Electronic Supporting Information for

Fluorescence-Based Detection of Benzene, Toluene, Ethylbenzene, Xylene, and Cumene (BTEXC) Compounds in Fuel-Contaminated Snow Environments

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SUMMARY TABLE FOR GC-MS CHARACTERIZATION

Table S1. GC-MS results for snow samples.

Snow	Retention Time (min)	NIST Compound ID
Newport	7.5	4,5-dimethylhexene
	15.4	3-methylpentadecane
	27.4	9-octadecenamide
Providence	9.8	2-trifluoroacetoxydodecane
	12.3	2-methyldecane
	15.3	3,7-dimethyldecane
	18.2	2,3,3-trimethyloctane
	18.6	isopropyl pentadecanoate
	20.5	6-propyltridecane
	25.3	Octanamide
	27.0	9-octadecenamide
Kingston	7.5	4-methylheptene
	12.3	2-methyldodecane
	15.0	triacetin
	15.5	2-methyltridecane
	18.0	2,3,5,8-tetramethyldecane
	27.5	9-octadecenamide

SUMMARY TABLES FOR FLUORESCENCE MODULATION EXPERIMENTS

Table S2. Fluorescence modulation results for Newport snow.

Analyte	β-Cyclodextrin	Methyl-β-Cyclodextrin	2-Hydroxypropyl-β-Cyclodextrin	Phosphate Buffered Saline
1	1.10 ± 0.01	1.12 ± 0.00	1.10 ± 0.00	1.10 ± 0.00
2	1.12 ± 0.01	1.08 ± 0.01	1.05 ± 0.00	1.09 ± 0.00
3	1.10 ± 0.01	1.11 ± 0.01	1.13 ± 0.01	1.84 ± 0.04
4	1.10 ± 0.01	1.05 ± 0.00	1.12 ± 0.01	1.08 ± 0.00
5	1.08 ± 0.00	1.10 ± 0.00	1.11 ± 0.00	1.09 ± 0.01
6	1.13 ± 0.00	1.09 ± 0.01	1.12 ± 0.00	1.08 ± 0.00
7	1.11 ± 0.00	1.10 ± 0.00	1.11 ± 0.01	1.11 ± 0.00
8	1.11 ± 0.00	1.11 ± 0.01	1.10 ± 0.01	1.11 ± 0.00

Table S3. Fluorescence modulation results for Providence snow.

Analyte	β-Cyclodextrin	Methyl-β-Cyclodextrin	2-Hydroxypropyl-β-Cyclodextrin	Phosphate Buffered Saline
1	1.13 ± 0.01	1.09 ± 0.01	1.12 ± 0.02	1.12 ± 0.00
2	1.10 ± 0.01	1.07 ± 0.00	1.08 ± 0.00	1.09 ± 0.00
3	1.07 ± 0.00	1.10 ± 0.00	1.04 ± 0.00	1.07 ± 0.00
4	1.08 ± 0.00	1.05 ± 0.00	1.05 ± 0.00	1.08 ± 0.00
5	1.06 ± 0.00	1.07 ± 0.00	1.04 ± 0.00	1.08 ± 0.00
6	1.08 ± 0.00	1.09 ± 0.01	1.04 ± 0.00	1.06 ± 0.00
7	1.06 ± 0.00	1.11 ± 0.01	1.04 ± 0.00	1.08 ± 0.00
8	1.08 ± 0.00	1.10 ± 0.00	1.04 ± 0.00	1.06 ± 0.00

Table S4. Fluorescence modulation for Kingston snow.

Analyte	β-Cyclodextrin	Methyl-β-Cyclodextrin	2-Hydroxypropyl-β-Cyclodextrin	Phosphate Buffered Saline
1	1.13 ± 0.01	1.11 ± 0.01	1.08 ± 0.00	1.14 ± 0.01
2	1.06 ± 0.00	1.06 ± 0.00	1.07 ± 0.00	1.08 ± 0.00
3	1.12 ± 0.01	1.07 ± 0.00	1.09 ± 0.00	1.13 ± 0.01
4	1.10 ± 0.01	1.07 ± 0.00	1.08 ± 0.01	1.08 ± 0.00
5	1.04 ± 0.00	1.08 ± 0.01	1.02 ± 0.00	1.10 ± 0.01
6	1.09 ± 0.00	1.07 ± 0.00	1.03 ± 0.00	1.11 ± 0.01
7	1.09 ± 0.00	1.11 ± 0.01	1.10 ± 0.01	1.11 ± 0.01
8	1.10 ± 0.00	1.10 ± 0.00	1.08 ± 0.00	1.14 ± 0.01

Table S5. Fluorescence modulation for DI water.

Analyte	β-Cyclodextrin	Methyl-β-Cyclodextrin	2-Hydroxypropyl-β-Cyclodextrin	Phosphate Buffered Saline
1	1.06 ± 0.00	1.08 ± 0.00	1.06 ± 0.02	1.11 ± 0.00
2	1.05 ± 0.01	1.06 ± 0.00	1.06 ± 0.01	1.08 ± 0.01
3	1.05 ± 0.00	1.05 ± 0.01	1.07 ± 0.00	1.09 ± 0.00
4	1.05 ± 0.01	1.05 ± 0.00	1.04 ± 0.00	1.09 ± 0.00
5	1.06 ± 0.01	1.04 ± 0.01	1.06 ± 0.00	1.06 ± 0.00
6	1.05 ± 0.01	1.05 ± 0.00	1.06 ± 0.00	1.10 ± 0.00
7	1.05 ± 0.00	1.04 ± 0.01	1.07 ± 0.00	1.08 ± 0.00
8	1.08 ± 0.01	1.05 ± 0.00	1.06 ± 0.00	1.09 ± 0.00

SUMMARY TABLES FOR MIXTURE FLUORESCENCE MODULATION EXPERIMENTS

Table S6. Fluorescence modulation for analyte mixtures in Kingston snow.

Analyte Mixture	β-cyclodextrin	Methyl-β-cyclodextrin	2-Hydroxypropyl-β-cyclodextrin	Phosphate Buffered Saline
Analyte **4** + Analyte **5**	0.82 ± 0.01	1.32 ± 0.01	1.16 ± 0.03	1.15 ± 0.01
Analyte **4** + Analyte **6**	1.20 ± 0.02	1.10 ± 0.00	1.31 ± 0.03	1.10 ± 0.00
Analyte **5** + Analyte **6**	0.87 ± 0.01	1.08 ± 0.01	1.38 ± 0.04	1.13 ± 0.01
Analyte **4** + Analyte **5** + Analyte **6**	1.15 ± 0.00	1.08 ± 0.01	1.29 ± 0.01	1.16 ± 0.01

Table S7. Fluorescence modulation for analyte mixtures in DI water.

Analyte Mixture	β-cyclodextrin	Methyl-β-cyclodextrin	2-Hydroxypropyl-β-cyclodextrin	Phosphate Buffered Saline
Analyte **4** + Analyte **5**	1.08 ± 0.01	1.02 ± 0.03	1.18 ± 0.01	1.18 ± 0.01
Analyte **4** + Analyte **6**	1.17 ± 0.04	1.08 ± 0.03	1.16 ± 0.02	1.13 ± .02
Analyte **5** + Analyte **6**	1.19 ± 0.02	1.16 ± 0.04	1.21 ± 0.02	1.23 ± 0.01
Analyte **4** + Analyte **5** + Analyte **6**	1.21 ± 0.03	1.14 ± 0.03	1.22 ± 0.02	1.21 ± 0.02

SUMMARY TABLES FOR LIMIT OF DETECTION EXPERIMENTS

Table S8. Limits of detection for analytes with fluorophore **9** and methyl-β-cyclodextrin in Newport snow.

Analyte	Equation	R^2	LOD (μM)
1	y = 0.0004x + 1.053	0.8983	63.03 ± 1.42
2	y = 0.0002x + 1.0135	0.9323	58.10 ± 4.41
3	y = 0.0009x + 1.0054	0.9857	4.02 ± 0.07
4	y = 0.0005x + 1.0286	0.7431	14.85 ± 0.41
5	y = 0.0011x + 0.9634	0.9033	7.60 ± 0.25
6	y = 0.0002x + 1.019	0.9388	30.8 ± 14.90
7	y = 0.0003x + 1.0073	0.3053	*a*

[a] Non-linear values were obtained

Table S9. Limits of detection for analytes with fluorophore **9** and methyl-β-cyclodextrin in Providence snow.

Analyte	Equation	R^2	LOD (μM)
1	y = 0.0007x + 1.0329	0.9221	8.33 ± 0.42
2	y = 0.0003x + 1.0201	0.9983	16.26 ± 0.62
3	y = 0.0005x + 1.014	0.9371	12.52 ± 1.39
4	y = 0.0007x + 0.9896	0.9641	7.52 ± 0.25
5	y = 0.0009x + 0.9523	0.9929	22.15 ± 4.46
6	y = 0.0008x + 0.9354	0.9528	34.40 ± 5.79
7	y = 0.0007x + 1.0285	0.9228	7.21 ± 0.29

Table S10. Limits of detection for analytes with fluorophore **9** and methyl-β-cyclodextrin in Kingston snow.

Analyte	Equation	R^2	LOD (μM)
1	y = 0.0003x + 1.061	0.5459	56.57 ± 4.96
2	y = 0.0005x + 1.0254	0.9143	6.12 ± 0.51
3	y = 0.0009x + 1.0465	0.8719	22.14 ± 0.99
4	y = 0.0005x + 1.0403	0.7831	19.62 ± 2.13
5	y = -0.0004x + 1.0509	0.7656	*a*
6	y = 0.0007x + 1.0113	0.8469	20.87 ± 4.19
7	y = 0.0001x + 0.9847	0.2607	*a*

[a] Non-linear values were obtained.

SUMMARY TABLES FOR ARRAY GENERATION EXPERIMENTS

Table S11. Results of array generation in Newport snow.

Jackknifed Classification Matrix

	Analyte 1	Analyte 2	Analyte 3	Analyte 4	Analyte 5	Analyte 6	Analyte 7	Analyte 8	%correct
Analyte 1	4	0	0	0	0	0	0	0	100
Analyte 2	0	4	0	0	0	0	0	0	100
Analyte 3	0	0	4	0	0	0	0	0	100
Analyte 4	0	0	0	4	0	0	0	0	100
Analyte 5	0	0	0	0	4	0	0	0	100
Analyte 6	0	0	0	0	0	4	0	0	100
Analyte 7	0	0	0	0	0	0	4	0	100
Analyte 8	0	0	0	0	0	0	0	4	100
Total	4	4	4	4	4	4	4	4	100

Cumulative Proportion of Total Dispersion

0.752	0.933	1.000

Table S12. Results of array generation in Providence snow.

Jackknifed Classification Matrix

	Analyte 1	Analyte 2	Analyte 3	Analyte 4	Analyte 5	Analyte 6	Analyte 7	Analyte 8	%correct
Analyte 1	4	0	0	0	0	0	0	0	100
Analyte 2	0	4	0	0	0	0	0	0	100
Analyte 3	0	0	4	0	0	0	0	0	100
Analyte 4	0	0	0	4	0	0	0	0	100
Analyte 5	0	0	0	0	4	0	0	0	100
Analyte 6	0	0	0	0	0	4	0	0	100
Analyte 7	0	0	0	0	0	0	4	0	100
Analyte 8	0	0	0	0	0	0	0	4	100
Total	4	4	4	4	4	4	4	4	100

Cumulative Proportion of Total Dispersion

0.855	0.978	1.000

Table S13. Results of array generation in Kingston snow.

Jackknifed Classification Matrix

	Analyte 1	Analyte 2	Analyte 3	Analyte 4	Analyte 5	Analyte 6	Analyte 7	Analyte 8	%correct
Analyte 1	4	0	0	0	0	0	0	0	100
Analyte 2	0	4	0	0	0	0	0	0	100
Analyte 3	0	0	4	0	0	0	0	0	100
Analyte 4	0	0	0	4	0	0	0	0	100
Analyte 5	0	0	0	0	4	0	0	0	100
Analyte 6	0	0	0	0	0	4	0	0	100
Analyte 7	0	0	0	0	0	0	4	0	100
Analyte 8	0	0	0	0	0	0	0	4	100
Total	4	4	4	4	4	4	4	4	100

Cumulative Proportion of Total Dispersion

0.770	0.988	1.000

Table S14. Results of array generation in DI water.

Jackknifed Classification Matrix

	Analyte 1	Analyte 2	Analyte 3	Analyte 4	Analyte 5	Analyte 6	Analyte 7	Analyte 8	%correct
Analyte 1	4	0	0	0	0	0	0	0	100
Analyte 2	0	4	0	0	0	0	0	0	100
Analyte 3	0	0	4	0	0	0	0	0	100
Analyte 4	0	0	0	4	0	0	0	0	100
Analyte 5	0	0	0	0	4	0	0	0	100
Analyte 6	0	0	0	0	0	4	0	0	100
Analyte 7	0	0	1	0	0	1	2	0	50
Analyte 8	0	0	0	0	0	0	0	4	100
Total	4	4	5	4	4	5	2	4	94

Cumulative Proportion of Total Dispersion

0.500	0.945	1.000

SUMMARY TABLES FOR MIXTURE ARRAY GENERATION EXPERIMENTS

Table S15. Results of array generation for analyte mixtures in Kingston snow

Jackknifed Classification Matrix

	Analyte 4	Analyte 4 + Analyte 5	Analyte 4 + Analyte 5 +	Analyte 4 + Analyte 6	Analyte 5	Analyte 5 + Analyte 6	Analyte 6	%correct
Analyte 4	4	0	0	0	0	0	0	100
Analyte 4 + Analyte 5	0	4	0	0	0	0	0	100
Analyte 4 + Analyte 5 +	0	0	4	0	0	0	0	100
Analyte 4 + Analyte 6	0	0	0	4	0	0	0	100
Analyte 5	0	0	0	0	4	0	0	100
Analyte 5 + Analyte 6	0	0	0	0	0	4	0	100
Analyte 6	0	0	0	0	0	0	4	100
Total	4	4	4	4	4	4	4	100

Cumulative Proportion of Total Dispersion

0.797	0.940	0.999	1.000

Table S16. Results of array generation for analyte mixtures in DI water

Jackknifed Classification Matrix

	Analyte 4	Analyte 4 + Analyte 5	Analyte 4 + Analyte 5 +	Analyte 4 + Analyte 6	Analyte 5	Analyte 5 + Analyte 6	Analyte 6	%correct
Analyte 4	4	0	0	0	0	0	0	100
Analyte 4 + Analyte 5	0	4	0	0	0	0	0	100
Analyte 4 + Analyte 5 +	0	0	4	0	0	0	0	100
Analyte 4 + Analyte 6	0	0	0	4	0	0	0	100
Analyte 5	0	0	0	0	4	0	0	100
Analyte 5 + Analyte 6	0	0	0	0	0	4	0	100
Analyte 6	0	0	0	0	0	0	4	100
Total	4	4	4	4	4	4	4	100

Cumulative Proportion of Total Dispersion

0.774	0.981	0.999	1.000

SUMMARY FIGURES

SUMMARY FIGURES FOR FLUORESCENCE MODULATION EXPERIMENTS

The black line represents the emission from the fluorophore, and the red line represents the emission from the analyte and fluorophore mixed together in the different snow melt samples, both with 460 nm excitation. All X-axes measure the emission from 470 nm to 800 nm, and all the Y-axes have been normalized so that the fluorescence emission is on a scale of 0.0 to 1.0.

Newport Snow

Analyte **1**- Newport

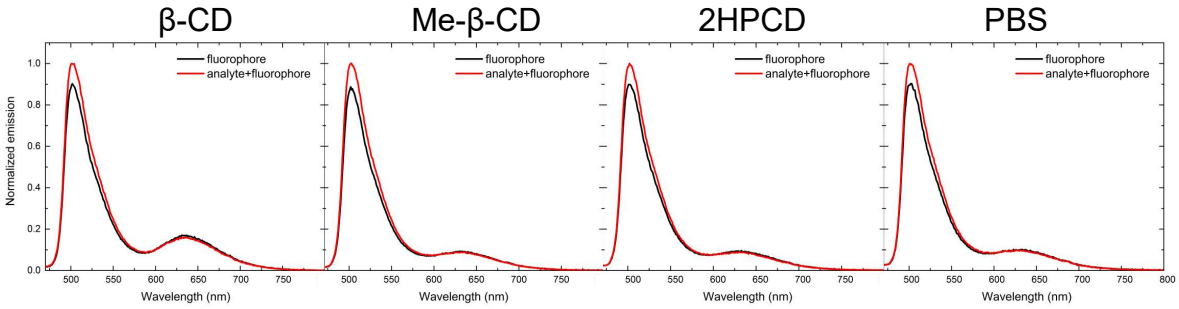

Figure S1. Fluorescence modulation of fluorophore **9** with analyte **1** in Newport snow.

Analyte **2** – Newport

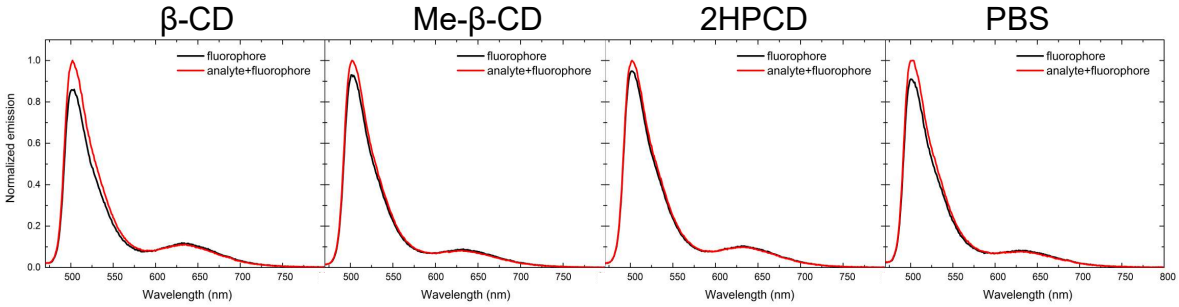

Figure S2. Fluorescence modulation of fluorophore **9** with analyte **2** in Newport snow.

Analyte **3** – Newport

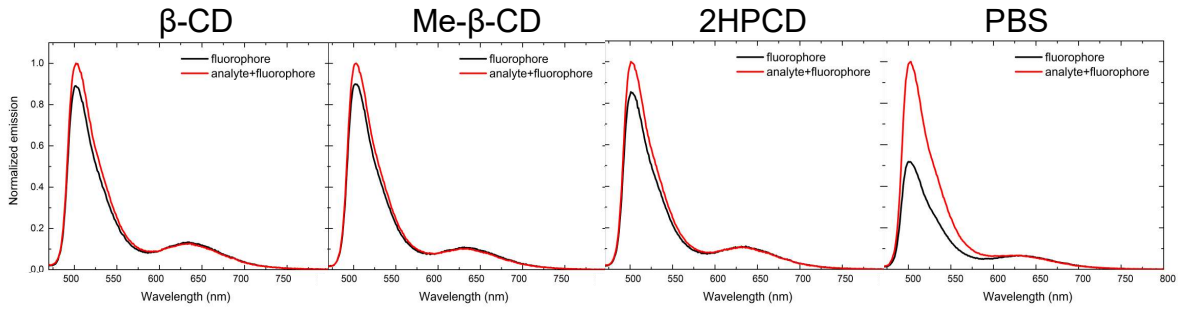

Figure S3: Fluorescence modulation of fluorophore **9** with analyte **3** in Newport snow

Analyte **4** – Newport

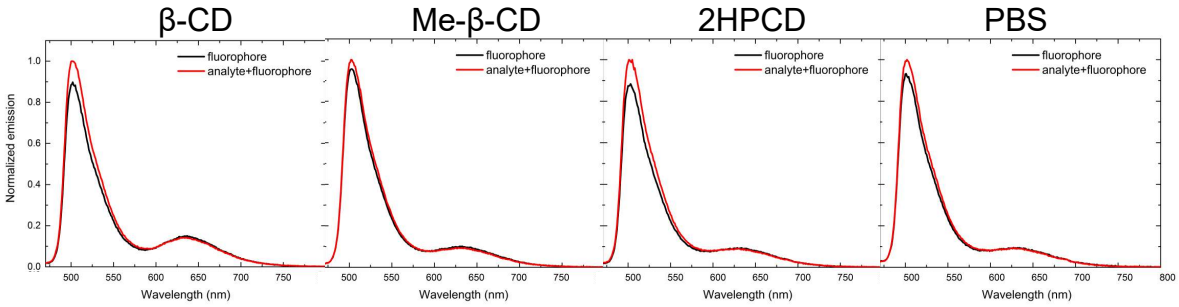

Figure S4: Fluorescence modulation of fluorophore **9** with analyte **4** in Newport snow

Analyte **5** – Newport

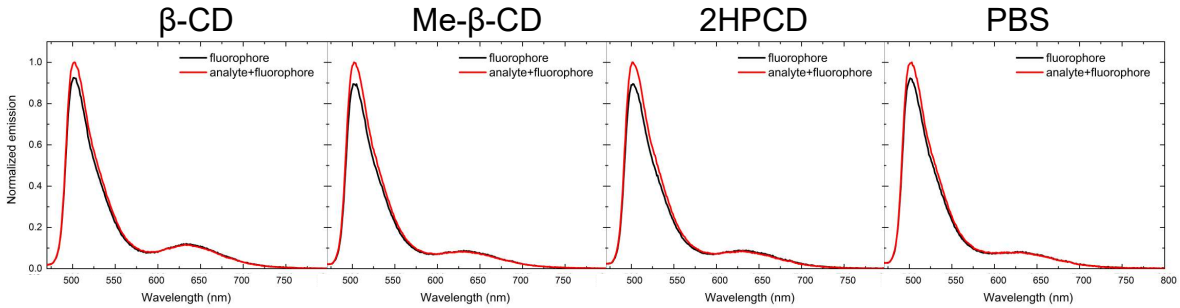

Figure S5: Fluorescence modulation of fluorophore **9** with analyte **5** in Newport snow

Analyte **6** – Newport

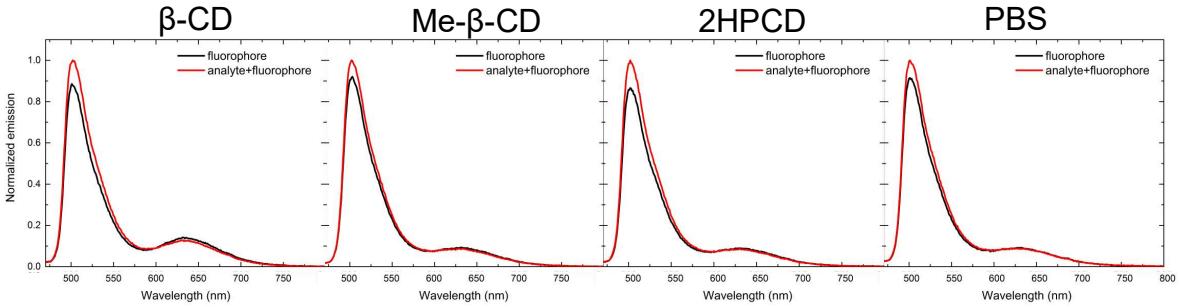

Figure S6: Fluorescence modulation of fluorophore **9** with analyte **6** in Newport snow

Analyte **7** – Newport

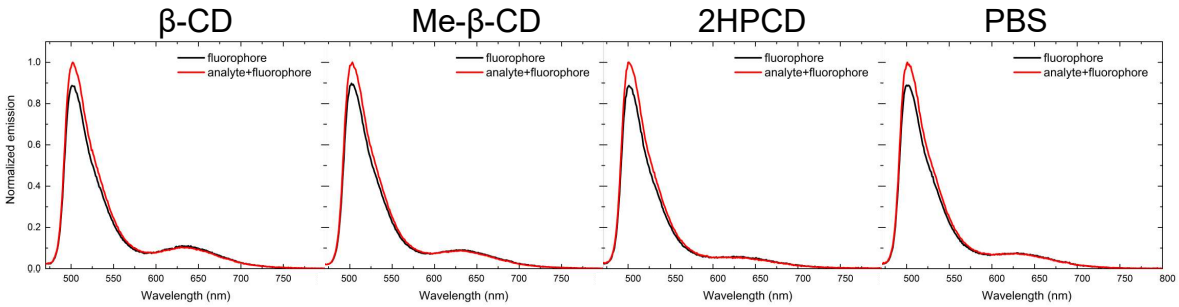

Figure S7: Fluorescence modulation of fluorophore **9** with analyte **7** in Newport snow

Analyte **8** – Newport

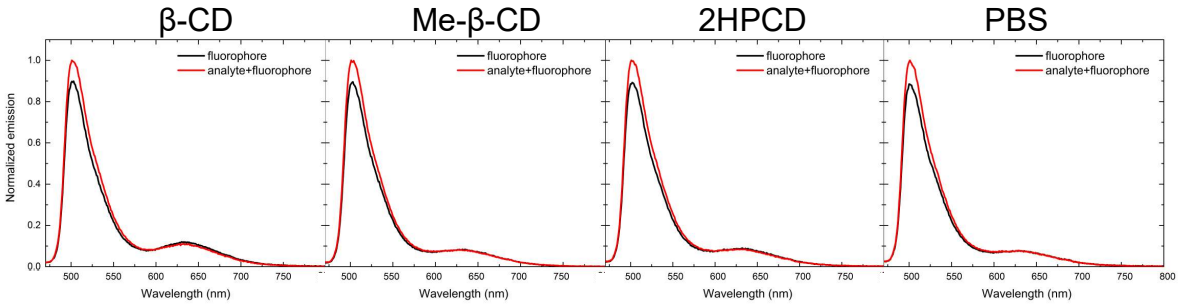

Figure S8: Fluorescence modulation of fluorophore **9** with control analyte **8** in Newport snow

Providence Snow

Analyte **1** – Providence

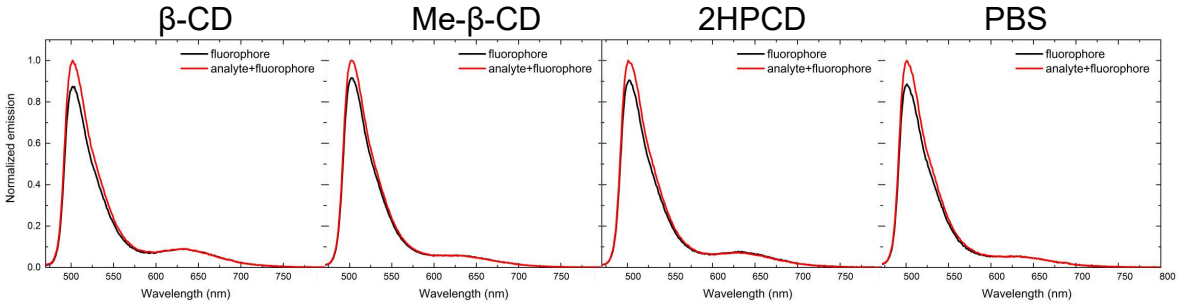

Figure S9: Fluorescence modulation of fluorophore **9** with analyte **1** in Providence snow

Analyte **2** – Providence

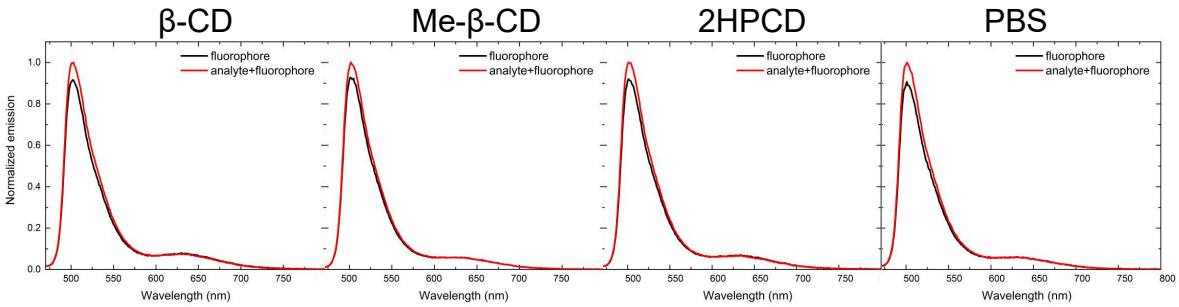

Figure S10: Fluorescence modulation of fluorophore **9** with analyte **2** in Providence snow

Analyte **3** – Providence

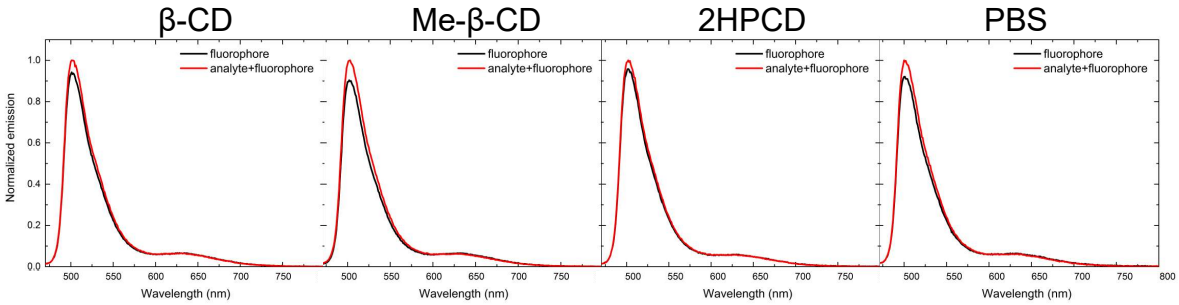

Figure S11: Fluorescence modulation of fluorophore **9** with analyte **3** in Providence snow

Analyte **4** – Providence

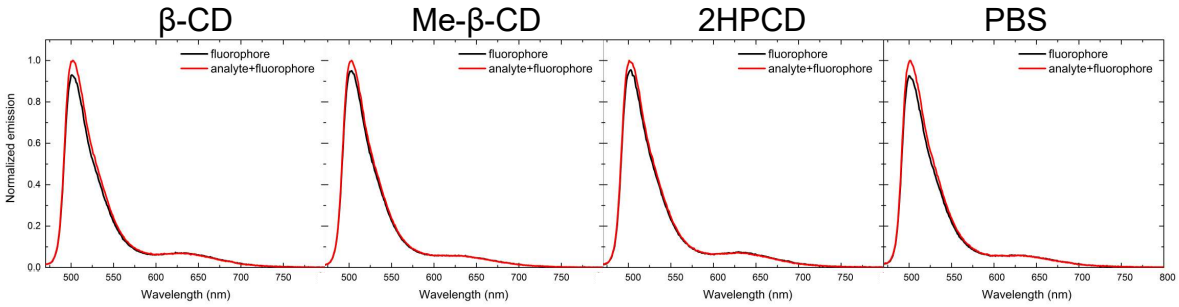

Figure S12: Fluorescence modulation of fluorophore **9** with analyte **4** in Providence snow

Analyte **5** – Providence

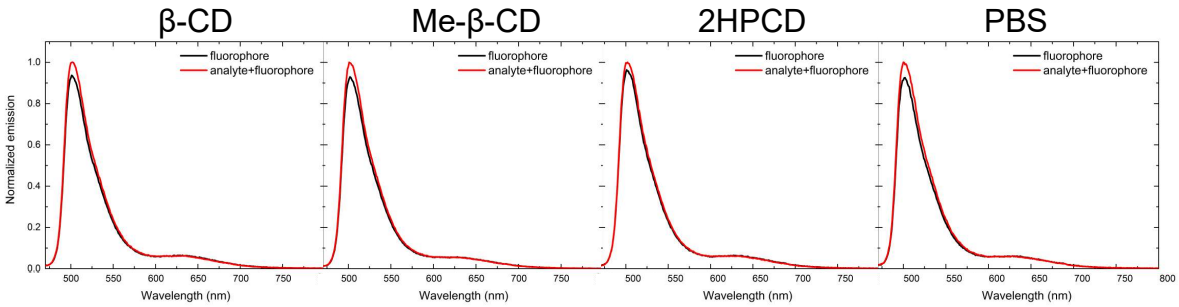

Figure S13: Fluorescence modulation of fluorophore **9** with analyte **5** in Providence snow

Analyte **6** – Providence

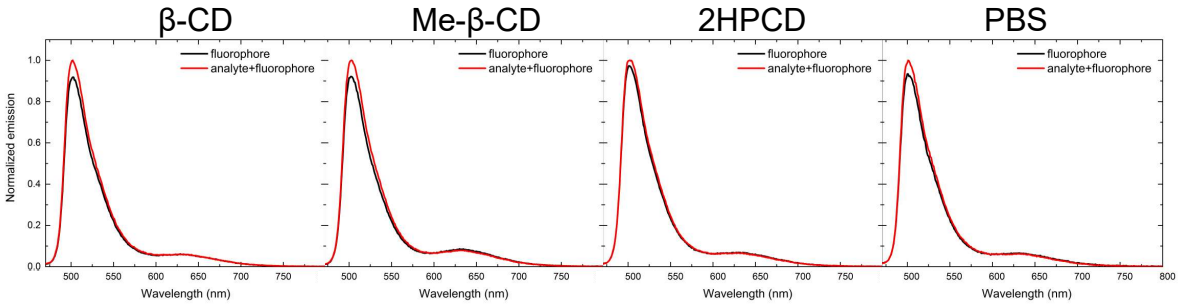

Figure S14: Fluorescence modulation of fluorophore **9** with analyte **6** in Providence snow

Analyte **7** – Providence

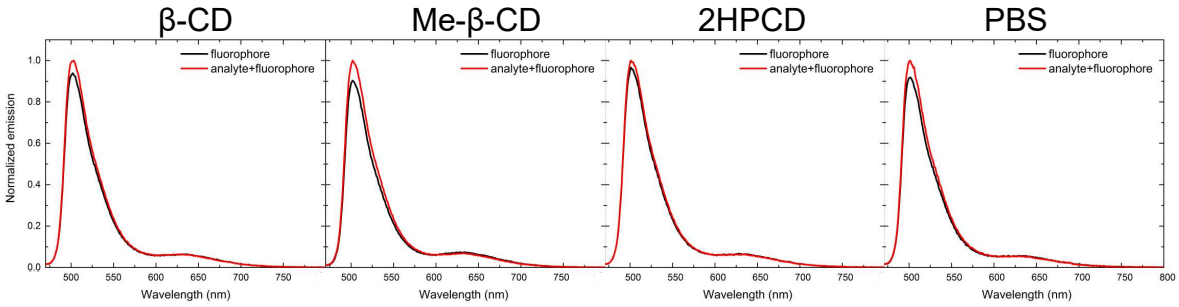

Figure S15: Fluorescence modulation of fluorophore **9** with analyte **7** in Providence snow

Analyte **8** – Providence

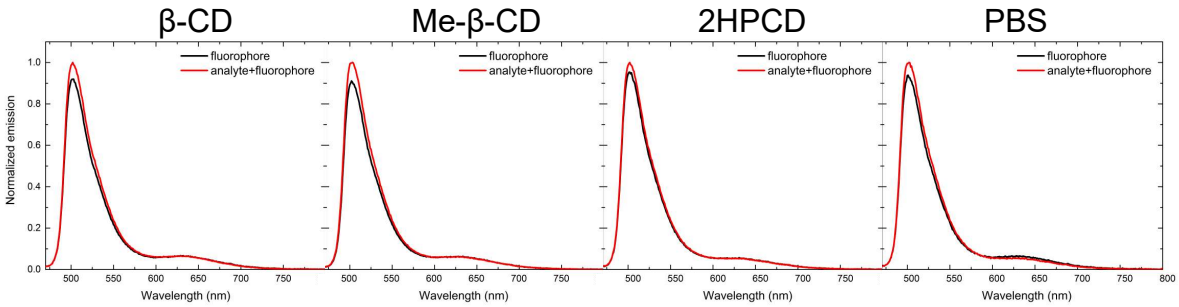

Figure S16: Fluorescence modulation of fluorophore **9** with control analyte **8** in Providence snow

Kingston Snow

Analyte **1** – Kingston

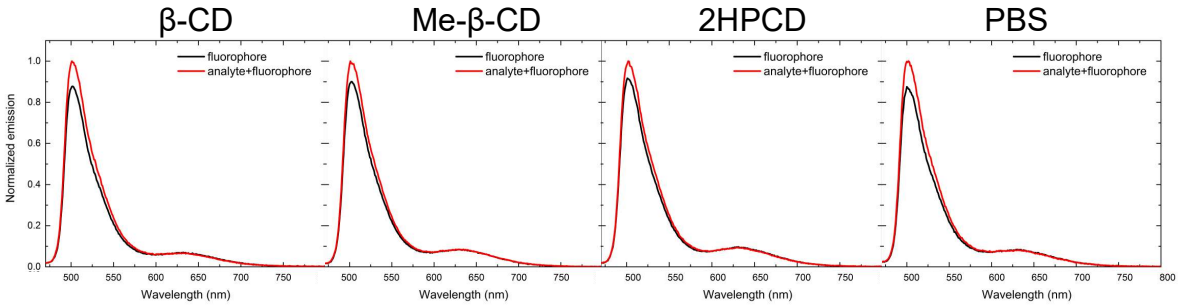

Figure S17: Fluorescence modulation of fluorophore **9** with analyte **1** in Kingston snow

Analyte **2** – Kingston

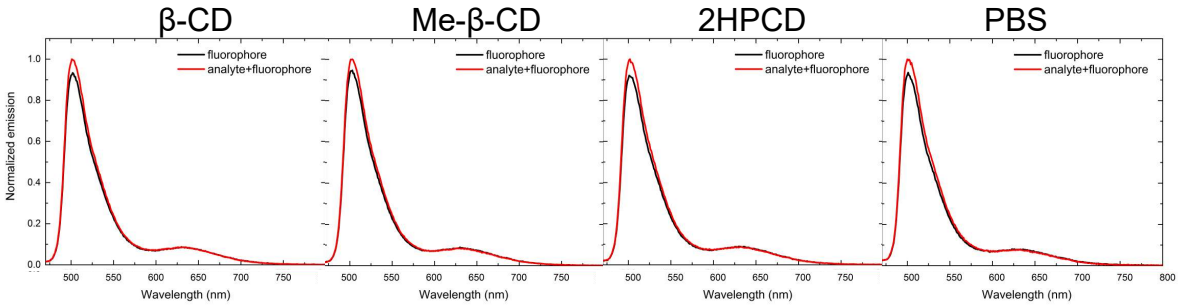

Figure S18: Fluorescence modulation of fluorophore **9** with analyte **2** in Kingston snow

Analyte **3** – Kingston

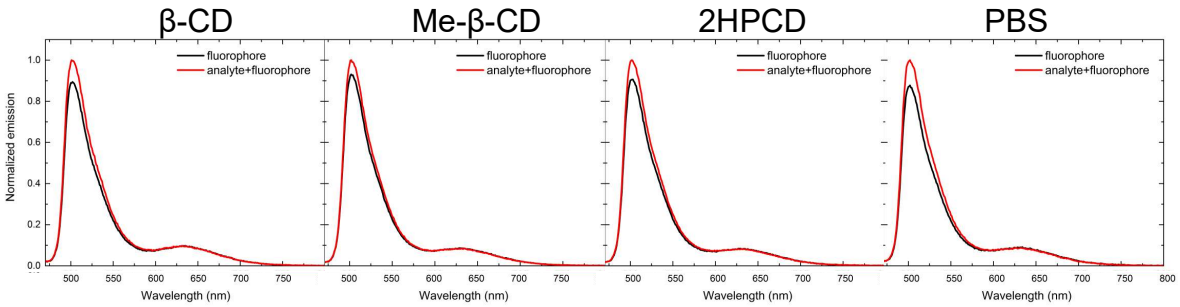

Figure S19: Fluorescence modulation of fluorophore **9** with analyte **3** in Kingston snow

Analyte **4** – Kingston

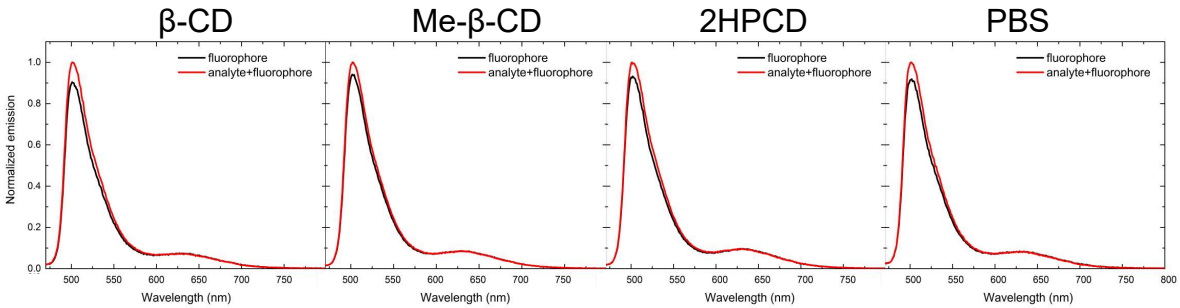

Figure S20: Fluorescence modulation of fluorophore **9** with analyte **4** in Kingston snow

Analyte **5** – Kingston

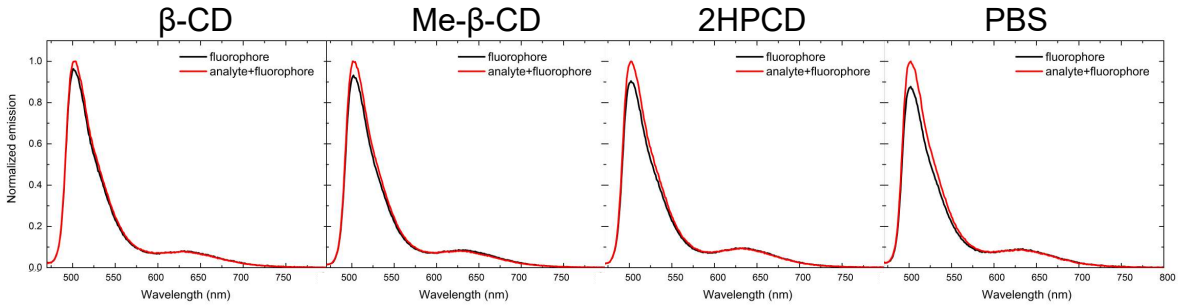

Figure S21: Fluorescence modulation of fluorophore **9** with analyte **5** in Kingston snow

Analyte **6** – Kingston

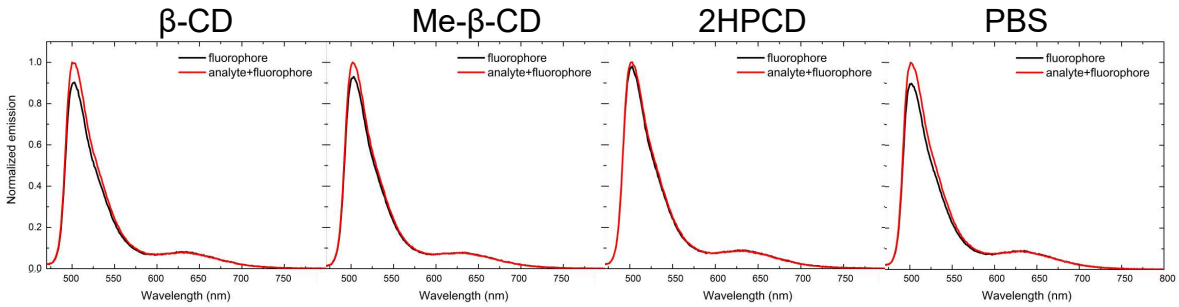

Figure S22: Fluorescence modulation of fluorophore **9** with analyte **6** in Kingston snow

Analyte **7** – Kingston

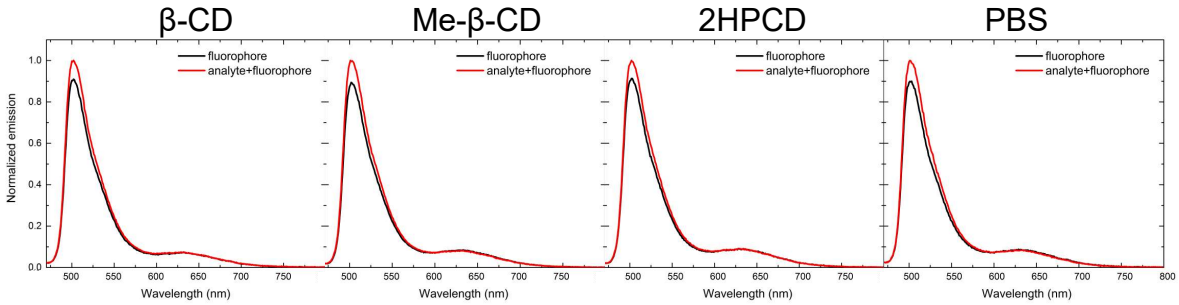

Figure S23: Fluorescence modulation of fluorophore **9** with analyte **7** in Kingston snow

Analyte **8** – Kingston

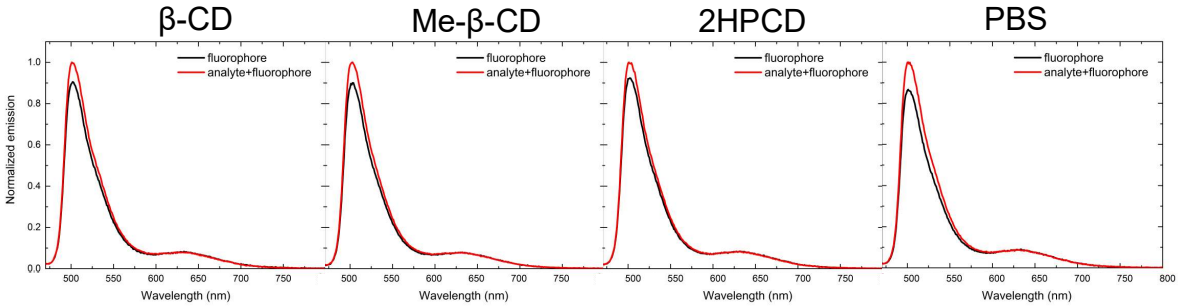

Figure S24: Fluorescence modulation of fluorophore **9** with control analyte **8** in Kingston snow

DI Water

Analyte **1** – DI Water

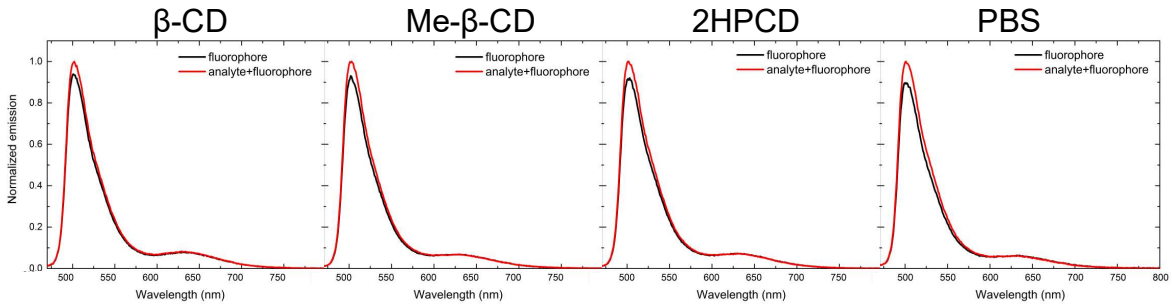

Figure S25: Fluorescence modulation of fluorophore **9** with analyte **1** in DI water

Analyte **2** – DI Water

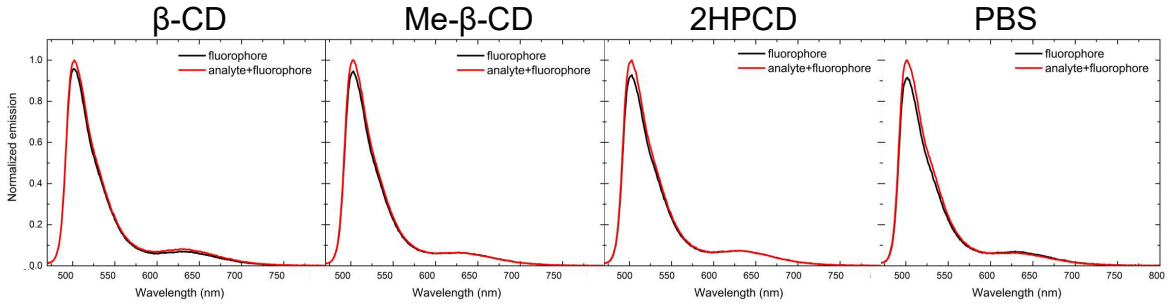

Figure S26: Fluorescence modulation of fluorophore **9** with analyte **2** in DI water

Analyte **3** – DI Water

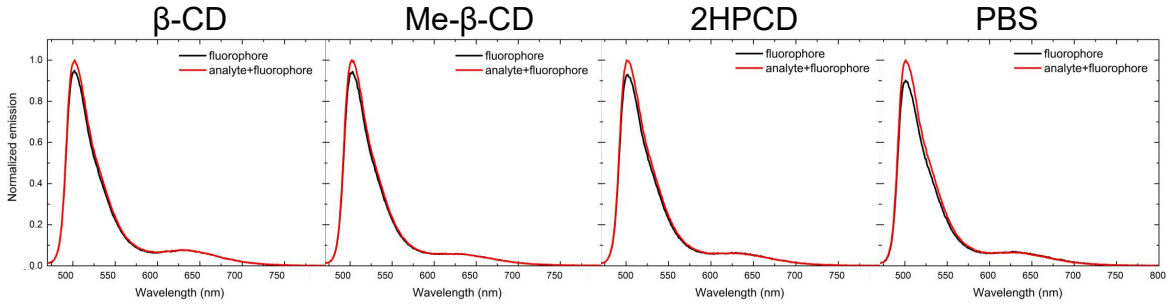

Figure S27: Fluorescence modulation of fluorophore **9** with analyte **3** in DI water

Analyte **4** – DI Water

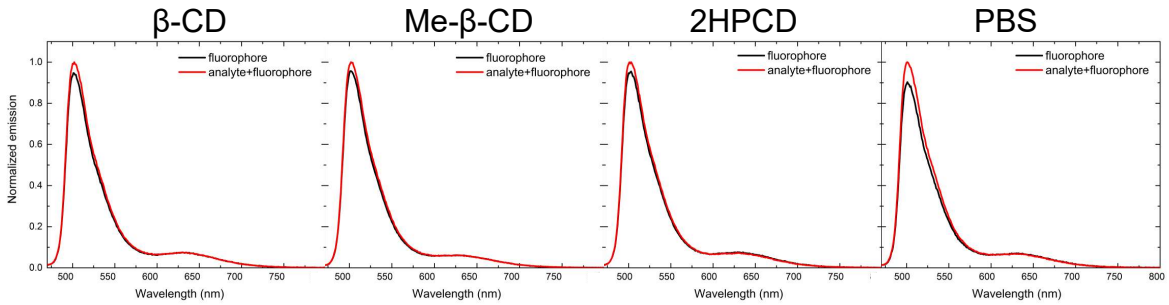

Figure S28: Fluorescence modulation of fluorophore **9** with analyte **4** in DI water

Analyte **5** – DI Water

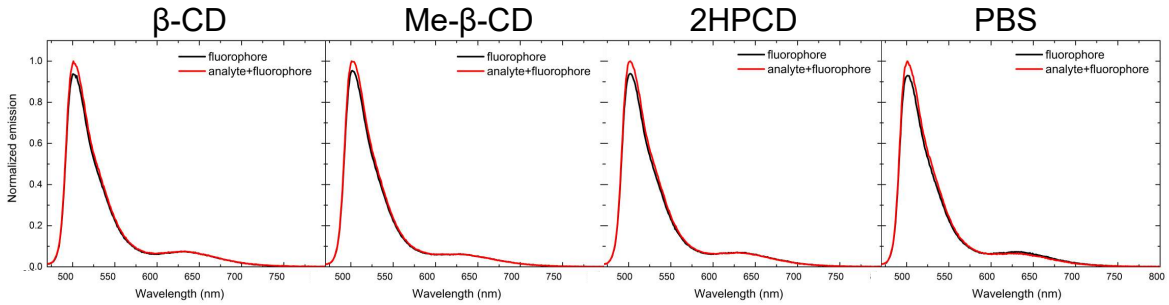

Figure S29: Fluorescence modulation of fluorophore **9** with analyte **5** in DI water

Analyte **6** – DI Water

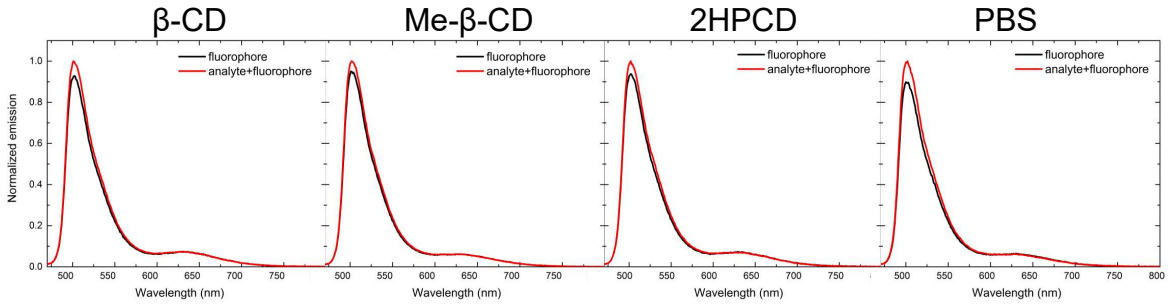

Figure S30: Fluorescence modulation of fluorophore **9** with analyte **6** in DI water

Analyte **7** – DI Water

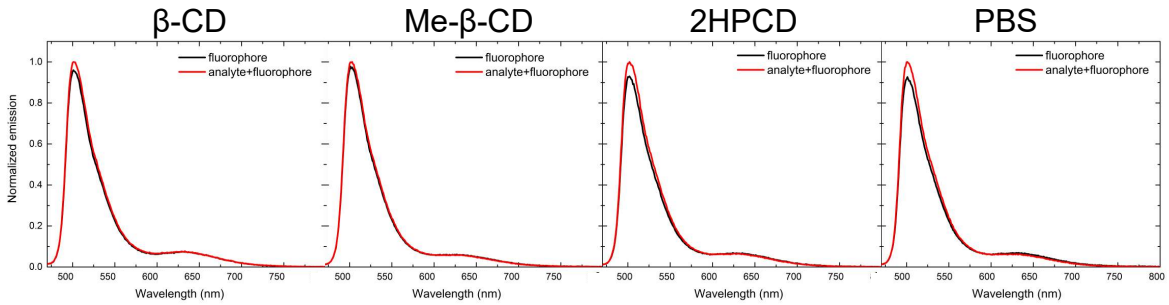

Figure S31: Fluorescence modulation of fluorophore **9** with analyte **7** in DI water

Analyte **8** – DI Water

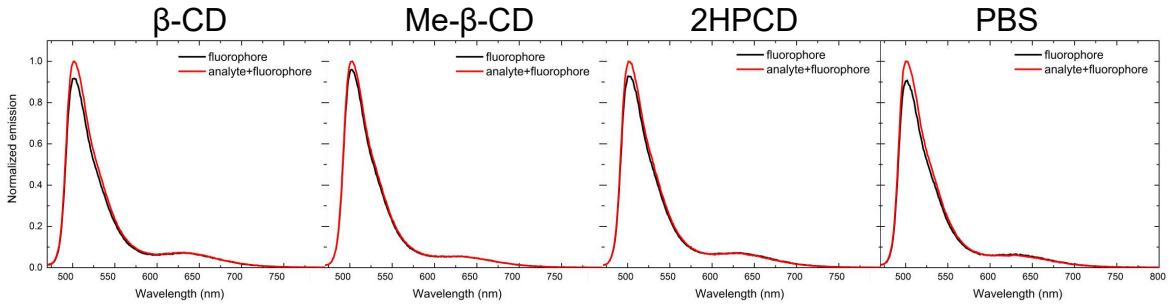

Figure S32: Fluorescence modulation of fluorophore **9** with control analyte **8** in DI water

SUMMARY FIGURES FOR LIMIT OF DETECTION EXPERIMENTS

Limits of detection were calculated following literature-reported procedures:

Cheng, D.; Zhao, W.; Yang, H.; Huang, Z.; Liu, X.; Han, A. Detection of Hg2+ by a FRET ratiometric fluorescent probe based on a novel BODIPY-RhB system. *Tetrahedron Lett.* **2016**, *57*, 2655-2659.

Plots were generated with the ratio of $Fl_{analyte}/Fl_{blank}$ on the Y-axis and analyte concentration in micromolar on the X-axis.

In cases where the slope was negative, we used the absolute values to calculate the limit of detection. Fluorescence modulation is not always an increase in fluorescence emission, it can also appear as a decrease in fluorescence emission with analyte addition.

Newport Snow

Analyte **1** – Fluorophore **9** – methyl-β-cyclodextrin

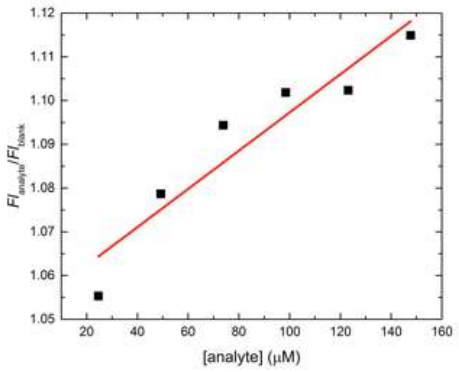

Figure S33: Limit of detection of analyte **1** with fluorophore **9** and methyl-β-cyclodextrin in Newport snow

Analyte **2** – Fluorophore **9** – methyl-β-cyclodextrin

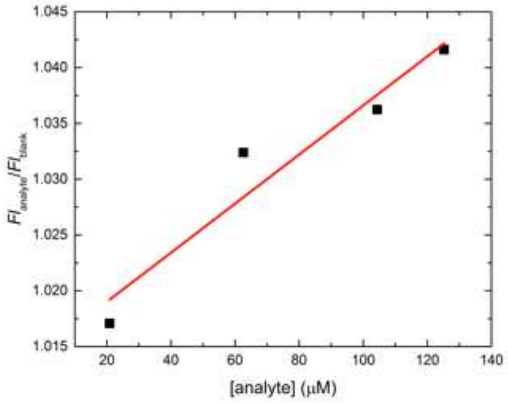

Figure S34: Limit of detection of analyte **2** with fluorophore **9** and methyl-β-cyclodextrin in Newport snow

Analyte **3** – Fluorophore **9** – methyl-β-cyclodextrin

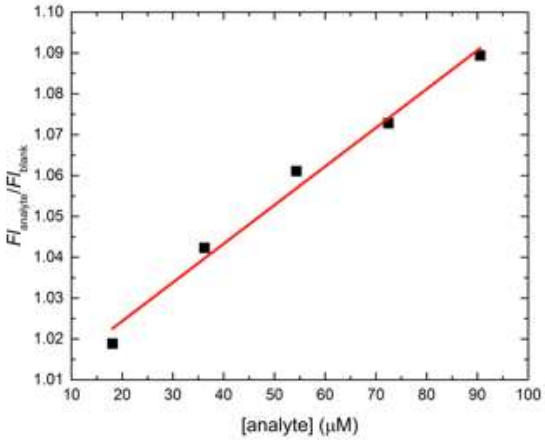

Figure S35: Limit of detection of analyte **3** with fluorophore **9** and methyl-β-cyclodextrin in Newport snow

Analyte **4** – Fluorophore **9** – methyl-β-cyclodextrin

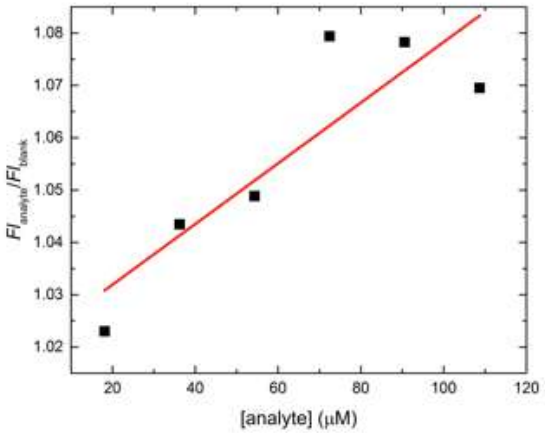

Figure S36: Limit of detection of analyte **4** with fluorophore **9** and methyl-β-cyclodextrin in Newport snow

Analyte **5** – Fluorophore **9** – methyl-β-cyclodextrin

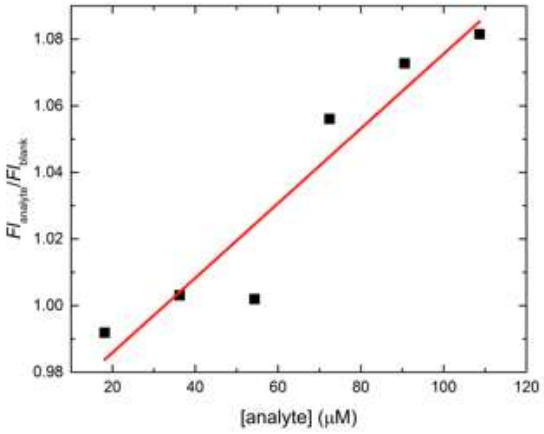

Figure S37: Limit of detection of analyte **5** with fluorophore **9** and methyl-β-cyclodextrin in Newport snow

Analyte **6** – Fluorophore **9** – methyl-β-cyclodextrin

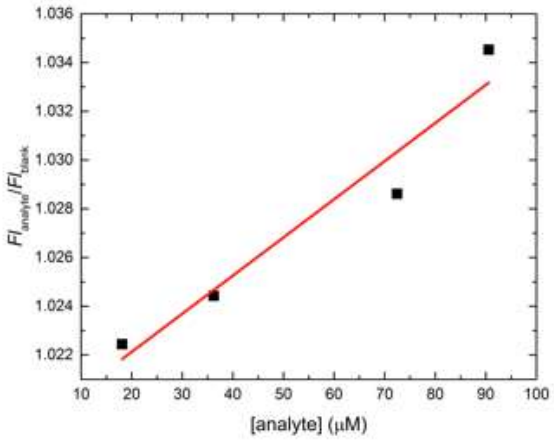

Figure S38: Limit of detection of analyte **6** with fluorophore **9** and methyl-β-cyclodextrin in Newport snow

Analyte **7** – Fluorophore **9** – methyl-β-cyclodextrin

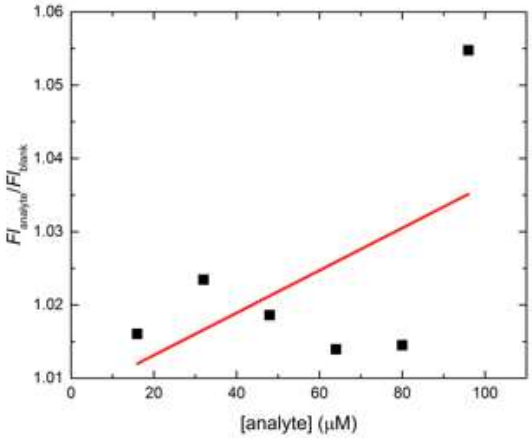

Figure S39: Limit of detection of analyte **7** with fluorophore **9** and methyl-β-cyclodextrin in Newport snow

Providence Snow

Analyte **1** – Fluorophore **9** – methyl-β-cyclodextrin

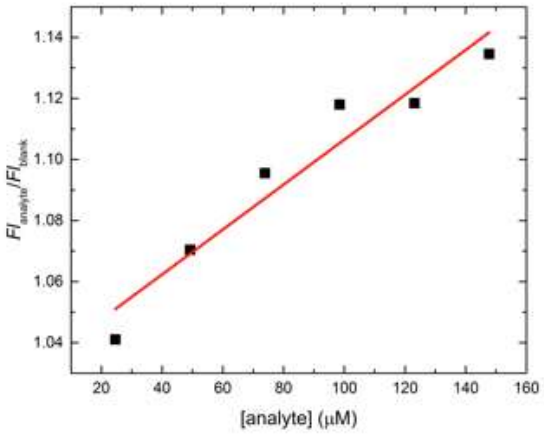

Figure S40: Limit of detection of analyte **1** with fluorophore **9** and methyl-β-cyclodextrin in Providence snow

Analyte **2** – Fluorophore **9** – methyl-β-cyclodextrin

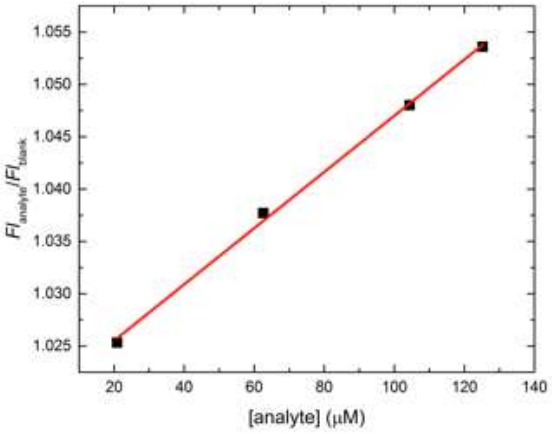

Figure S41: Limit of detection of analyte **2** with fluorophore **9** and methyl-β-cyclodextrin in Providence snow

Analyte **3** – Fluorophore **9** – methyl-β-cyclodextrin

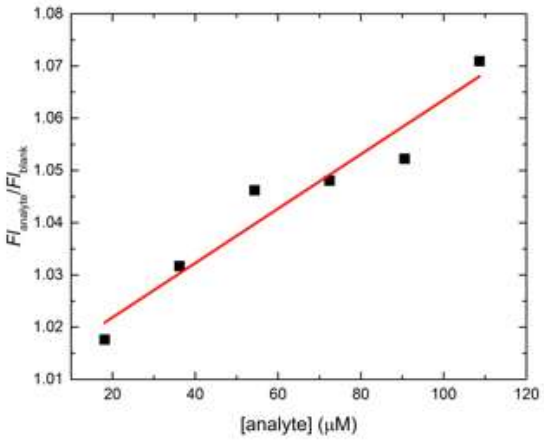

Figure S42: Limit of detection of analyte **3** with fluorophore **9** and methyl-β-cyclodextrin in Providence snow

Analyte **4** – Fluorophore **9** – methyl-β-cyclodextrin

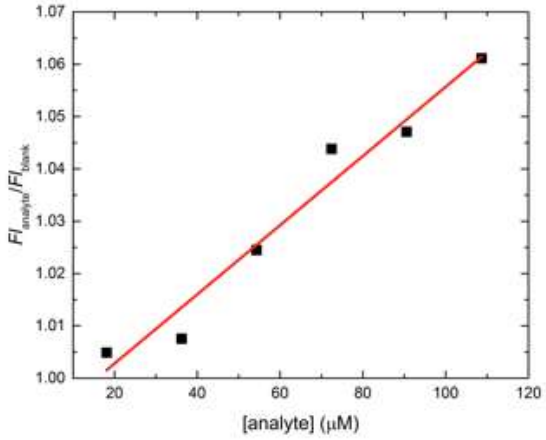

Figure S43: Limit of detection of analyte **4** with fluorophore **9** and methyl-β-cyclodextrin in Providence snow

Analyte **5** – Fluorophore **9** – methyl-β-cyclodextrin

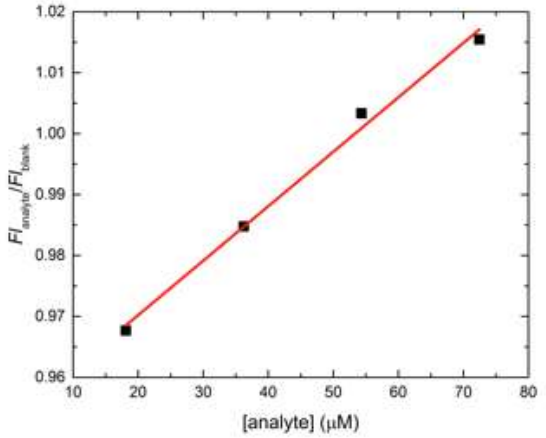

Figure S44: Limit of detection of analyte **5** with fluorophore **9** and methyl-β-cyclodextrin in Providence snow

Analyte **6** – Fluorophore **9** – methyl-β-cyclodextrin

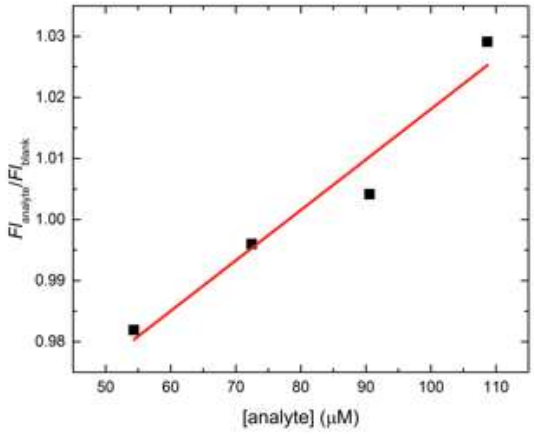

Figure S45: Limit of detection of analyte **6** with fluorophore **9** and methyl-β-cyclodextrin in Providence snow

Analyte **7** – Fluorophore **9** – methyl-β-cyclodextrin

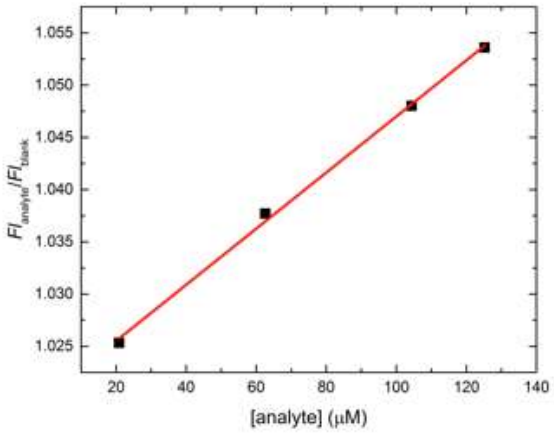

Figure S46: Limit of detection of analyte **7** with fluorophore **9** and methyl-β-cyclodextrin in Providence snow

Kingston Snow

Analyte **1** – Fluorophore **9** – methyl-β-cyclodextrin

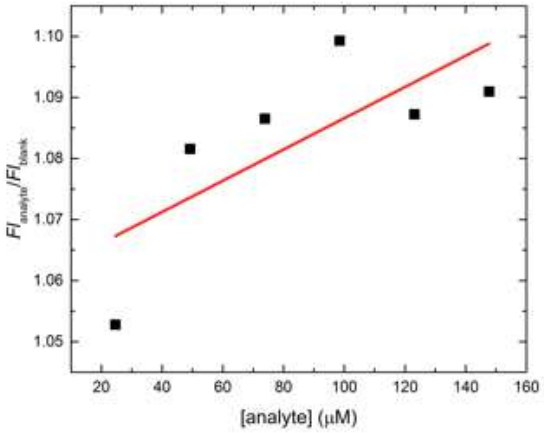

Figure S47: Limit of detection of analyte **1** with fluorophore **9** and methyl-β-cyclodextrin in Kingston snow

Analyte **2** – Fluorophore **9** – methyl-β-cyclodextrin

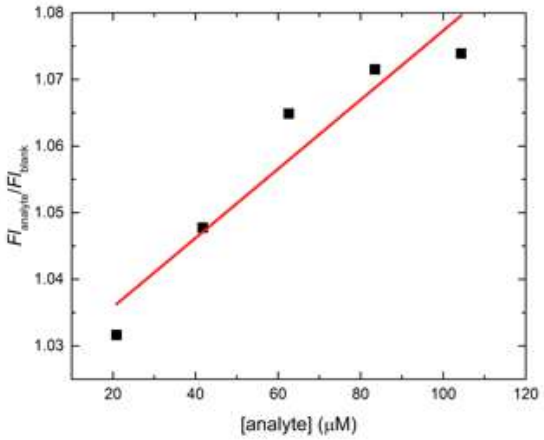

Figure S48: Limit of detection of analyte **2** with fluorophore **9** and methyl-β-cyclodextrin in Kingston snow

Analyte **3** – Fluorophore **9** – methyl-β-cyclodextrin

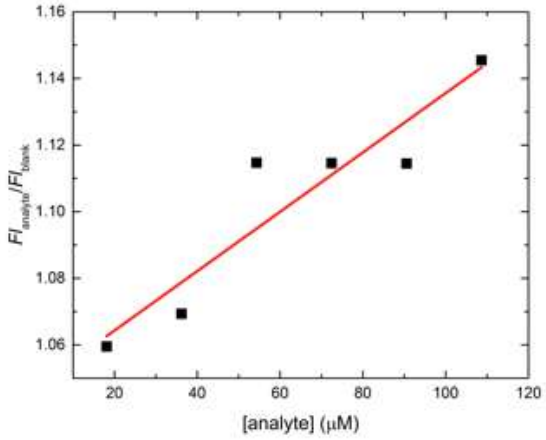

Figure S49: Limit of detection of analyte **3** with fluorophore **9** and methyl-β-cyclodextrin in Kingston snow

Analyte **4** – Fluorophore **9** – methyl-β-cyclodextrin

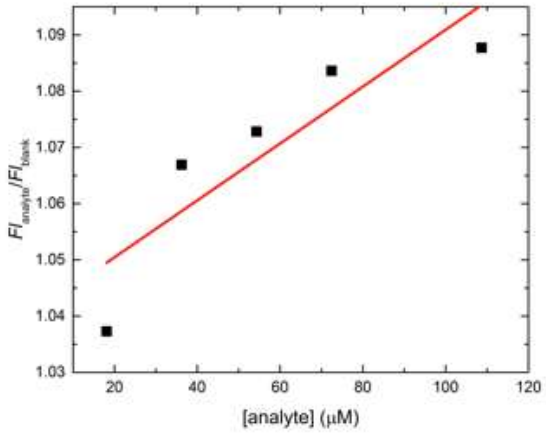

Figure S50: Limit of detection of analyte **4** with fluorophore **9** and methyl-β-cyclodextrin in Kingston snow

Analyte **5** – Fluorophore **9** – methyl-β-cyclodextrin

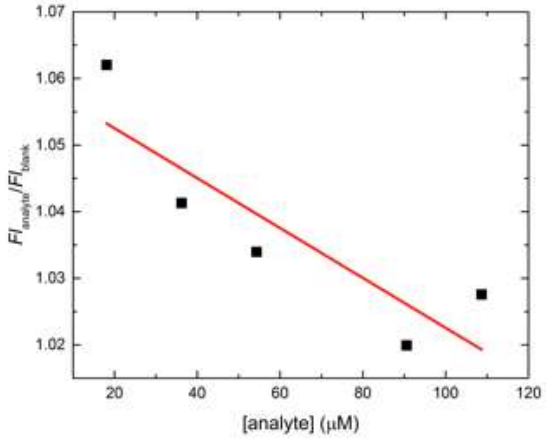

Figure S51: Limit of detection of analyte **5** with fluorophore **9** and methyl-β-cyclodextrin in Kingston snow

Analyte **6** – Fluorophore **9** – methyl-β-cyclodextrin

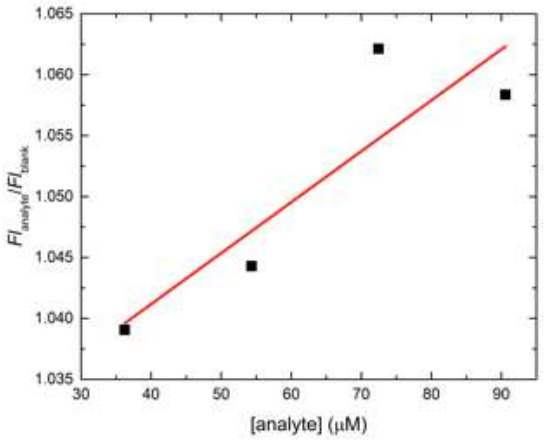

Figure S52: Limit of detection of analyte **6** with fluorophore **9** and methyl-β-cyclodextrin in Kingston snow

Analyte **7** – Fluorophore **9** – methyl-β-cyclodextrin

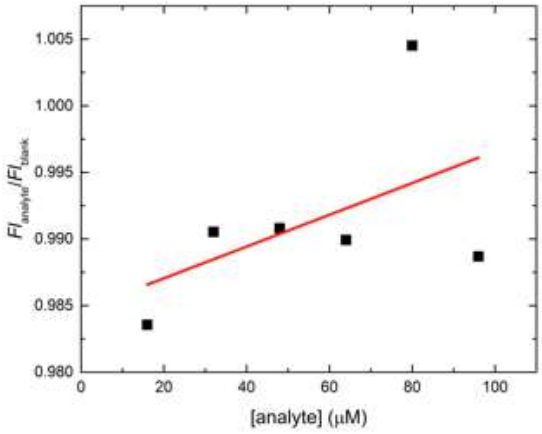

Figure S53: Limit of detection of analyte **7** with fluorophore **9** and methyl-β-cyclodextrin in Kingston snow

SUMMARY FIGURES FOR ARRAY GENERATION EXPERIMENTS

Newport Snow

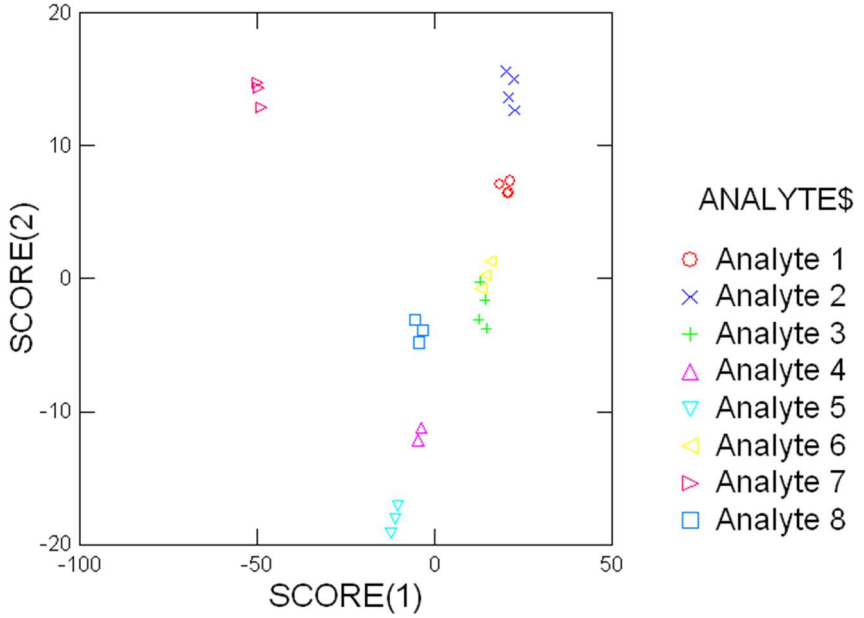

Figure S54: Linear discriminant analysis of fluorescence responses for analytes **1-8** with fluorophore **9** in Newport snow

Providence Snow

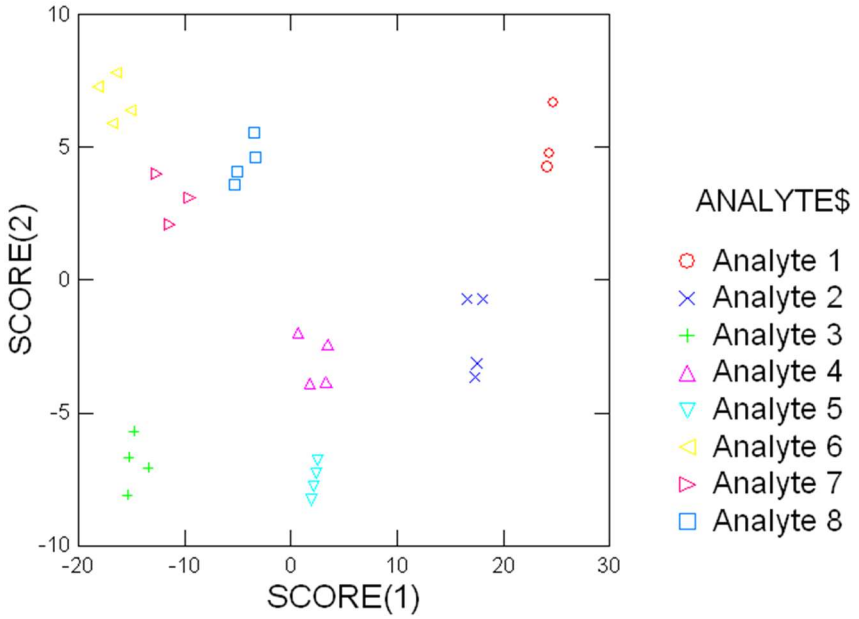

Figure S55: Linear discriminant analysis of fluorescence responses for analytes **1-8** with fluorophore **9** in Providence snow

Kingston Snow

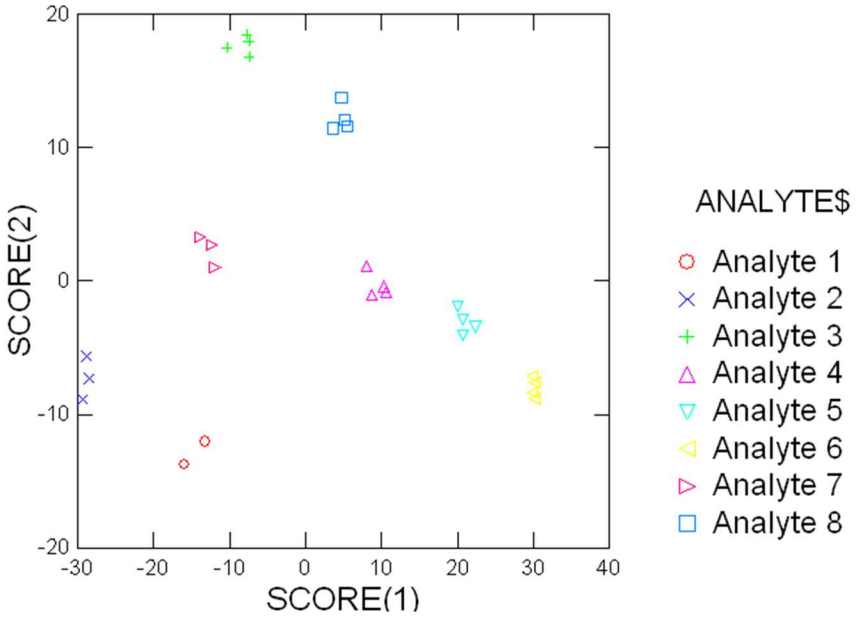

Figure S56: Linear discriminant analysis of fluorescence responses for analytes **1-8** with fluorophore **9** in Kingston snow

DI Water

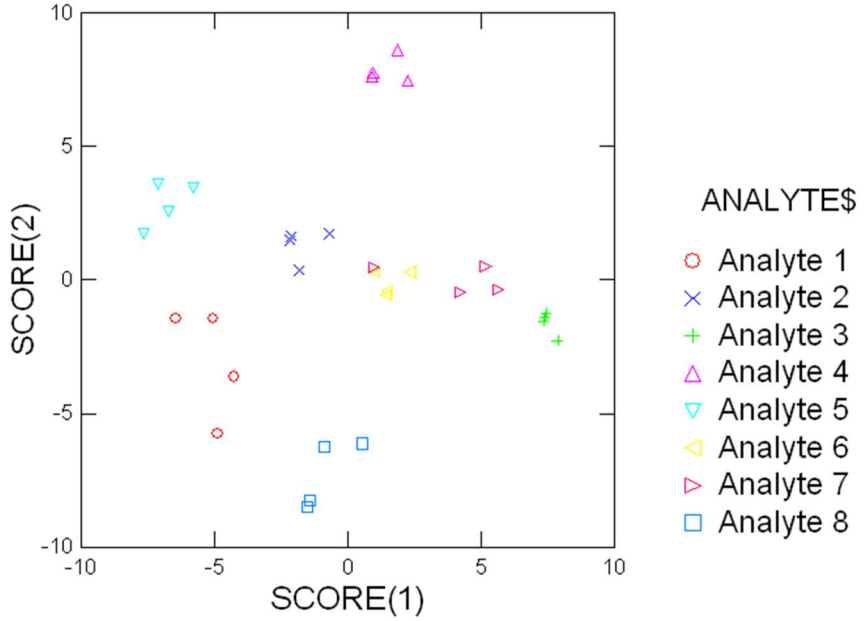

Figure S57: Linear discriminant analysis of fluorescence responses for analytes **1-8** with fluorophore **9** in DI water

SUMMARY FIGURES FOR MIXTURE FLUORESCENCE MODULATION

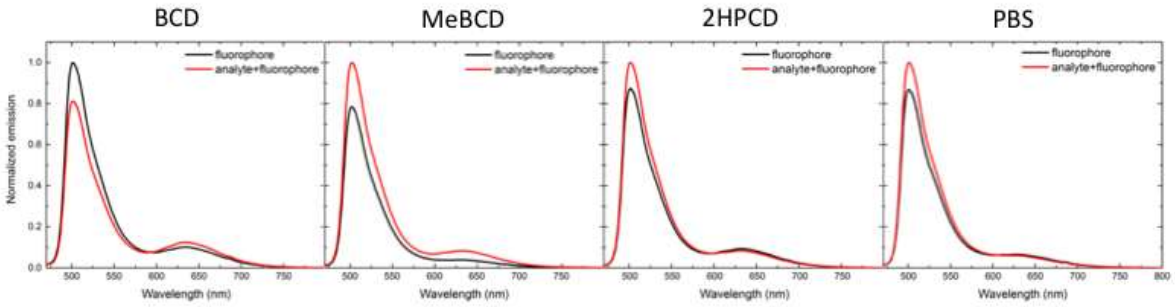

Figure S58. Fluorescence modulation of fluorophore **9** with 1:1 (vol:vol) analyte **4** and analyte **5** in Kingston snow

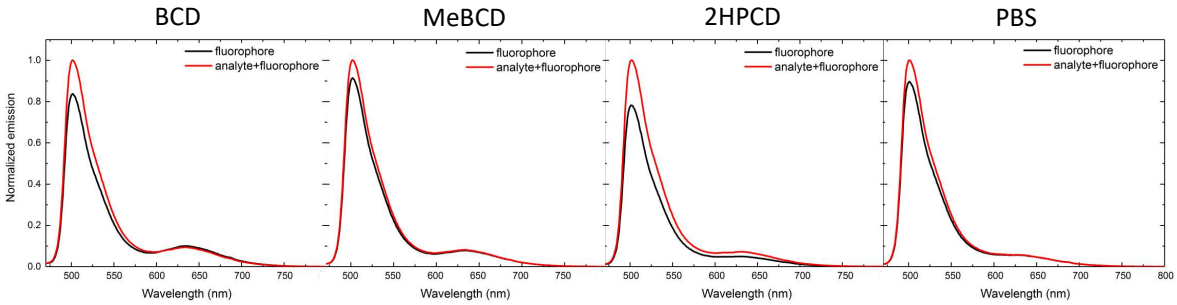

Figure S59. Fluorescence modulation of fluorophore **9** with 1:1 (vol:vol) analyte **4** and analyte **6** in Kingston snow

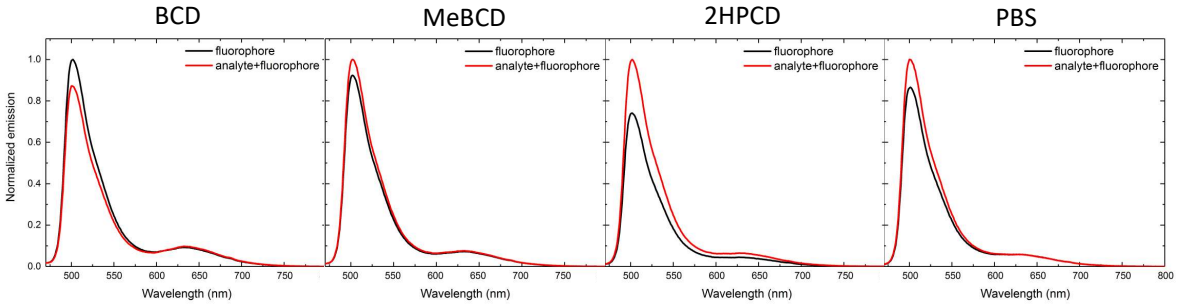

Figure S60. Fluorescence modulation of fluorophore **9** with 1:1 (vol:vol) analyte **5** and analyte **6** in Kingston snow

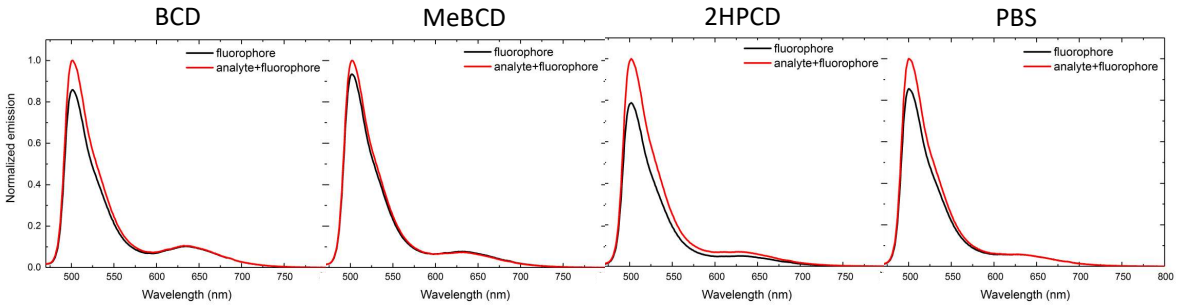

Figure S61. Fluorescence modulation of fluorophore **9** with 1:1:1 (vol:vol:vol) analyte **4**, analyte **5**, and analyte **6** in Kingston snow

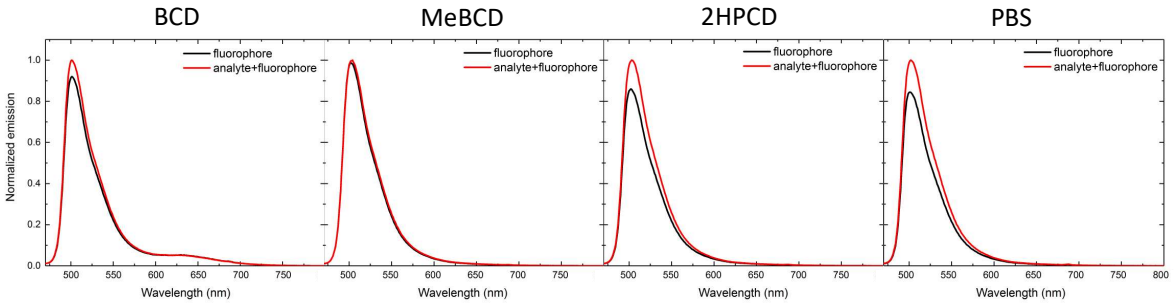

Figure S62. Fluorescence modulation of fluorophore **9** with 1:1 (vol:vol) analyte **4** and analyte **5** in DI water

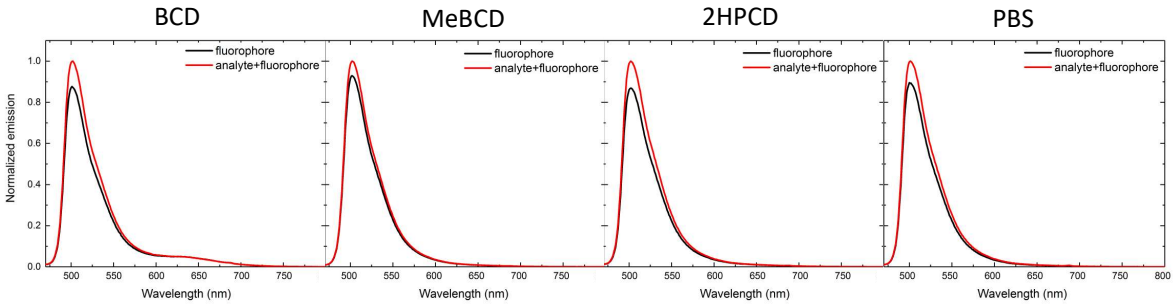

Figure S63. Fluorescence modulation of fluorophore **9** with 1:1 (vol:vol) analyte **4** and analyte **6** in DI water

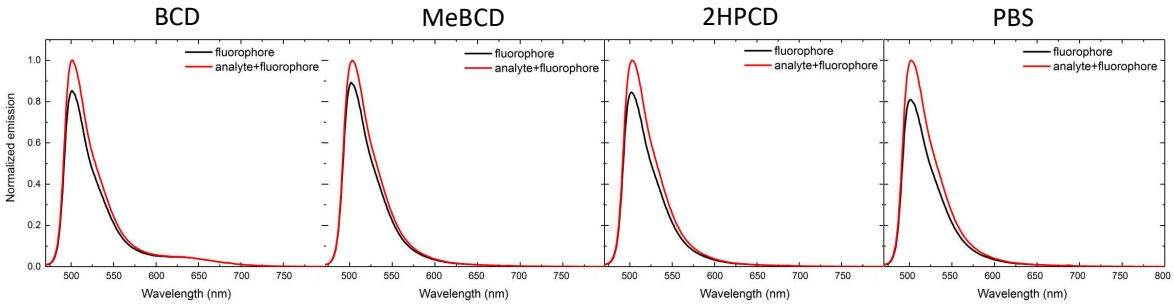

Figure S64. Fluorescence modulation of fluorophore **9** with 1:1 (vol:vol) analyte **5** and analyte **6** in DI water

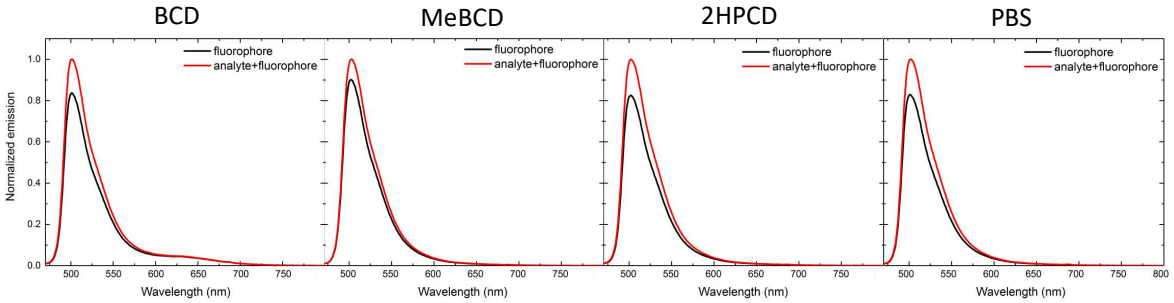

Figure S65. Fluorescence modulation of fluorophore **9** with 1:1:1 (vol:vol:vol) analyte **4**, analyte **5**, and analyte **6** in DI water