Supporting information

A ratiometric and colorimetric probe for detecting Hg^{2+} based on naphthalimide-rhodamine and its staining function in cell imaging

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Cell culture and imaging

In light of good cellular permeability of probe **1**, the probe was applied to cell staining. The fluorescence images were taken by an OLYMPUS FV1000 confocal laser scanning microscope. HeLa cells (human cervical cancer cell) were cultured in cell staining (Dulbecco modified Eagle's medium) supplemented with 10% FBS (fetal bovine serum) in an atmosphere of 5% CO_2 and 95% air at 37 °C overnight. Before the cell staining, the cells of DMEM were washed three times with phosphate-buffered saline (PBS). Subsequently, the cells were incubated with probe **1** (20 μM) in the culture medium for 30 min and washed with PBS three times.

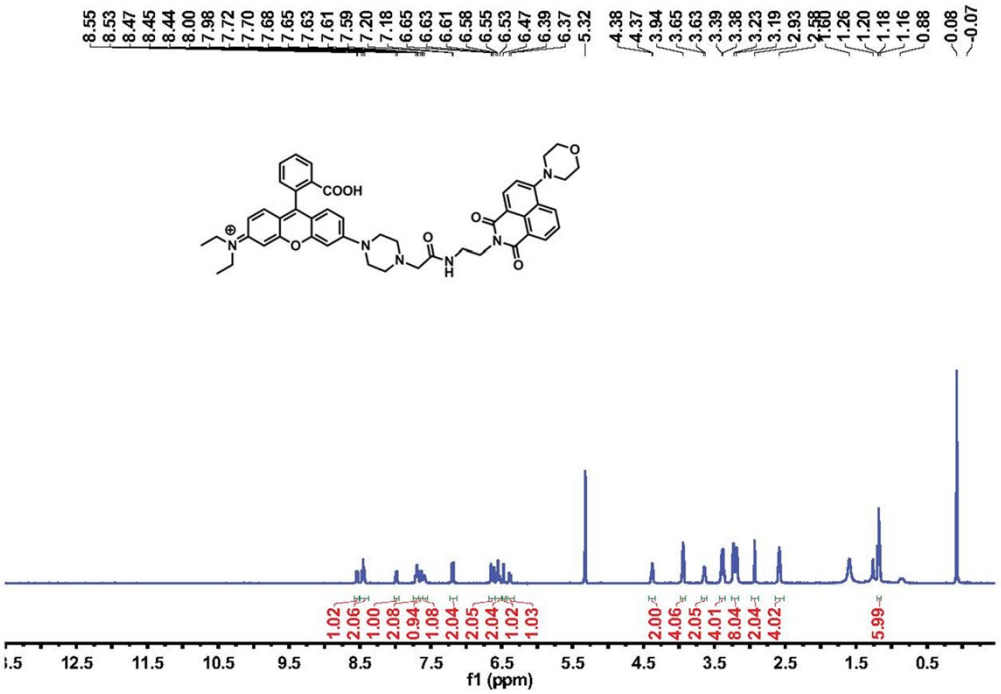
8.55
8.53
8.47
8.45
8.44
8.00
7.98
7.72
7.70
7.68
7.65
7.63
7.61
7.59
7.20
7.18
6.65
6.63
6.61
6.58
6.55
6.53
6.47
6.39
6.37
5.32
4.38
4.37
3.94
3.65
3.63
3.39
3.38
3.23
3.19
2.93
1.26
1.20
1.18
1.16
0.88
0.08
-0.07
COOH
1.02
2.06
1.00
2.08
0.94
1.08
2.04
2.05
2.04
1.02
1.03
2.00
4.06
2.05
4.01
8.04
2.04
4.02
5.99
12.5
11.5
10.5
9.5
8.5
7.5
6.5
5.5
4.5
3.5
2.5
1.5
0.5
f1 (ppm)

Fig. S1.

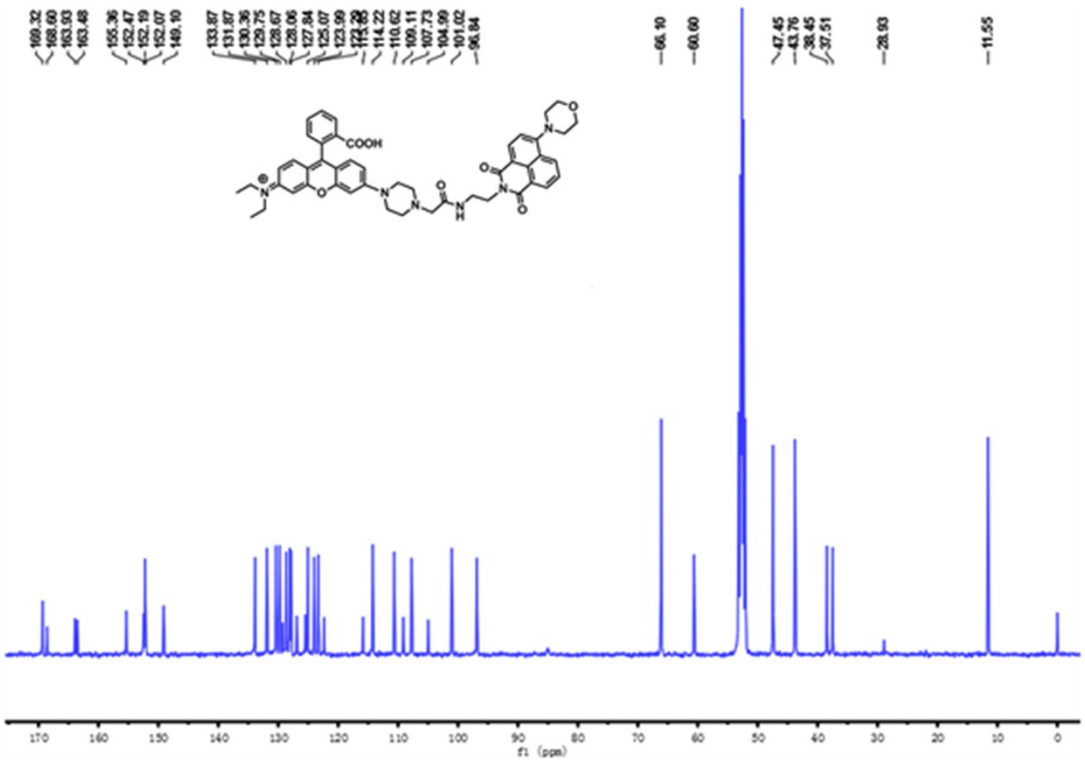
169.32
168.60
163.93
163.48
155.36
152.47
152.19
152.07
149.10
133.87
131.87
130.36
129.75
128.67
128.06
127.84
125.07
123.99
114.22
110.62
109.11
107.73
104.99
101.02
96.84
66.10
60.60
47.45
43.76
38.45
37.51
28.93
11.55
COOH
f1 (ppm)

Fig. S2.

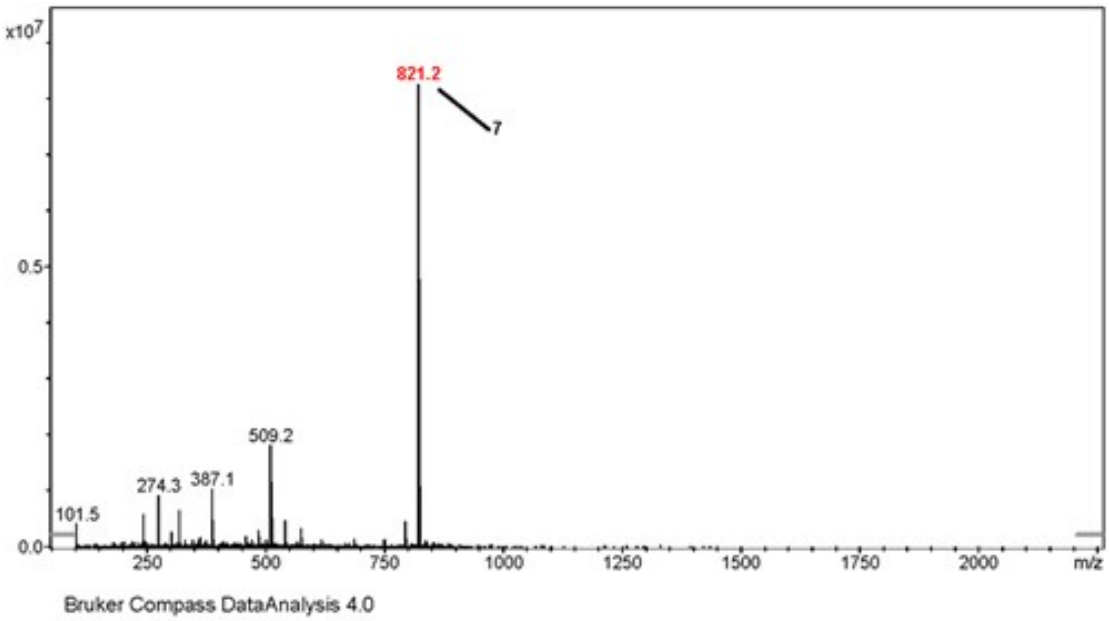
x10^7
821.2
7
0.5
509.2
274.3
387.1
101.5
0.0
250
500
750
1000
1250
1500
1750
2000
m/z
Bruker Compass DataAnalysis 4.0

Fig. S3

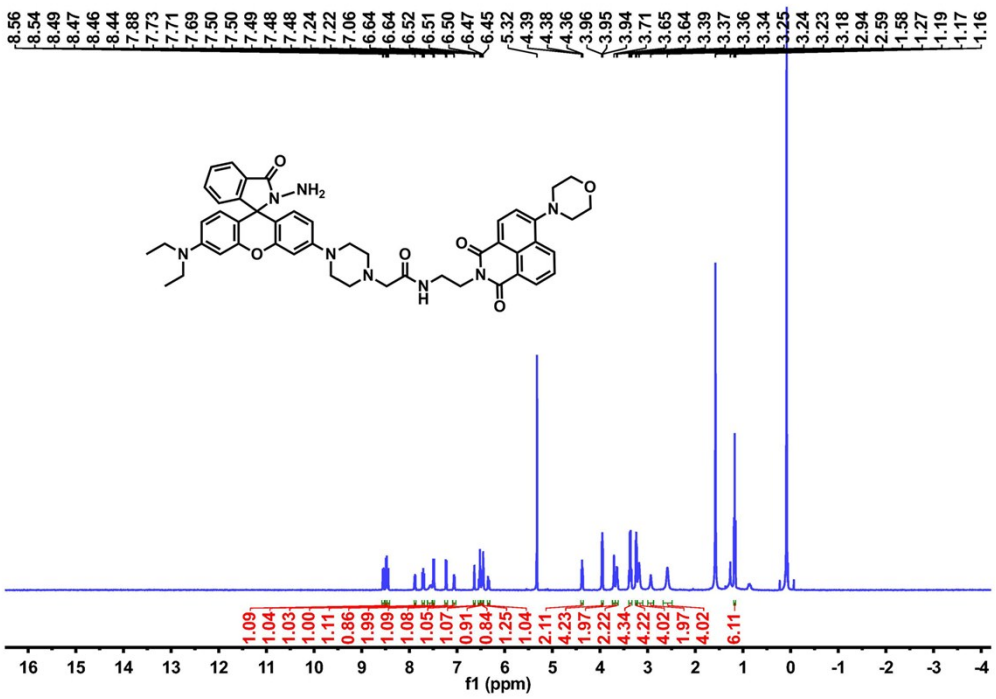
8.56
8.54
8.49
8.47
8.46
8.44
7.88
7.73
7.71
7.69
7.50
7.49
7.48
7.48
7.24
7.22
7.06
6.64
6.64
6.52
6.51
6.50
6.47
6.45
5.32
4.39
4.38
4.36
3.96
3.95
3.94
3.71
3.65
3.64
3.39
3.37
3.36
3.34
3.25
3.24
3.23
3.18
2.94
2.59
1.58
1.27
1.19
1.17
1.16
1.09
1.04
1.03
1.00
1.11
0.86
1.99
1.09
1.08
1.05
1.07
0.91
0.84
1.25
1.04
2.11
4.23
1.97
2.22
4.34
4.22
4.02
1.97
4.02
6.11
16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 -1 -2 -3 -4
f1 (ppm)

Fig. S4

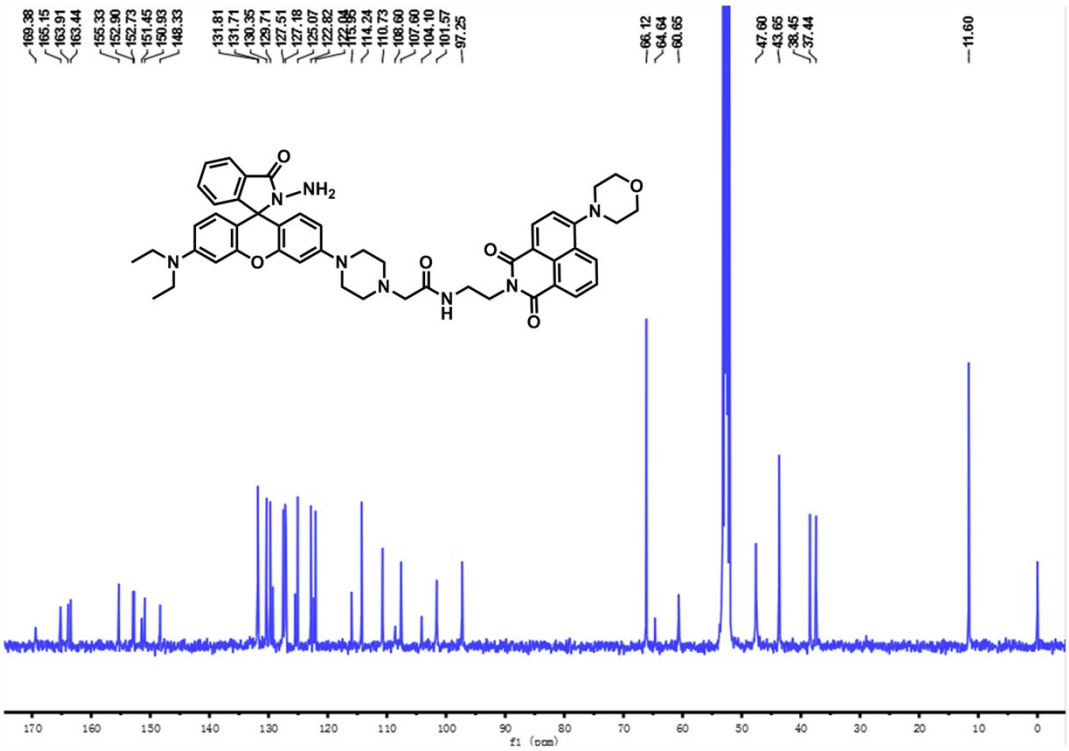
169.38
165.15
163.91
163.44
155.33
152.90
152.73
151.45
150.93
148.33
131.81
131.71
130.35
129.71
127.51
127.18
125.07
122.82
114.24
110.73
108.60
107.60
104.10
101.57
97.25
66.12
64.64
60.65
47.60
43.65
38.45
37.44
11.60
NH2
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

Fig. S5

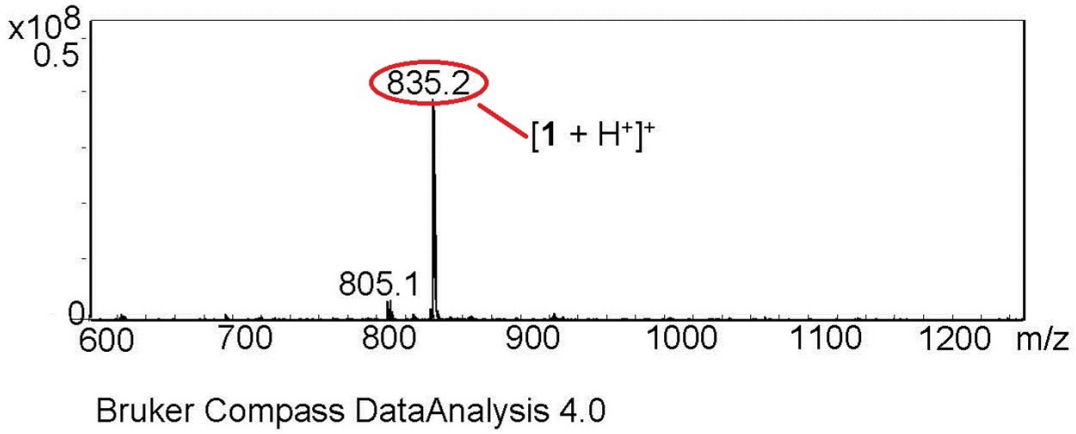
x10^8
0.5
0
835.2
[1 + H+]+
805.1
600
700
800
900
1000
1100
1200
m/z
Bruker Compass DataAnalysis 4.0

Fig. S6

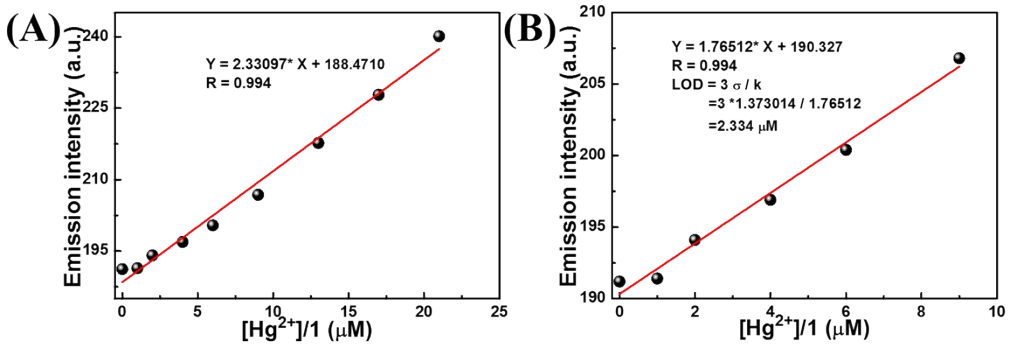
(A)
Y = 2.33097* X + 188.4710
R = 0.994
Emission intensity (a.u.)
[Hg2+]/1 (μM)
(B)
Y = 1.76512* X + 190.327
R = 0.994
LOD = 3 σ / k
=3 *1.373014 / 1.76512
=2.334 μM
Emission intensity (a.u.)
[Hg2+]/1 (μM)

Fig. S7

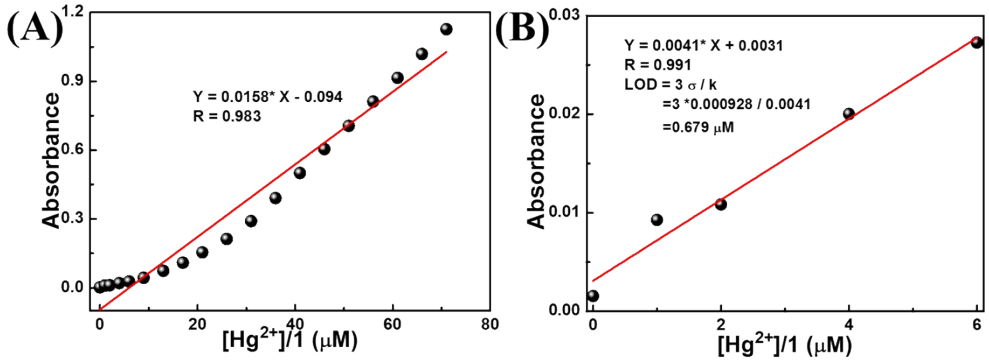
(A)
Absorbance
Y = 0.0158* X - 0.094
R = 0.983
[Hg2+]/1 (μM)
(B)
Absorbance
Y = 0.0041* X + 0.0031
R = 0.991
LOD = 3 σ / k
=3 *0.000928 / 0.0041
=0.679 μM
[Hg2+]/1 (μM)

Fig. S8