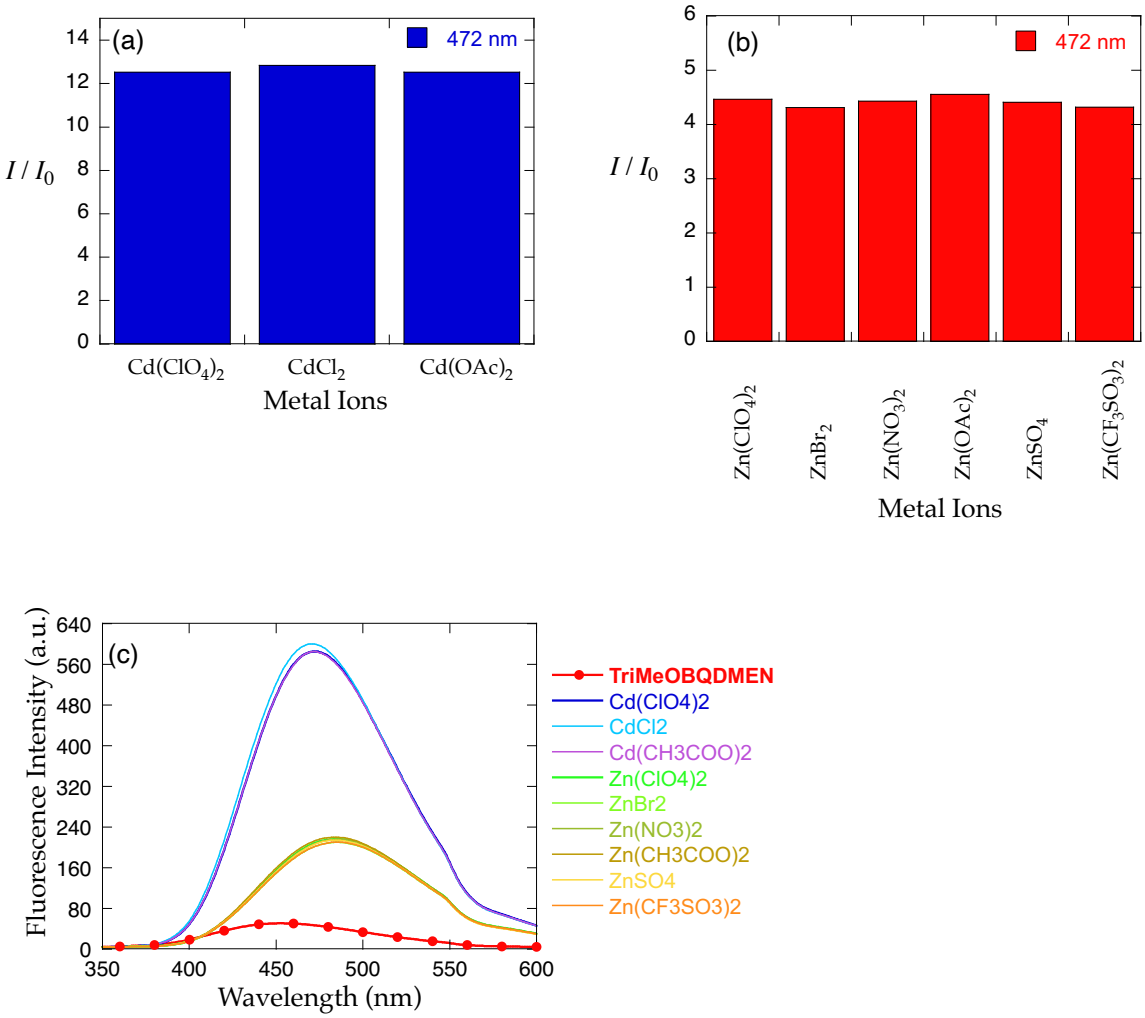


Fig. S31. Effect of counter anion on the fluorescence intensity of 34 μM TriMeOBQDMEN (**3**) in the presence of 1 equiv. of various metal salts in DMF-H_2O (1:1) at 25 °C (λ_{ex} = 339 nm). I_0 is the emission intensity of free ligand. (a) Effect of cadmium salt. (b) Effect of zinc salt. (c) Fluorescence spectra.

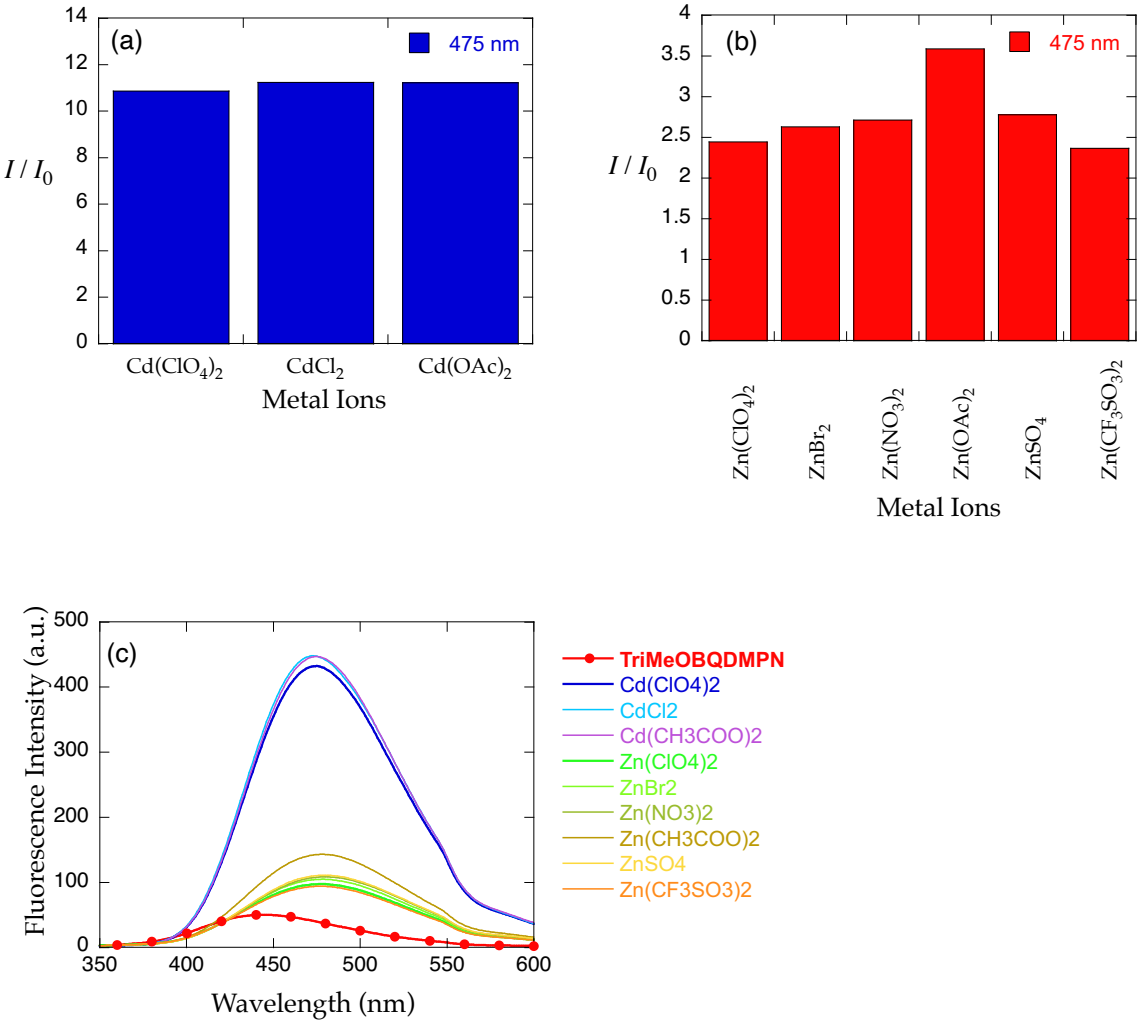


Fig. S32. Effect of counter anion on the fluorescence intensity of 34 μM TriMeOBQDMPN (**6**) in the presence of 1 equiv. of various metal salts in DMF-H_2O (1:1) at 25 °C (λ_{ex} = 337 nm). I_0 is the emission intensity of free ligand. (a) Effect of cadmium salt. (b) Effect of zinc salt. (c) Fluorescence spectra.

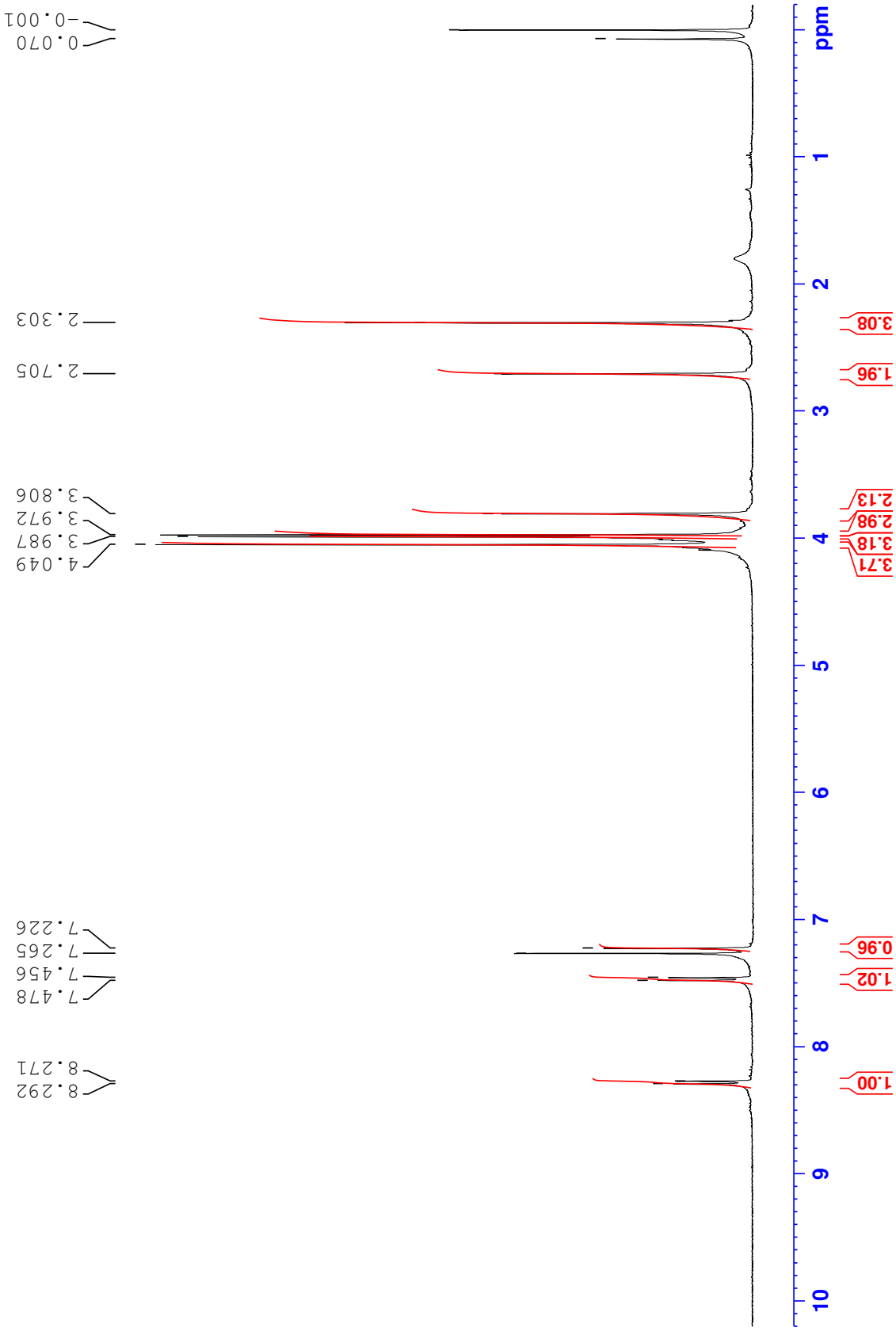


Fig. S33. ^{1}H NMR spectrum for TriMeOBQDMEN (**3**) in $CDCl_3$.

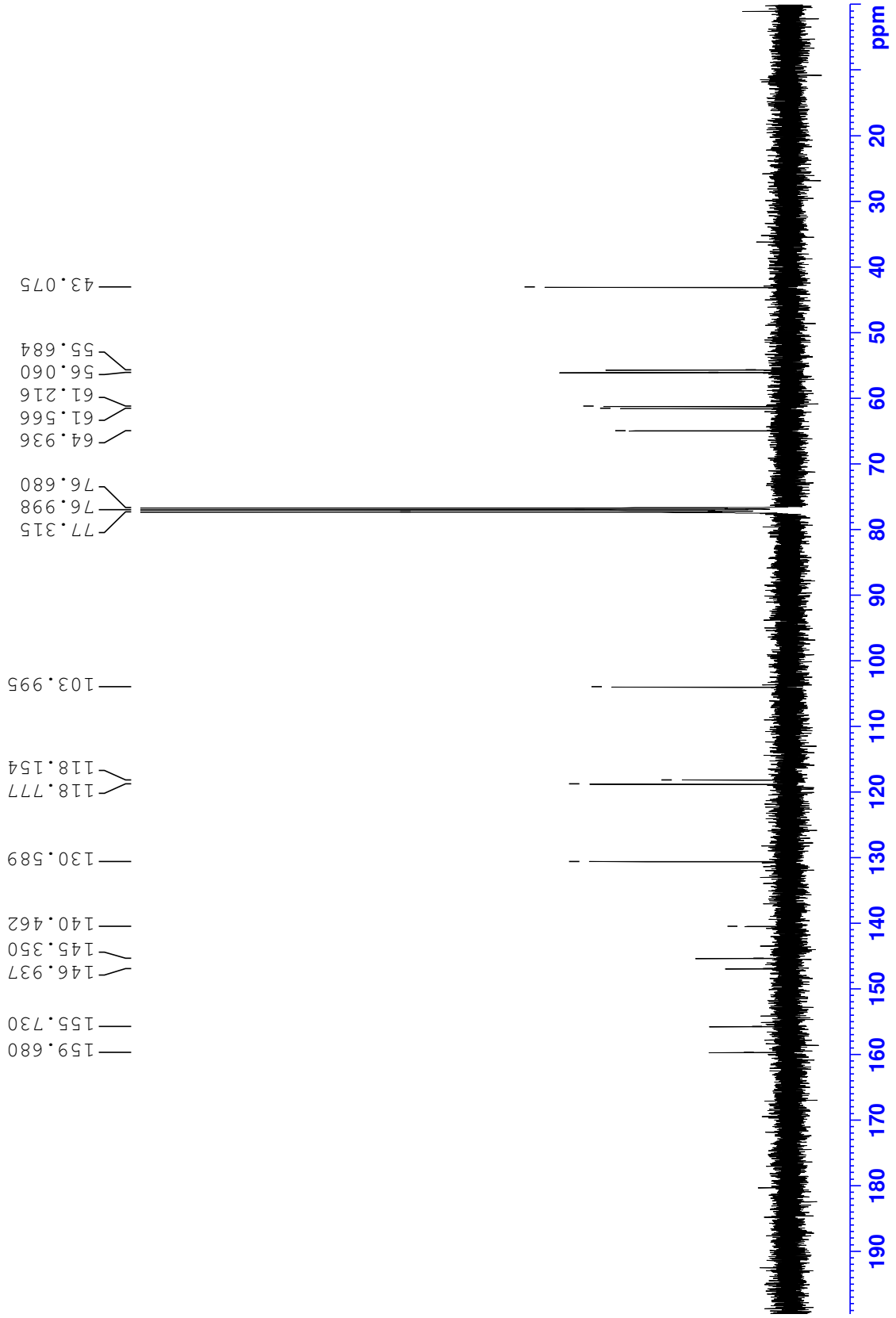


Fig. S34. ^{13}C NMR spectrum for TriMeOBQDMEN (**3**) in $CDCl_3$.

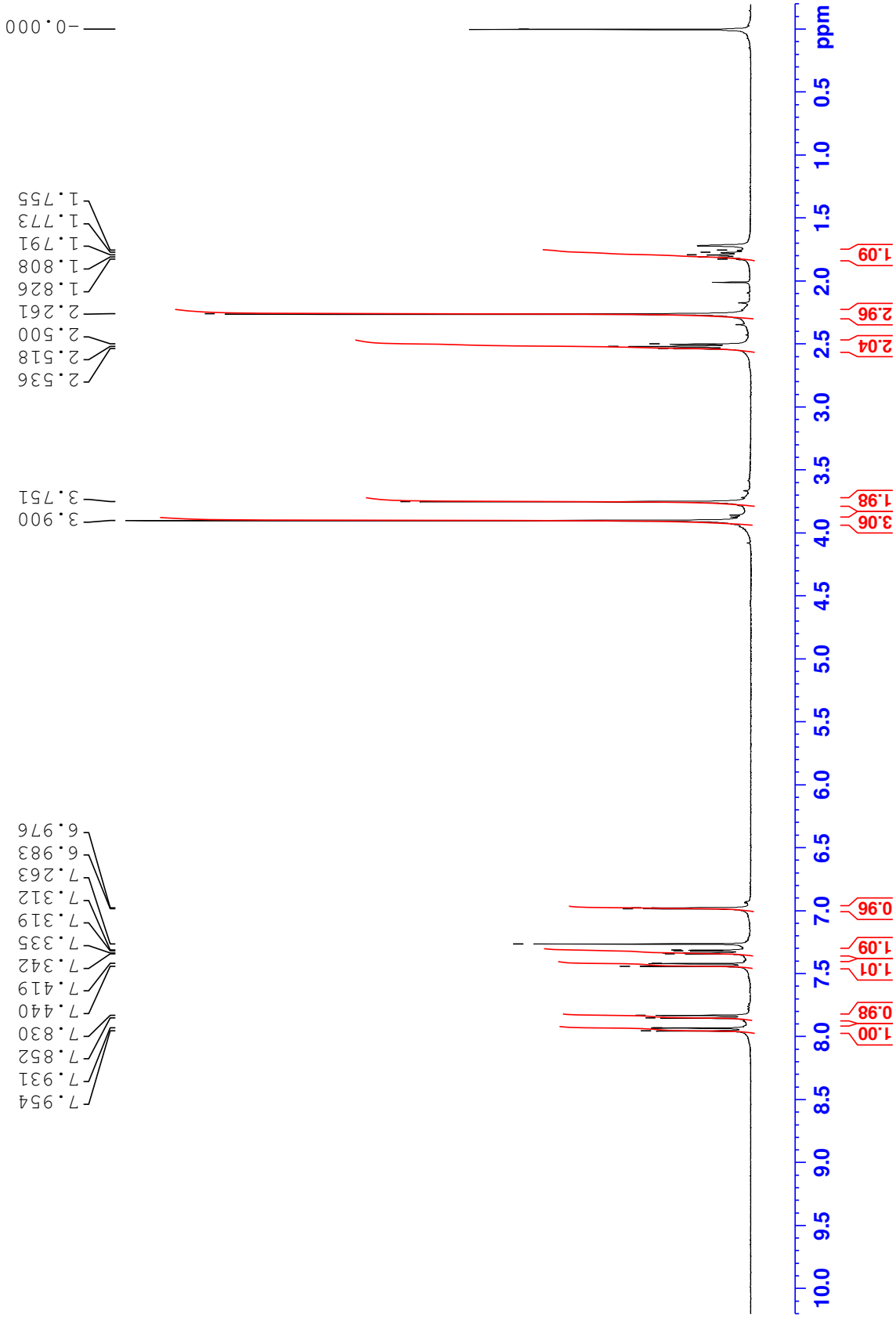


Fig. S35. ^{1}H NMR spectrum for 6-MeOBQDMPN (**5**) in $CDCl_3$.

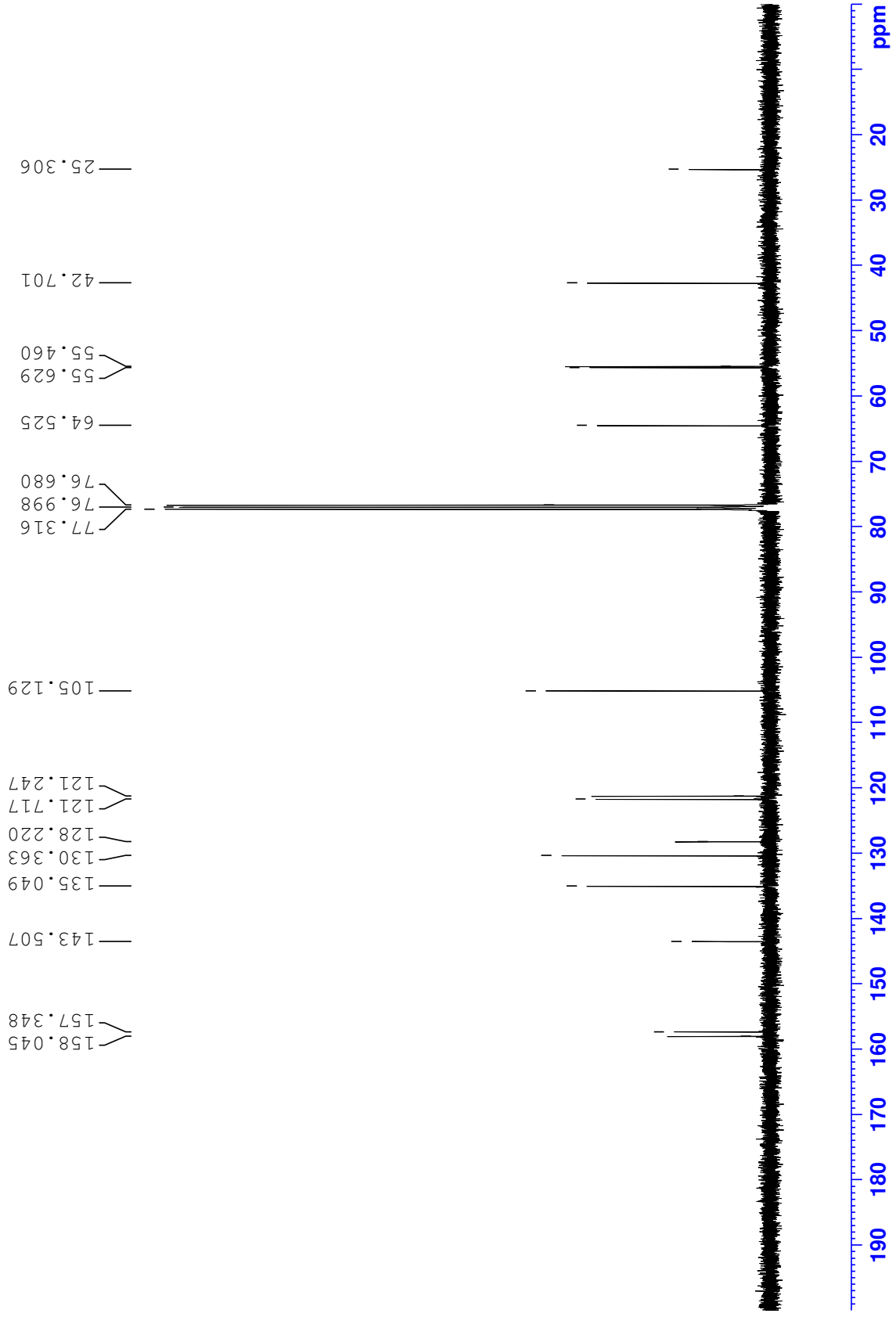


Fig. S36. ^{13}C NMR spectrum for 6-MeOBQDMPN (**5**) in $CDCl_3$.

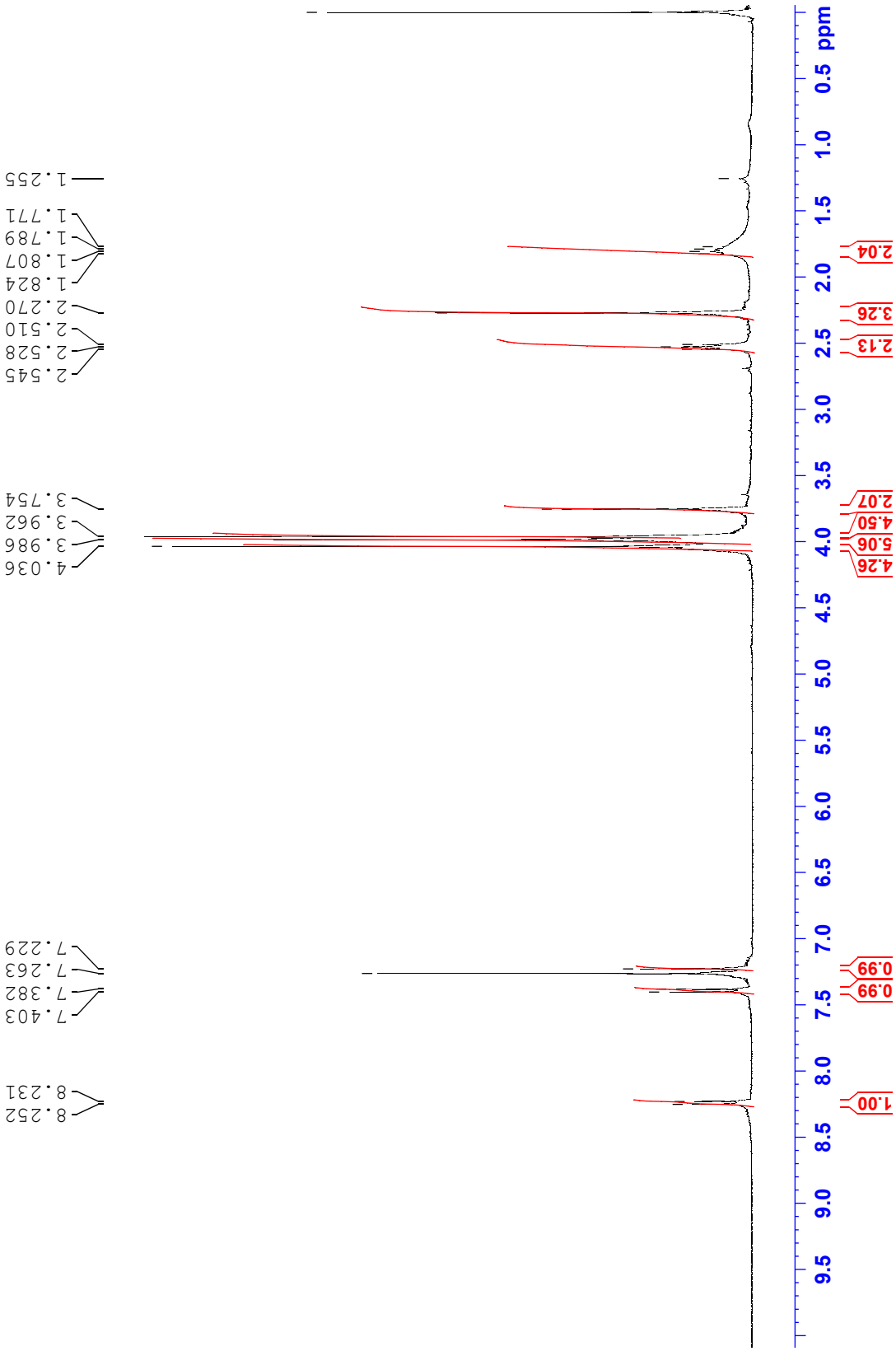


Fig. S37. ^{1}H NMR spectrum for TriMeOBQDMPN (**6**) in $CDCl_3$.

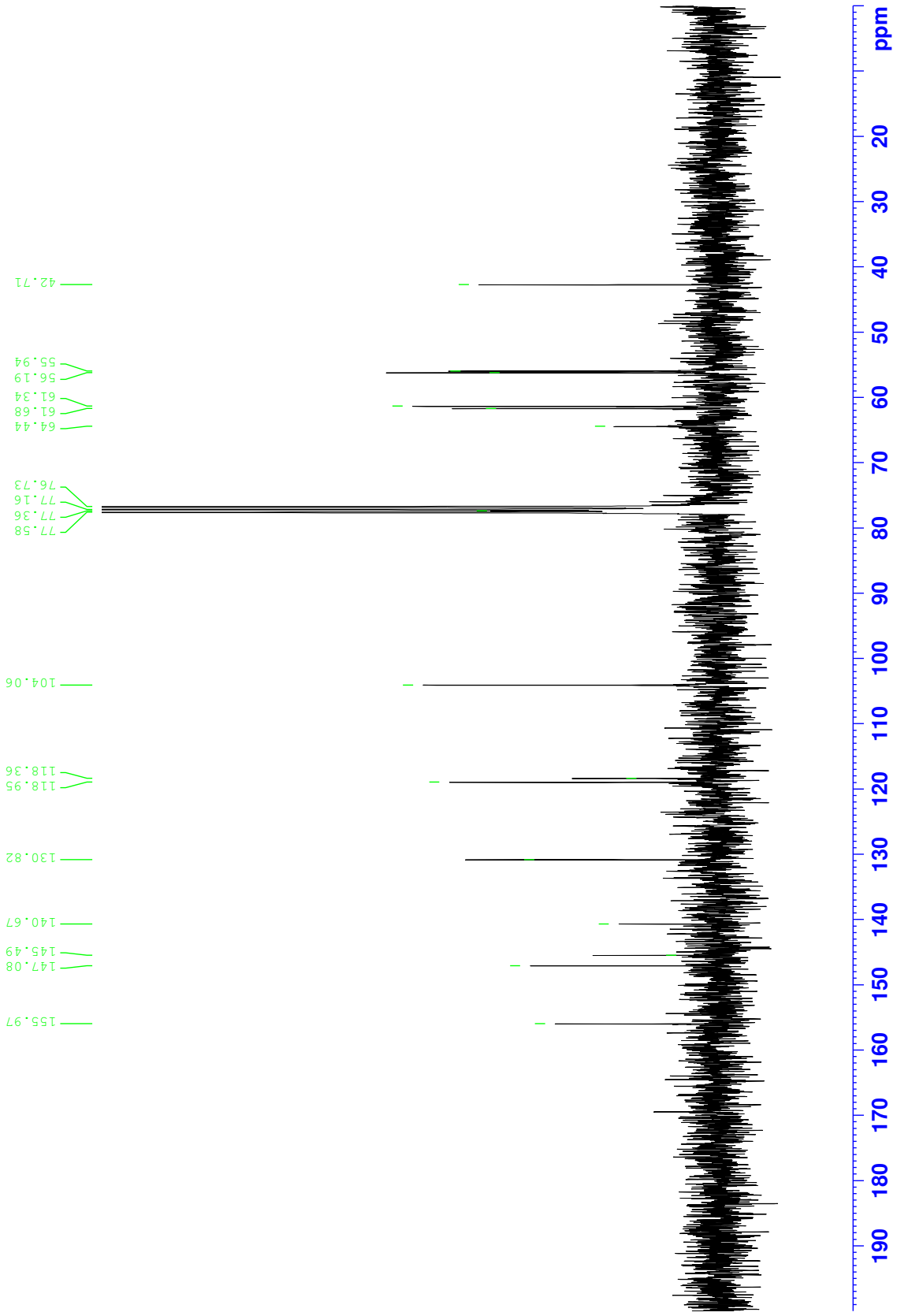


Fig. S38. ^{13}C NMR spectrum for TriMeOBQDMPN (**6**) in $CDCl_3$.