

# A combinatorial approach to surface-confined cations sensor in water

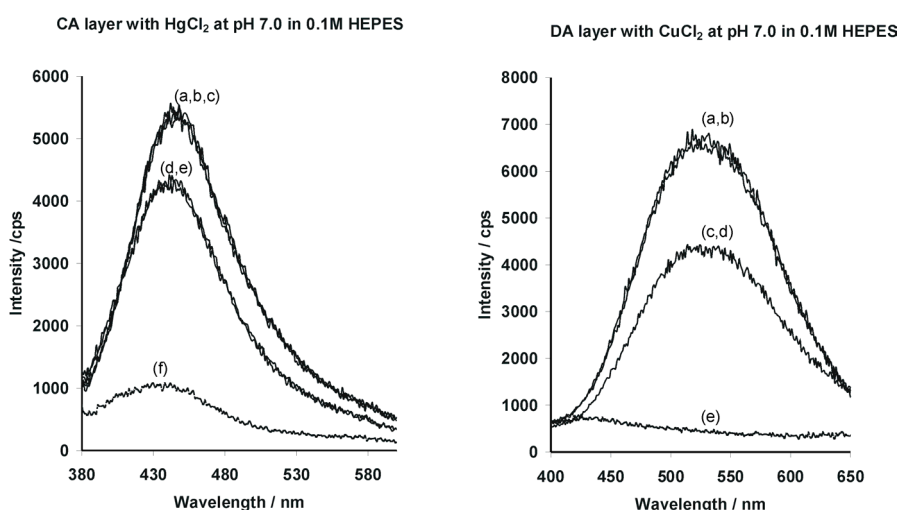
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## Supplementary Material

### Example of fluorescence spectra of two different monolayers in presence of analytes

Two examples of typical fluorescence emission spectra of the layers in the presence of analytes are shown below (figure 1)



**Fig. 1** : Left : Spectra of CA layer in 0.1 M HEPES solution (a), after 3 min. (b), after 5 min. (c), in 10<sup>-4</sup> M aqueous solution of HgCl<sub>2</sub> (d), 3 min. later (e), and spectrum of the residual solvent after removal of

the layer from the fluorescence cuvette (f). Right : Spectra of DA layer in 0.1 M HEPES solution (a), after 5 min. (b), in  $10^{-4}$  M aqueous solution of  $\text{CuCl}_2$  (c), 3 min. later (d), and spectrum of the residual solvent after removal of the layer from the fluorescence cuvette (e). Units of the y axe are counts per second (cps).

## Error analysis

A detailed statistical error analysis of the fluorescence responses at  $10^{-4}$  M analyte concentration is shown below in table and graph format.

10<sup>-4</sup> M in 0.1M HEPES with chloride metal salts

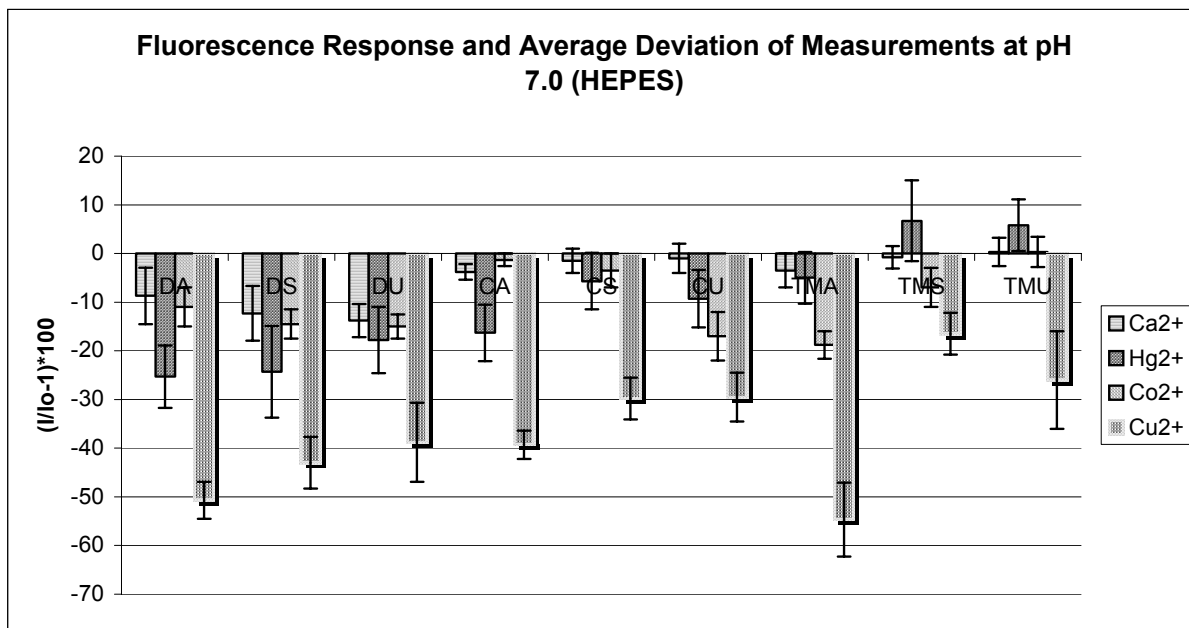
DA					CA					TMA				
Ca <sup>2+</sup>	Co <sup>2+</sup>	Cu <sup>2+</sup>	Hg <sup>2+</sup>		Ca <sup>2+</sup>	Co <sup>2+</sup>	Cu <sup>2+</sup>	Hg <sup>2+</sup>		Ca <sup>2+</sup>	Co <sup>2+</sup>	Cu <sup>2+</sup>	Hg <sup>2+</sup>	
-15.0		-55.0	-16.0		-2.0	-3.0	-43.0	-8.0		-9.0	-16.0		-2.0	
-11.0	-15.0	-45.0	-35.0		-3.0	0.0	-40.0	-25.0		-5.0	-21.0	-47.0	-21.0	
0.0	-7.0	-52.0	-25.0		-3.0	-2.0	-35.0	-16.0		0.0	-16.0	-51.0	-4.0	
					-7.0	0.0				0.0	-22.0	-66.0	-5.0	
													-3.0	
													5.0	
Avg	-8.7	-11.0	-50.7	-25.3	Avg	-3.8	-1.3	-39.3	-16.3	Avg	-3.5	-18.8	-54.7	-5.0
Avg Dev	5.8	4.0	3.8	6.4	Avg Dev	1.6	1.3	2.9	5.8	Avg Dev	3.5	2.8	7.6	5.3

DS					CS					TMS				
Ca <sup>2+</sup>	Co <sup>2+</sup>	Cu <sup>2+</sup>	Hg <sup>2+</sup>		Ca <sup>2+</sup>	Co <sup>2+</sup>	Cu <sup>2+</sup>	Hg <sup>2+</sup>		Ca <sup>2+</sup>	Co <sup>2+</sup>	Cu <sup>2+</sup>	Hg <sup>2+</sup>	
		-19.0	-36.0		-2.0	-10.0	-30.0	3.0		0.0	-6.0	-25.0	2.0	
	-4.0	-16.0	-46.0	-41.0	-6.0	0.0	-27.0	-14.0		-5.0	-10.0	-11.0	23.0	
	-16.0	-9.0	-35.0	-13.0	0.0	0.0	-24.0	-6.0		3.0	0.0	-16.0	11.0	
	-17.0	-14.0	-48.0	-19.0	2.0	-4.0	-38.0			-1.0	-12.0	-14.0	11.0	
				-20.0									4.0	
				-17.0									-11.0	
Avg	-12.3	-14.5	-43.0	-24.3	Avg	-1.5	-3.5	-29.8	-5.7	Avg	-0.8	-7.0	-16.5	6.7
Avg Dev	5.6	3.0	5.3	9.4	Avg Dev	2.5	3.5	4.3	5.8	Avg Dev	2.3	4.0	4.3	8.3

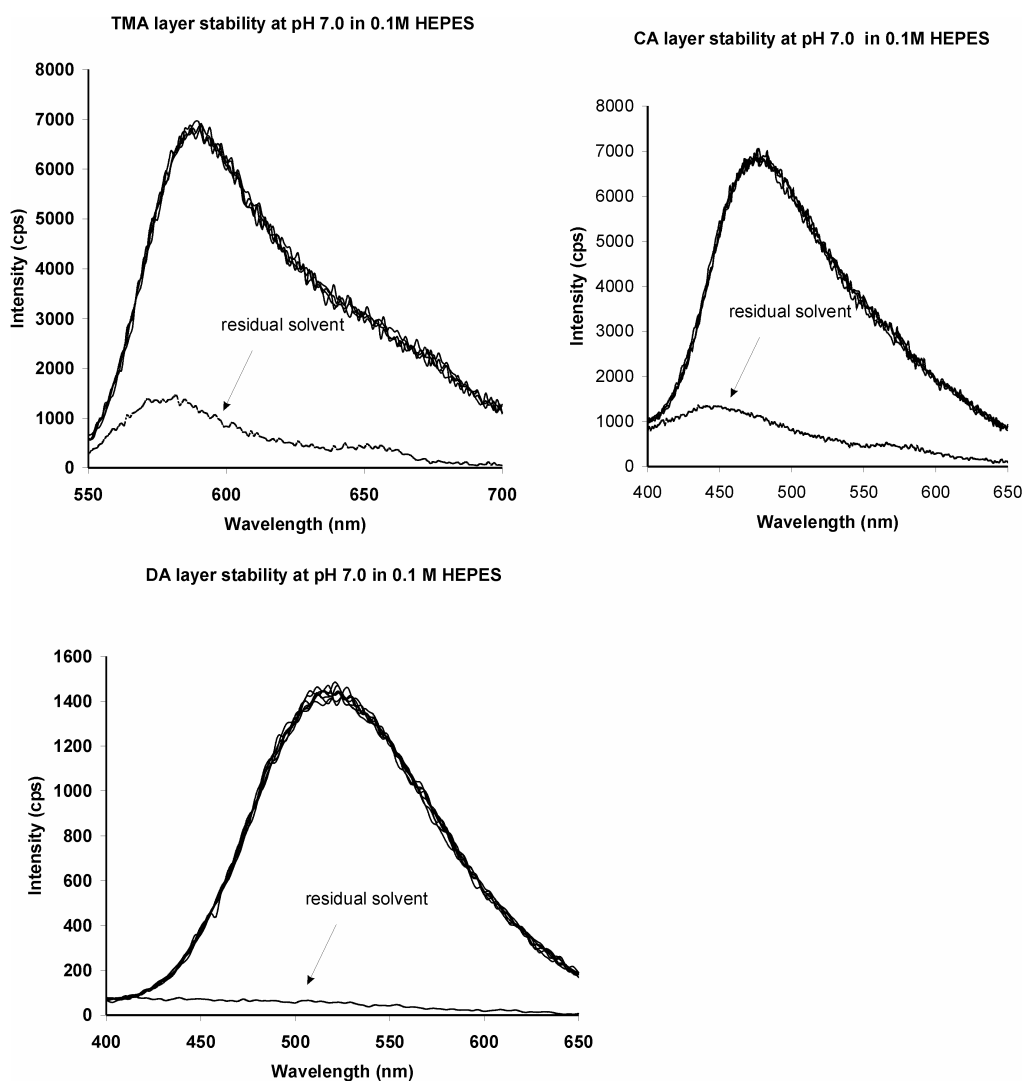
  

DU					CU					TMU				
Ca <sup>2+</sup>	Co <sup>2+</sup>	Cu <sup>2+</sup>	Hg <sup>2+</sup>		Ca <sup>2+</sup>	Co <sup>2+</sup>	Cu <sup>2+</sup>	Hg <sup>2+</sup>		Ca <sup>2+</sup>	Co <sup>2+</sup>	Cu <sup>2+</sup>	Hg <sup>2+</sup>	
-17.0	-11.0	-27.0	-27.0		0.0	-7.0	-25.0	-7.0		2.0	-2.0		14.0	
-7.0	-14.0	-55.0	-28.0		-7.0	-21.0	-33.0	-21.0		-4.0	5.0	-17.0	8.0	
-16.0	-15.0	-35.0	-10.0		3.0	-19.0	-36.0	-7.0		3.0	-2.0	-41.0	-3.0	
-15.0	-20.0	-38.0	-14.0		0.0	-21.0	-24.0	-2.0				-20.0	4.0	
			-9.0											
			-19.0											
Avg	-13.8	-15.0	-38.8	-17.8	Avg	-1.0	-17.0	-29.5	-9.3	Avg	0.3	0.3	-26.0	5.8
Avg Dev	3.4	2.5	8.1	6.8	Avg Dev	3.0	5.0	5.0	5.9	Avg Dev	2.9	3.1	10.0	5.3



### Stabilization studies

Examples of the initial fluorescence emission studies of the stabilization of the fluorophores on the monolayer. Spectra of the self-assembled monolayers (SAMs) TMA, CA and DA (figure 2). The layers were immersed in 0.1 M HEPES solution and the spectra were recorded at 0, 3, 5, 10, 15 min. for layers TMA and CA. For layer DA two additional spectra were done at 30 and 60 min. The fluorescence signal of the layer is constant in time and after removal of the functionalized slide from the spectrofluorometer cuvette negligible fluorescence signal is detected on the residual solvent.



**Fig. 2 :** Fluorescence emission spectra of the TMA, CA, and CA SAMs immersed in HEPES 0.1 M after

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0, 3, 5, 10, 15 min for layers TMA and CA, and after 0, 3, 5, 10, 15, 30 and 60 min. for layer DA.