Supporting Information

Calix[4]arene based crab-like molecular sensors for highly selective detection of mercury and copper ions

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Figure S1. ¹H NMR (400 MHz, DMSO-*d*₆) spectrum of **BC1**

Figure S2. ¹³C NMR (100 MHz, DMSO-*d*₆) spectrum of **BC1**

Figure S3. FT-IR spectrum of **BC1**

Figure S4. High resolution mass spectrum (HRMS) of **BC1**

Figure S5. ¹H NMR (400 MHz, DMSO-*d*₆) spectrum of **BC2**

Figure S6. ¹³C NMR (100 MHz, DMSO-*d*₆) spectrum of **BC2**

Figure S7. FT-IR spectrum of **BC2**

Figure S8. High resolution mass spectrum (HRMS) of **BC2**

Fluorescence response of BC1 to various metal ions at 430 nm in CH₃CN:

A JASCO FP-6500 spectrofluorometer was used to record the data.

$C_{\text{Compound BC1}} = 10^{-4}$ mol/l, $V_{\text{Compound BC1}} = 1000$ μ L, $C_{\text{Ba(ClO}_4)_2} = 10^{-3}$ mol/l

Volume of Ba(ClO ₄) ₂ μ L	$C_{\text{Compound BC1}}$ mol/l	$C_{\text{Ba}^{2+}}$ mol/l	Ratio $C_{\text{Ba}^{2+}} / C_{\text{Compound BC1}}$	RelativeEmission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	2.7
40	9.62E-05	3.85E-05	0.4	4.94
60	9.43E-05	5.66E-05	0.6	6.47
80	9.26E-05	7.41E-05	0.8	8.2
100	9.09E-05	9.09E-05	1	9.74
200	8.33E-05	0.000167	2	15.41
300	7.69E-05	0.000231	3	17.73
400	7.14E-05	0.000286	4	19.12
500	6.67E-05	0.000333	5	20.56

$K_a = 8970 \text{ M}^{-1}$, $R^2 = 0.9990$

$C_{\text{Compound BC1}} = 10^{-4} \text{ mol/l}$, $V_{\text{Compound BC1}} = 1000 \text{ }\mu\text{L}$, $C_{\text{Cd}(\text{ClO}_4)_2} = 10^{-3} \text{ mol/l}$

Volume of $\text{Cd}(\text{ClO}_4)_2$ μL	$C_{\text{Compound BC1}}$ mol/l	$C_{\text{Cd}^{2+}}$ mol/l	Ratio $C_{\text{Cd}^{2+}} / C_{\text{Compound BC1}}$	RelativeEmission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	23.69
40	9.62E-05	3.85E-05	0.4	39.9
60	9.43E-05	5.66E-05	0.6	54.64
80	9.26E-05	7.41E-05	0.8	67.48
100	9.09E-05	9.09E-05	1	79.66
200	8.33E-05	0.000167	2	108.6
300	7.69E-05	0.000231	3	118.92
400	7.14E-05	0.000286	4	127.07
500	6.67E-05	0.000333	5	133.76

$K_a = 25761 \text{ M}^{-1}$, $R^2 = 0.9986$

$C_{\text{Compound BC1}} = 10^{-4} \text{ mol/l}$, $V_{\text{Compound BC1}} = 1000 \text{ }\mu\text{L}$, $C_{\text{Co}(\text{ClO}_4)_2} = 10^{-3} \text{ mol/l}$

Volume of $\text{Co}(\text{ClO}_4)_2$ μL	$C_{\text{Compound BC1}}$ mol/l	$C_{\text{Co}^{2+}}$ mol/l	Ratio $C_{\text{Co}^{2+}} / C_{\text{Compound BC1}}$	RelativeEmission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	4.03
40	9.62E-05	3.85E-05	0.4	8.37
60	9.43E-05	5.66E-05	0.6	12.32
80	9.26E-05	7.41E-05	0.8	17.02
100	9.09E-05	9.09E-05	1	22.17
200	8.33E-05	0.000167	2	35.01
300	7.69E-05	0.000231	3	41.93
400	7.14E-05	0.000286	4	44.81
500	6.67E-05	0.000333	5	46.49

$K_a = 6078 \text{ M}^{-1}$, $R^2 = 0.9932$

$C_{\text{Compound BC1}} = 10^{-4} \text{ mol/l}$, $V_{\text{Compound BC1}} = 1000 \text{ }\mu\text{L}$, $C_{\text{Cu}(\text{ClO}_4)_2} = 10^{-3} \text{ mol/l}$

Volume of $\text{Cu}(\text{ClO}_4)_2$ μL	$C_{\text{Compound BC1}}$ mol/l	$C_{\text{Cu}^{2+}}$ mol/l	Ratio $C_{\text{Cu}^{2+}} / C_{\text{Compound BC1}}$	RelativeEmission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	40.06
40	9.62E-05	3.85E-05	0.4	70.63
60	9.43E-05	5.66E-05	0.6	108.35
80	9.26E-05	7.41E-05	0.8	147.04
100	9.09E-05	9.09E-05	1	169.66
200	8.33E-05	0.000167	2	179.38
300	7.69E-05	0.000231	3	185.9
400	7.14E-05	0.000286	4	190.92
500	6.67E-05	0.000333	5	195.74

$K_a = 824215 \text{ M}^{-1}$, $R^2 = 0.9966$

$C_{\text{Compound BC1}} = 10^{-4} \text{ mol/l}$, $V_{\text{Compound BC1}} = 1000 \text{ }\mu\text{L}$, $C_{\text{CuI}} = 10^{-3} \text{ mol/l}$

Volume of CuI μL	$C_{\text{Compound BC1}}$ mol/l	C_{Cu^+} mol/l	Ratio $C_{\text{Cu}^+} / C_{\text{Compound BC1}}$	RelativeEmission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	7.41
40	9.62E-05	3.85E-05	0.4	15.56
60	9.43E-05	5.66E-05	0.6	23.85
80	9.26E-05	7.41E-05	0.8	30.38
100	9.09E-05	9.09E-05	1	37.89
200	8.33E-05	0.000167	2	80.91
300	7.69E-05	0.000231	3	114.42
400	7.14E-05	0.000286	4	139.74
500	6.67E-05	0.000333	5	159.52

$K_a = 43 \text{ M}^{-1}$, $R^2 = 0.9963$

$$C_{\text{Compound BC1}} = 10^{-4} \text{ mol/l}, V_{\text{Compound BC1}} = 1000 \text{ }\mu\text{L}, C_{\text{Fe}(\text{ClO}_4)_2} = 10^{-3} \text{ mol/l}$$

Volume of $\text{Fe}(\text{ClO}_4)_2$ μL	$C_{\text{Compound BC1}}$ mol/l	$C_{\text{Fe}^{2+}}$ mol/l	Ratio $C_{\text{Fe}^{2+}} / C_{\text{Compound BC1}}$	Relative Emission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	16.79
40	9.62E-05	3.85E-05	0.4	33.13
60	9.43E-05	5.66E-05	0.6	46.37
80	9.26E-05	7.41E-05	0.8	58.76
100	9.09E-05	9.09E-05	1	67.52
200	8.33E-05	0.000167	2	101.98
300	7.69E-05	0.000231	3	117.91
400	7.14E-05	0.000286	4	125.24
500	6.67E-05	0.000333	5	131.09

$$K_a = 12729 \text{ M}^{-1}, R^2 = 0.9997$$

$$C_{\text{Compound BC1}} = 10^{-4} \text{ mol/l}, V_{\text{Compound BC1}} = 1000 \text{ }\mu\text{L}, C_{\text{Hg}(\text{ClO}_4)_2} = 10^{-3} \text{ mol/l}$$

Volume of $\text{Hg}(\text{ClO}_4)_2$ μL	$C_{\text{Compound BC1}}$ mol/l	$C_{\text{Hg}^{2+}}$ mol/l	Ratio $C_{\text{Hg}^{2+}} / C_{\text{Compound BC1}}$	Relative Emission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	20.68
40	9.62E-05	3.85E-05	0.4	33.92
60	9.43E-05	5.66E-05	0.6	44.79
80	9.26E-05	7.41E-05	0.8	52.56
100	9.09E-05	9.09E-05	1	61.11
200	8.33E-05	0.000167	2	93.83
300	7.69E-05	0.000231	3	115.07
400	7.14E-05	0.000286	4	120.95
500	6.67E-05	0.000333	5	127.09

$$K_a = 10454 \text{ M}^{-1}, R^2 = 0.9970$$

$$C_{\text{Compound BC1}} = 10^{-4} \text{ mol/l}, V_{\text{Compound BC1}} = 1000 \text{ }\mu\text{L}, C_{\text{KClO}_4} = 10^{-3} \text{ mol/l}$$

Volume of KClO ₄ μL	C _{Compound BC1} mol/l	C _{K⁺} mol/l	Ratio C _{K⁺} / C _{Compound BC1}	RelativeEmission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	5.06
40	9.62E-05	3.85E-05	0.4	9.26
60	9.43E-05	5.66E-05	0.6	14.67
80	9.26E-05	7.41E-05	0.8	17.9
100	9.09E-05	9.09E-05	1	19.98
200	8.33E-05	0.000167	2	25.52
300	7.69E-05	0.000231	3	28.08
400	7.14E-05	0.000286	4	28.81
500	6.67E-05	0.000333	5	29.46

$$K_a = 57861 \text{ M}^{-1}, R^2 = 0.9932$$

$$C_{\text{Compound BC1}} = 10^{-4} \text{ mol/l}, V_{\text{Compound BC1}} = 1000 \text{ }\mu\text{L}, C_{\text{LiClO}_4} = 10^{-3} \text{ mol/l}$$

Volume of LiClO ₄ μL	C _{Compound BC1} mol/l	C _{Li⁺} mol/l	Ratio C _{Li⁺} / C _{Compound BC1}	RelativeEmission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	2.1
40	9.62E-05	3.85E-05	0.4	4.62
60	9.43E-05	5.66E-05	0.6	7.03
80	9.26E-05	7.41E-05	0.8	9.42
100	9.09E-05	9.09E-05	1	11.07
200	8.33E-05	0.000167	2	19.04
300	7.69E-05	0.000231	3	25.28
400	7.14E-05	0.000286	4	28.6
500	6.67E-05	0.000333	5	31.46

$$K_a = 1908 \text{ M}^{-1}, R^2 = 0.9988$$

$C_{\text{Compound BC1}} = 10^{-4} \text{ mol/l}$, $V_{\text{Compound BC1}} = 1000 \text{ }\mu\text{L}$, $C_{\text{Mg}(\text{ClO}_4)_2} = 10^{-3} \text{ mol/l}$

Volume of $\text{Mg}(\text{ClO}_4)_2$ μL	$C_{\text{Compound BC1}}$ mol/l	$C_{\text{Mg}^{2+}}$ mol/l	Ratio $C_{\text{Mg}^{2+}} / C_{\text{Compound BC1}}$	RelativeEmission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	12.57
40	9.62E-05	3.85E-05	0.4	27.68
60	9.43E-05	5.66E-05	0.6	40.86
80	9.26E-05	7.41E-05	0.8	52.53
100	9.09E-05	9.09E-05	1	61.3
200	8.33E-05	0.000167	2	94.74
300	7.69E-05	0.000231	3	110.87
400	7.14E-05	0.000286	4	118.62
500	6.67E-05	0.000333	5	124.05

$K_a = 9658 \text{ M}^{-1}$, $R^2 = 0.9986$

$C_{\text{Compound BC1}} = 10^{-4} \text{ mol/l}$, $V_{\text{Compound BC1}} = 1000 \text{ }\mu\text{L}$, $C_{\text{Mn}(\text{ClO}_4)_2} = 10^{-3} \text{ mol/l}$

Volume of $\text{Mn}(\text{ClO}_4)_2$ μL	$C_{\text{Compound BC1}}$ mol/l	$C_{\text{Mn}^{2+}}$ mol/l	Ratio $C_{\text{Mn}^{2+}} / C_{\text{Compound BC1}}$	RelativeEmission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	7.56
40	9.62E-05	3.85E-05	0.4	15.94
60	9.43E-05	5.66E-05	0.6	22.74
80	9.26E-05	7.41E-05	0.8	27.59
100	9.09E-05	9.09E-05	1	31.15
200	8.33E-05	0.000167	2	38.91
300	7.69E-05	0.000231	3	42.79
400	7.14E-05	0.000286	4	43.53
500	6.67E-05	0.000333	5	44.39

$K_a = 73903 \text{ M}^{-1}$, $R^2 = 0.9982$

$$C_{\text{Compound BC1}} = 10^{-4} \text{ mol/l}, V_{\text{Compound BC1}} = 1000 \text{ }\mu\text{L}, C_{\text{NaClO}_4} = 10^{-3} \text{ mol/l}$$

Volume of NaClO ₄ μL	C _{Compound BC1} mol/l	C _{Na⁺} mol/l	Ratio C _{Na⁺} / C _{Compound BC1}	RelativeEmission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	5.62
40	9.62E-05	3.85E-05	0.4	11.56
60	9.43E-05	5.66E-05	0.6	16.11
80	9.26E-05	7.41E-05	0.8	19.8
100	9.09E-05	9.09E-05	1	23.29
200	8.33E-05	0.000167	2	33.88
300	7.69E-05	0.000231	3	37.26
400	7.14E-05	0.000286	4	38.22
500	6.67E-05	0.000333	5	39.75

$$K_a = 23428 \text{ M}^{-1}, R^2 = 0.9990$$

$$C_{\text{Compound BC1}} = 10^{-4} \text{ mol/l}, V_{\text{Compound BC1}} = 1000 \text{ }\mu\text{L}, C_{\text{Ni(ClO}_4)_2} = 10^{-3} \text{ mol/l}$$

Volume of Ni(ClO ₄) ₂ μL	C _{Compound BC1} mol/l	C _{Ni²⁺} mol/l	Ratio C _{Ni²⁺} / C _{Compound BC1}	RelativeEmission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	8.21
40	9.62E-05	3.85E-05	0.4	15.15
60	9.43E-05	5.66E-05	0.6	23.67
80	9.26E-05	7.41E-05	0.8	34.73
100	9.09E-05	9.09E-05	1	42.46
200	8.33E-05	0.000167	2	69.24
300	7.69E-05	0.000231	3	79.01
400	7.14E-05	0.000286	4	85.06
500	6.67E-05	0.000333	5	86.84

$$K_a = 7386 \text{ M}^{-1}, R^2 = 0.9906$$

$C_{\text{Compound BC1}} = 10^{-4} \text{ mol/l}$, $V_{\text{Compound BC1}} = 1000 \text{ }\mu\text{L}$, $C_{\text{Pb}(\text{ClO}_4)_2} = 10^{-3} \text{ mol/l}$

Volume of $\text{Pb}(\text{ClO}_4)_2$ μL	$C_{\text{Compound BC1}}$ mol/l	$C_{\text{Pb}^{2+}}$ mol/l	Ratio $C_{\text{Pb}^{2+}} / C_{\text{Compound BC1}}$	RelativeEmission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	27.64
40	9.62E-05	3.85E-05	0.4	43.59
60	9.43E-05	5.66E-05	0.6	57.48
80	9.26E-05	7.41E-05	0.8	71.75
100	9.09E-05	9.09E-05	1	84.22
200	8.33E-05	0.000167	2	118.32
300	7.69E-05	0.000231	3	131.77
400	7.14E-05	0.000286	4	138.51
500	6.67E-05	0.000333	5	146.9

$K_a = 22177 \text{ M}^{-1}$, $R^2 = 0.9979$

$C_{\text{Compound BC1}} = 10^{-4} \text{ mol/l}$, $V_{\text{Compound BC1}} = 1000 \text{ }\mu\text{L}$, $C_{\text{Zn}(\text{ClO}_4)_2} = 10^{-3} \text{ mol/l}$

Volume of $\text{Zn}(\text{ClO}_4)_2$ μL	$C_{\text{Compound BC1}}$ mol/l	$C_{\text{Zn}^{2+}}$ mol/l	Ratio $C_{\text{Zn}^{2+}} / C_{\text{Compound BC1}}$	RelativeEmission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	16.66
40	9.62E-05	3.85E-05	0.4	26.5
60	9.43E-05	5.66E-05	0.6	39.03
80	9.26E-05	7.41E-05	0.8	49.5
100	9.09E-05	9.09E-05	1	58.89
200	8.33E-05	0.000167	2	71.27
300	7.69E-05	0.000231	3	73.75
400	7.14E-05	0.000286	4	74.06
500	6.67E-05	0.000333	5	74.39

$K_a = 140947 \text{ M}^{-1}$, $R^2 = 0.9985$

Fluorescence response of BC2 to various metal ions at 445 nm in CH₃CN:

A JASCO FP-6500 spectrofluorometer was used to record the data.

$C_{\text{Compound BC2}} = 10^{-4}$ mol/l, $V_{\text{Compound BC2}} = 1000$ μ L, $C_{\text{Ba(ClO}_4)_2} = 10^{-3}$ mol/l

Volume of Ba(ClO ₄) ₂ μ L	$C_{\text{Compound BC2}}$ mol/l	$C_{\text{Ba}^{2+}}$ mol/l	Ratio $C_{\text{Ba}^{2+}} / C_{\text{Compound BC2}}$	Relative Emission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	1.4
40	9.62E-05	3.85E-05	0.4	2.73
60	9.43E-05	5.66E-05	0.6	4
80	9.26E-05	7.41E-05	0.8	5.08
100	9.09E-05	9.09E-05	1	6.11
200	8.33E-05	0.000167	2	10.22
300	7.69E-05	0.000231	3	12.36
400	7.14E-05	0.000286	4	13.5
500	6.67E-05	0.000333	5	14.39

$$K_a = 5061 \text{ M}^{-1}, R^2 = 0.9983$$

$$C_{\text{Compound BC2}} = 10^{-4} \text{ mol/l}, V_{\text{Compound BC2}} = 1000 \text{ }\mu\text{L}, C_{\text{Cd}(\text{ClO}_4)_2} = 10^{-3} \text{ mol/l}$$

Volume of $\text{Cd}(\text{ClO}_4)_2$ μL	$C_{\text{Compound BC2}}$ mol/l	$C_{\text{Cd}^{2+}}$ mol/l	Ratio $C_{\text{Cd}^{2+}} / C_{\text{Compound BC2}}$	RelativeEmission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	1.88
40	9.62E-05	3.85E-05	0.4	3.8
60	9.43E-05	5.66E-05	0.6	5.56
80	9.26E-05	7.41E-05	0.8	6.73
100	9.09E-05	9.09E-05	1	8.23
200	8.33E-05	0.000167	2	15.41
300	7.69E-05	0.000231	3	19.55
400	7.14E-05	0.000286	4	22.18
500	6.67E-05	0.000333	5	23.87

$$K_a = 2111 \text{ M}^{-1}, R^2 = 0.9972$$

$$C_{\text{Compound BC2}} = 10^{-4} \text{ mol/l}, V_{\text{Compound BC2}} = 1000 \text{ }\mu\text{L}, C_{\text{Co}(\text{ClO}_4)_2} = 10^{-3} \text{ mol/l}$$

Volume of $\text{Co}(\text{ClO}_4)_2$ μL	$C_{\text{Compound BC2}}$ mol/l	$C_{\text{Co}^{2+}}$ mol/l	Ratio $C_{\text{Co}^{2+}} / C_{\text{Compound BC2}}$	RelativeEmission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	1.9
40	9.62E-05	3.85E-05	0.4	2.9
60	9.43E-05	5.66E-05	0.6	4.05
80	9.26E-05	7.41E-05	0.8	5.11
100	9.09E-05	9.09E-05	1	5.94
200	8.33E-05	0.000167	2	9.46
300	7.69E-05	0.000231	3	11.74
400	7.14E-05	0.000286	4	12.79
500	6.67E-05	0.000333	5	13.19

$$K_a = 6852 \text{ M}^{-1}, R^2 = 0.9981$$

$C_{\text{Compound BC2}} = 10^{-4} \text{ mol/l}$, $V_{\text{Compound BC2}} = 1000 \text{ }\mu\text{L}$, $C_{\text{Cu}(\text{ClO}_4)_2} = 10^{-3} \text{ mol/l}$

Volume of $\text{Cu}(\text{ClO}_4)_2$ μL	$C_{\text{Compound BC2}}$ mol/l	$C_{\text{Cu}^{2+}}$ mol/l	Ratio $C_{\text{Cu}^{2+}} / C_{\text{Compound BC2}}$	RelativeEmission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	4.65
40	9.62E-05	3.85E-05	0.4	9.04
60	9.43E-05	5.66E-05	0.6	13.9
80	9.26E-05	7.41E-05	0.8	18.84
100	9.09E-05	9.09E-05	1	21.76
200	8.33E-05	0.000167	2	28.28
300	7.69E-05	0.000231	3	31.39
400	7.14E-05	0.000286	4	33.48
500	6.67E-05	0.000333	5	34.19

$K_a = 28858 \text{ M}^{-1}$, $R^2 = 0.9968$

$C_{\text{Compound BC2}} = 10^{-4} \text{ mol/l}$, $V_{\text{Compound BC2}} = 1000 \text{ }\mu\text{L}$, $C_{\text{CuI}} = 10^{-3} \text{ mol/l}$

Volume of CuI μL	$C_{\text{Compound BC2}}$ mol/l	C_{Cu^+} mol/l	Ratio $C_{\text{Cu}^+} / C_{\text{Compound BC2}}$	RelativeEmission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	2.87
40	9.62E-05	3.85E-05	0.4	5.95
60	9.43E-05	5.66E-05	0.6	8.14
80	9.26E-05	7.41E-05	0.8	9.78
100	9.09E-05	9.09E-05	1	11.2
200	8.33E-05	0.000167	2	17.98
300	7.69E-05	0.000231	3	20.52
400	7.14E-05	0.000286	4	21.62
500	6.67E-05	0.000333	5	22.59

$K_a = 12265 \text{ M}^{-1}$, $R^2 = 0.9982$

$$C_{\text{Compound BC2}} = 10^{-4} \text{ mol/l}, V_{\text{Compound BC2}} = 1000 \text{ }\mu\text{L}, C_{\text{Fe}(\text{ClO}_4)_2} = 10^{-3} \text{ mol/l}$$

Volume of $\text{Fe}(\text{ClO}_4)_2$ μL	$C_{\text{Compound BC2}}$ mol/l	$C_{\text{Fe}^{2+}}$ mol/l	Ratio $C_{\text{Fe}^{2+}} / C_{\text{Compound BC2}}$	Relative Emission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	2.24
40	9.62E-05	3.85E-05	0.4	4.71
60	9.43E-05	5.66E-05	0.6	6.57
80	9.26E-05	7.41E-05	0.8	8.92
100	9.09E-05	9.09E-05	1	11.44
200	8.33E-05	0.000167	2	19.94
300	7.69E-05	0.000231	3	27.30
400	7.14E-05	0.000286	4	34.65
500	6.67E-05	0.000333	5	39.6

$$K_a = 53 \text{ M}^{-1}, R^2 = 0.9996$$

$$C_{\text{Compound BC2}} = 10^{-4} \text{ mol/l}, V_{\text{Compound BC2}} = 1000 \text{ }\mu\text{L}, C_{\text{KClO}_4} = 10^{-3} \text{ mol/l}$$

Volume of KClO_4 μL	$C_{\text{Compound BC2}}$ mol/l	C_{K^+} mol/l	Ratio $C_{\text{K}^+} / C_{\text{Compound BC2}}$	Relative Emission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	0.91
40	9.62E-05	3.85E-05	0.4	2.00
60	9.43E-05	5.66E-05	0.6	2.96
80	9.26E-05	7.41E-05	0.8	4.13
100	9.09E-05	9.09E-05	1	5.19
200	8.33E-05	0.000167	2	8.76
300	7.69E-05	0.000231	3	11.03
400	7.14E-05	0.000286	4	12.2
500	6.67E-05	0.000333	5	13.14

$$K_a = 2919 \text{ M}^{-1}, R^2 = 0.9964$$

$C_{\text{Compound BC2}} = 10^{-4} \text{ mol/l}$, $V_{\text{Compound BC2}} = 1000 \text{ }\mu\text{L}$, $C_{\text{LiClO}_4} = 10^{-3} \text{ mol/l}$

Volume of LiClO ₄ μL	$C_{\text{Compound BC2}}$ mol/l	C_{Li^+} mol/l	Ratio $C_{\text{Li}^+} / C_{\text{Compound BC2}}$	RelativeEmission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	2.94
40	9.62E-05	3.85E-05	0.4	5.25
60	9.43E-05	5.66E-05	0.6	7.00
80	9.26E-05	7.41E-05	0.8	8.84
100	9.09E-05	9.09E-05	1	10.51
200	8.33E-05	0.000167	2	14.60
300	7.69E-05	0.000231	3	16.67
400	7.14E-05	0.000286	4	17.75
500	6.67E-05	0.000333	5	17.87

$K_a = 20632 \text{ M}^{-1}$, $R^2 = 0.9993$

$C_{\text{Compound BC2}} = 10^{-4} \text{ mol/l}$, $V_{\text{Compound BC2}} = 1000 \text{ }\mu\text{L}$, $C_{\text{Mg}(\text{ClO}_4)_2} = 10^{-3} \text{ mol/l}$

Volume of Mg(ClO ₄) ₂ μL	$C_{\text{Compound BC2}}$ mol/l	$C_{\text{Mg}^{2+}}$ mol/l	Ratio $C_{\text{Mg}^{2+}} / C_{\text{Compound BC2}}$	RelativeEmission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	3.49
40	9.62E-05	3.85E-05	0.4	5.64
60	9.43E-05	5.66E-05	0.6	7.22
80	9.26E-05	7.41E-05	0.8	9.46
100	9.09E-05	9.09E-05	1	11.25
200	8.33E-05	0.000167	2	13.94
300	7.69E-05	0.000231	3	15.69
400	7.14E-05	0.000286	4	16.72
500	6.67E-05	0.000333	5	17.87

$K_a = 32099 \text{ M}^{-1}$, $R^2 = 0.9933$

$C_{\text{Compound BC2}} = 10^{-4} \text{ mol/l}$, $V_{\text{Compound BC2}} = 1000 \text{ }\mu\text{L}$, $C_{\text{Mn(ClO}_4)_2} = 10^{-3} \text{ mol/l}$

Volume of $\text{Mn(ClO}_4)_2$ μL	$C_{\text{Compound BC2}}$ mol/l	$C_{\text{Mn}^{2+}}$ mol/l	Ratio $C_{\text{Mn}^{2+}} / C_{\text{Compound BC2}}$	RelativeEmission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	4.46
40	9.62E-05	3.85E-05	0.4	9.11
60	9.43E-05	5.66E-05	0.6	14.29
80	9.26E-05	7.41E-05	0.8	18.83
100	9.09E-05	9.09E-05	1	22.15
200	8.33E-05	0.000167	2	28.28
300	7.69E-05	0.000231	3	31.39
400	7.14E-05	0.000286	4	33.48
500	6.67E-05	0.000333	5	34.35

$K_a = 30320 \text{ M}^{-1}$, $R^2 = 0.9963$

$C_{\text{Compound BC2}} = 10^{-4} \text{ mol/l}$, $V_{\text{Compound BC2}} = 1000 \text{ }\mu\text{L}$, $C_{\text{NaClO}_4} = 10^{-3} \text{ mol/l}$

Volume of NaClO_4 μL	$C_{\text{Compound BC2}}$ mol/l	C_{Na^+} mol/l	Ratio $C_{\text{Na}^+} / C_{\text{Compound BC2}}$	RelativeEmission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	2.16
40	9.62E-05	3.85E-05	0.4	3.83
60	9.43E-05	5.66E-05	0.6	5.62
80	9.26E-05	7.41E-05	0.8	7.49
100	9.09E-05	9.09E-05	1	8.59
200	8.33E-05	0.000167	2	12.6
300	7.69E-05	0.000231	3	14.78
400	7.14E-05	0.000286	4	16.05
500	6.67E-05	0.000333	5	16.69

$K_a = 11245 \text{ M}^{-1}$, $R^2 = 0.9994$

$C_{\text{Compound BC2}} = 10^{-4} \text{ mol/l}$, $V_{\text{Compound BC2}} = 1000 \text{ }\mu\text{L}$, $C_{\text{Ni(ClO}_4)_2} = 10^{-3} \text{ mol/l}$

Volume of $\text{Ni(ClO}_4)_2$ μL	$C_{\text{Compound BC2}}$ mol/l	$C_{\text{Ni}^{2+}}$ mol/l	Ratio $C_{\text{Ni}^{2+}} / C_{\text{Compound BC2}}$	RelativeEmission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	1.13
40	9.62E-05	3.85E-05	0.4	2.38
60	9.43E-05	5.66E-05	0.6	3.86
80	9.26E-05	7.41E-05	0.8	5.11
100	9.09E-05	9.09E-05	1	6.29
200	8.33E-05	0.000167	2	9.53
300	7.69E-05	0.000231	3	11.68
400	7.14E-05	0.000286	4	13.17
500	6.67E-05	0.000333	5	14.39

$K_a = 4425 \text{ M}^{-1}$, $R^2 = 0.9982$

$C_{\text{Compound BC2}} = 10^{-4} \text{ mol/l}$, $V_{\text{Compound BC2}} = 1000 \text{ }\mu\text{L}$, $C_{\text{Pb(ClO}_4)_2} = 10^{-3} \text{ mol/l}$

Volume of $\text{Pb(ClO}_4)_2$ μL	$C_{\text{Compound BC2}}$ mol/l	$C_{\text{Pb}^{2+}}$ mol/l	Ratio $C_{\text{Pb}^{2+}} / C_{\text{Compound BC2}}$	RelativeEmission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	0.87
40	9.62E-05	3.85E-05	0.4	1.55
60	9.43E-05	5.66E-05	0.6	2.36
80	9.26E-05	7.41E-05	0.8	3.27
100	9.09E-05	9.09E-05	1	4.33
200	8.33E-05	0.000167	2	7.52
300	7.69E-05	0.000231	3	9.77
400	7.14E-05	0.000286	4	12.03
500	6.67E-05	0.000333	5	13.28

$K_a = 695 \text{ M}^{-1}$, $R^2 = 0.9985$

$C_{\text{Compound BC2}} = 10^{-4} \text{ mol/l}$, $V_{\text{Compound BC2}} = 1000 \text{ }\mu\text{L}$, $C_{\text{Zn(ClO}_4)_2} = 10^{-3} \text{ mol/l}$

Volume of $\text{Zn(ClO}_4)_2$ μL	$C_{\text{Compound BC2}}$ mol/l	$C_{\text{Zn}^{2+}}$ mol/l	Ratio $C_{\text{Zn}^{2+}} / C_{\text{Compound BC2}}$	RelativeEmission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	2.16
40	9.62E-05	3.85E-05	0.4	4.03
60	9.43E-05	5.66E-05	0.6	5.25
80	9.26E-05	7.41E-05	0.8	6.38
100	9.09E-05	9.09E-05	1	7.26
200	8.33E-05	0.000167	2	11.6
300	7.69E-05	0.000231	3	13.92
400	7.14E-05	0.000286	4	16.1
500	6.67E-05	0.000333	5	17.17

$K_a = 5838 \text{ M}^{-1}$, $R^2 = 0.9982$

Fluorescence response of BC2 to Hg^{2+} ions at 545 nm in CH_3CN :

$C_{\text{Compound BC2}} = 10^{-4} \text{ mol/l}$, $V_{\text{Compound BC2}} = 1000 \text{ }\mu\text{L}$, $C_{\text{Hg(ClO}_4)_2} = 10^{-3} \text{ mol/l}$

Volume of $\text{Hg(ClO}_4)_2$ μL	$C_{\text{Compound BC2}}$ mol/l	$C_{\text{Hg}^{2+}}$ mol/l	Ratio $C_{\text{Hg}^{2+}} / C_{\text{Compound BC2}}$	RelativeEmission Difference
0	0.0001	0	0	0
20	9.8E-05	1.96E-05	0.2	45.52
40	9.62E-05	3.85E-05	0.4	87.28
60	9.43E-05	5.66E-05	0.6	150.97
100	9.09E-05	9.09E-05	1	236.64
150	8.7E-05	0.00013	1.5	247.24
200	8.33E-05	0.000167	2	260.48

$K_a = 2061336 \text{ M}^{-1}$, $R^2 = 0.9957$