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ELECTRONIC SUPPLEMENTARY INFORMATION

Self-assembled multilayer surfaces of highly fluorescent spirobifluorene-based dye for label-free protein recognition

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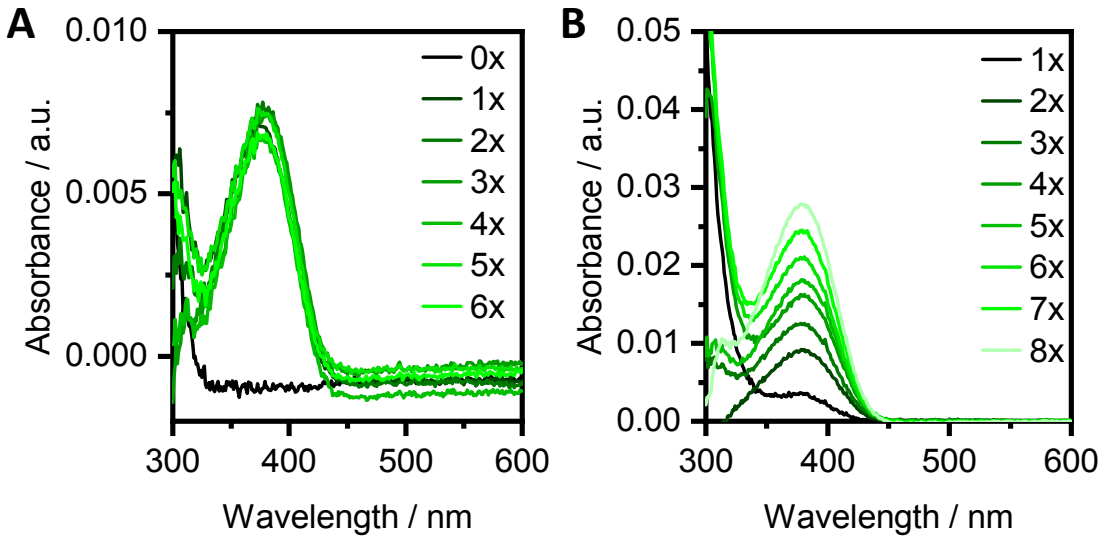

Figure S1. Absorption spectra of functionalized glass surfaces. **A:** LbL-functionalization with PDADMAC /dye **1**. **B:** LBL-functionalization with p(VBTMA)Cl /dye **1**.

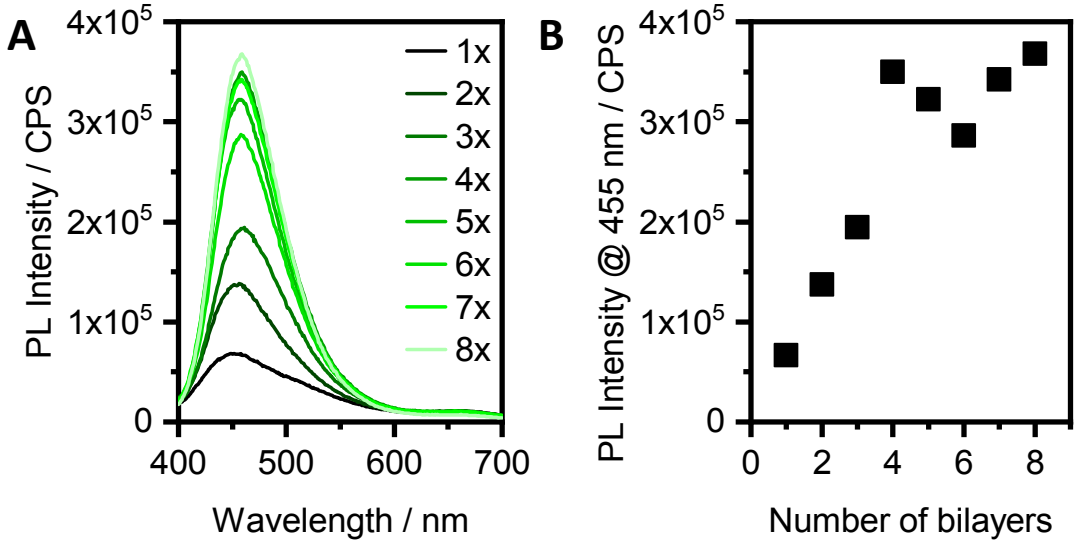

Figure S2. Photoluminescence spectra of glass surfaces functionalized with one to seven p(VBTMA)Cl/dye **1** bilayers (**A**) and the fluorescence maxima at 455 nm plotted against the number of bilayers (**B**).

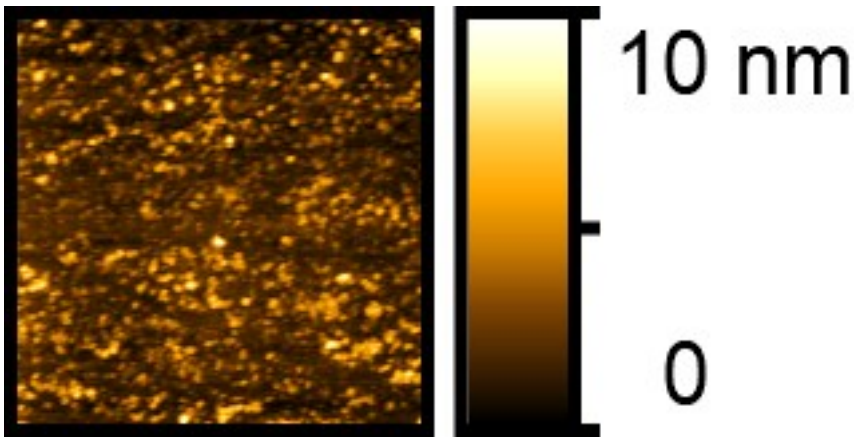

Figure S3. AFM analysis of activated glass surface.

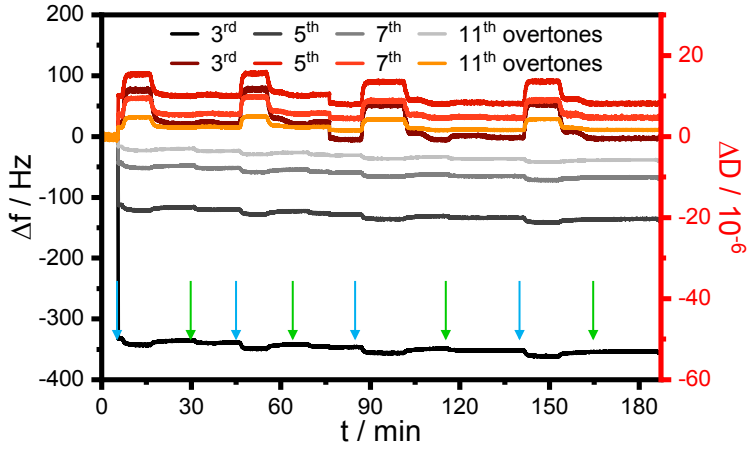

Figure S4. QCM-D measurements of the multilayer formation with p(VBTMA)Cl and dye **1** at 23 °C. Arrows indicate the starting point of incubation with p(VBTMA)Cl (blue) and **1** (green).

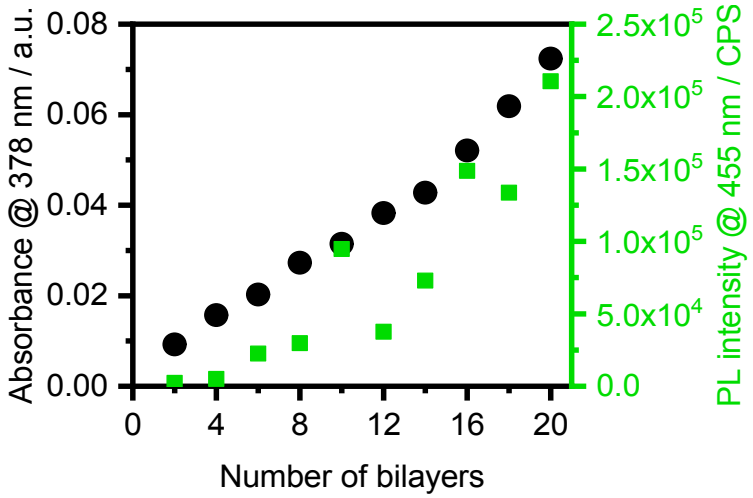

Figure S5. Photophysical analysis of multilayer containing p(VBTMA)CL and dye **1** formed in a fast deposition process (1 min as incubation time). **Black:** Absorbance maxima at 378 nm. **Green:** PL Intensity at 455 nm.

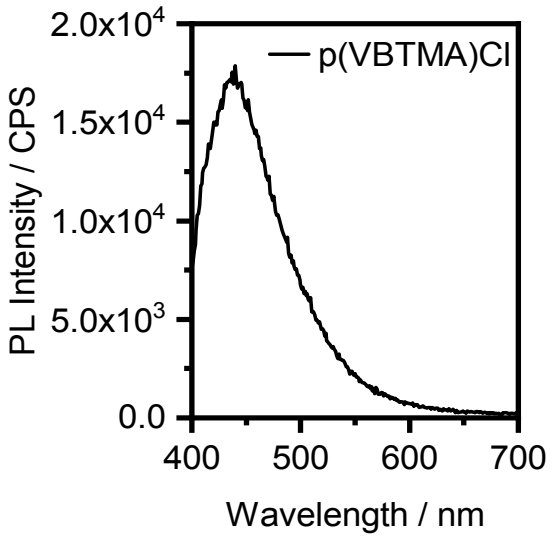

Figure S6. Photoluminescence spectrum of one layer of p(VBTMA)Cl on quartz substrate.

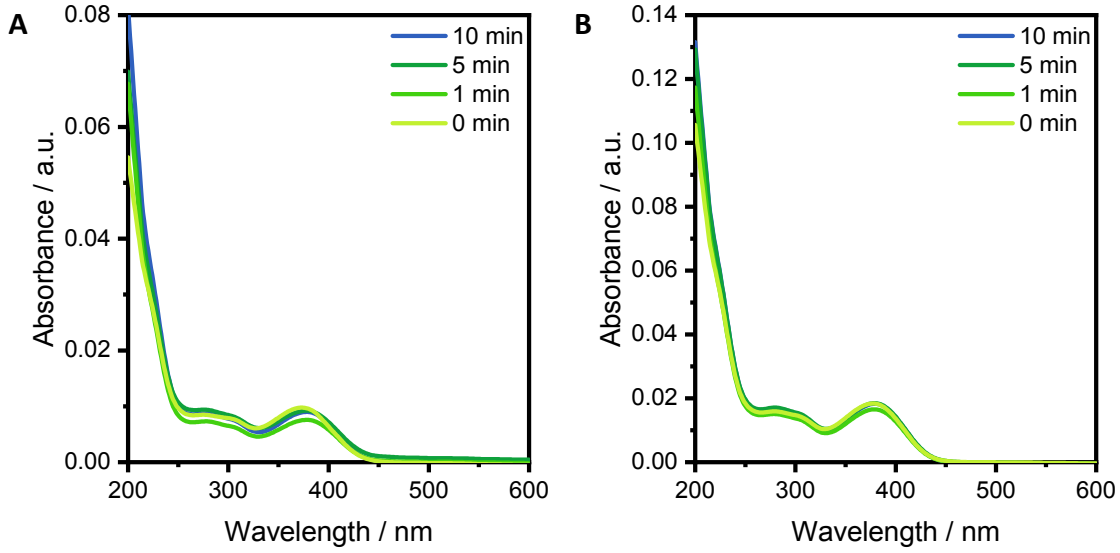

Figure S7. Absorption spectra of four (**A**) and seven (**B**) bilayers of p(VBTMA)Cl /dye **1** incubated with aqueous solution of BSA (1 mM) for 1, 5 or 10 min.

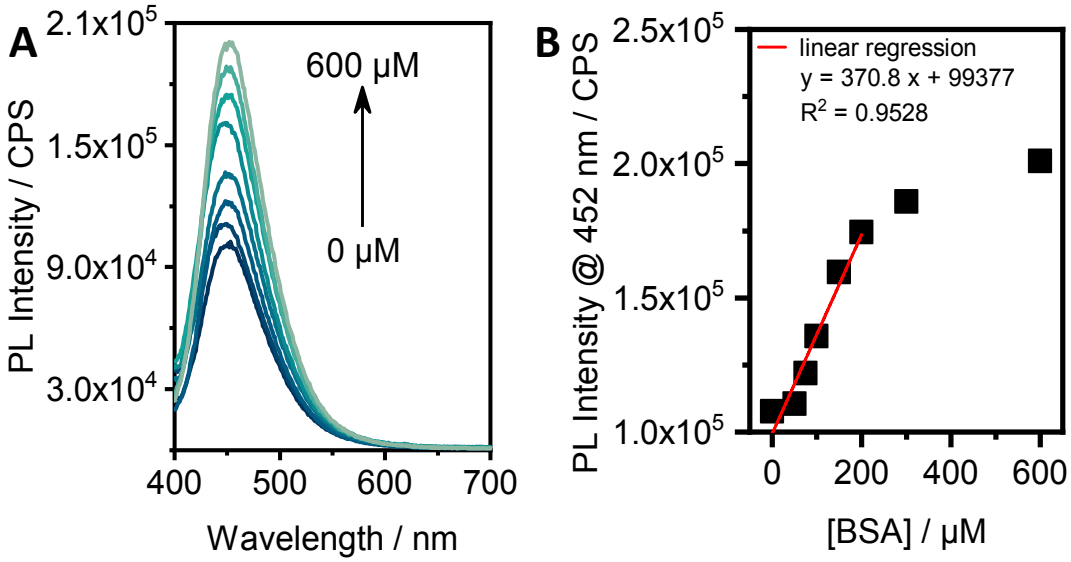

Figure S8: Photophysical analysis of the concentration-dependent response of surfaces functionalized with four bilayers of p(VBTMA)Cl / dye **1** to BSA solutions with various concentrations (0 µM – 600 µM). **A:** Photoluminescence Spectra; **B:** Photoluminescence maxima at 452 nm plotted against the concentration of BSA. The linear region of the graph is fitted with a linear regression (**red**) for the determination of the LOD.

Table S1. Fluorescence lifetimes (τ) recorded for p(VBTMA)Cl /dye **1** functionalized surfaces and one, four or seven bilayers and incubation with an aqueous BSA solution (1 mM) for 1, 5 or 10 min respectively.

Layer; BSA	τ ns	τ_{Av}[a] ns
0x; 10 min	21.1 (33%); 6.28 (52%); 2.00 (15%)	5.74
1x; 1 min	10.0 (36%); 2.86 (64%)	5.46
1x; 5 min	18.73 (20%); 5.72 (51%); 1.64 (29%)	7.12
1x; 10 min	21.1 (13%); 6.38 (49%); 2.05 (38%)	6.60
4x; 1 min	25.12 (8%); 6.77 (48%); 1.96 (44%)	6.07
4x; 5 min	22.41 (14%); 6.67 (52%); 1.98 (34%)	7.21
4x; 10 min	25.34 (12%); 7.57 (49%); 2.34 (39%)	7.62
7x; 1 min	21.99 (15%); 6.45 (52%); 1.78 (33%)	7.28
7x; 5 min	23.28 (11%); 6.61 (55%); 1.99 (34%)	6.80
7x; 10 min	22.02 (12%); 6.50 (46%); 1.95 (42%)	6.41

All τ recorded with excitation at 376 nm and detection at 460 nm. Analysis by tail fit between 6.5 – 60 ns. [a]Amplitude weighted.

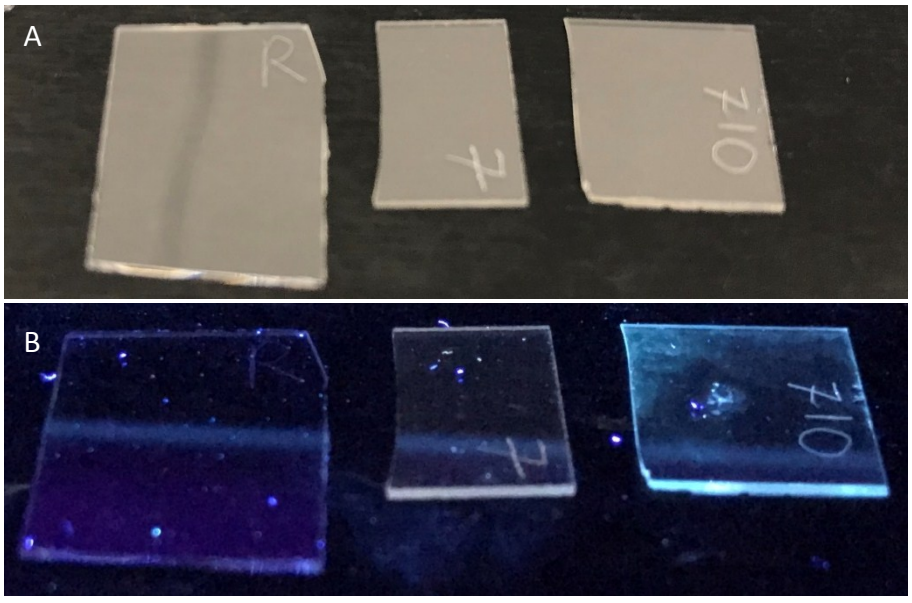

Figure S9. Photographic images of surfaces. **A**: Daylight. **B**: Excitation with 366 nm. **Left**: Bare Quartz. **Middle**: Quartz surface with seven bilayers p(VBTMA)Cl /dye **1**. **Right**: Quartz surface with seven bilayers p(VBTMA)Cl /dye **1** incubated with BSA for 10 min.