Supporting information:

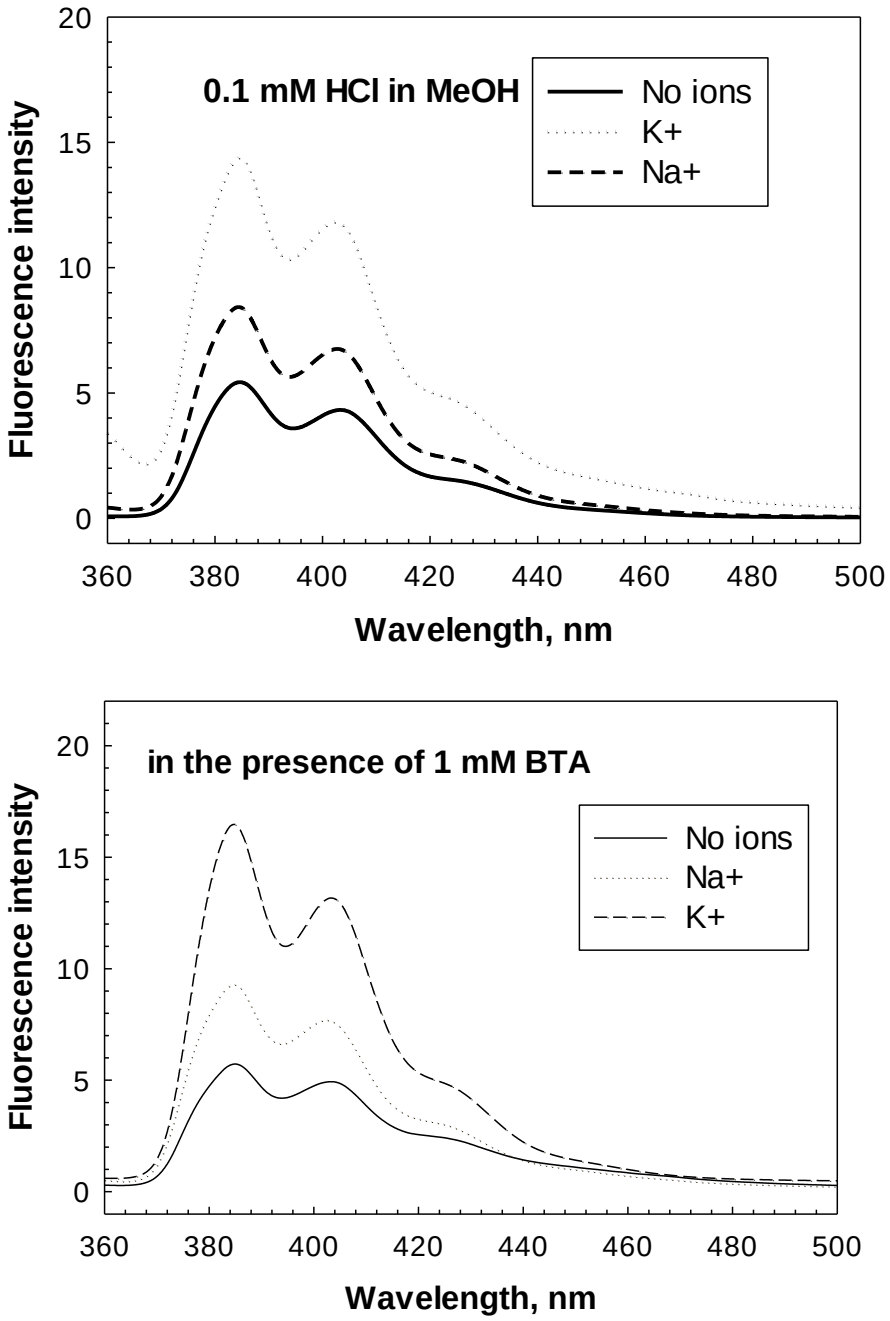

Figure S1. Fluorescence of a $(B15C5\text{-}An\text{-}A18C6/PSS)_8$ multilayer film before and after exposure to metal ions in 0.1 mM HCl (top) in MeOH and 1 mM benzyltrimethylammonium hydroxide in MeOH (BTA) (bottom) solutions. BTA acts as a proton scavenger in the basic, organic solution. Characteristic fluorescence spectra of anthracene are shown in the figure, but not in those in aqueous solutions (Figure 4).

The formation of the A18C6/PSS multilayer film was quantitatively measured by using the QCM technique, which records the frequency decrease of a QCM plate that is proportional to the mass increase. Figure S2 showed the frequency decreases (Δf) of a QCM resonator. The mass increase due to the growth of a multilayer film was calculated according to the Sauerbrey equation:[3]

$$\Delta \mathrm{m} = -\frac{C \cdot \Delta f}{n} \quad (1)$$

The constant C of crystal (5 MHz quartz crystal) is 17.7 ng Hz^{-1} cm^{-2}. n (n=1, 3, 5, 7…) is the overtone number. Δf is proportional to the mass change of the film (Δm) and n. In our system, a frequency decrease of 1 Hz corresponds to a mass increase of 0.9 ng. The frequency decrease, i.e. the mass increase was observed on alternate adsorption of A18C6 and PSS due to the growth of the A18C6/PSS multilayer film. The growth of the film showed an increment of 33±5 Hz and 52±9 Hz on adsorption of each A18C6 and PSS layer, respectively.

The thickness (d) of each (A18C6/PSS) layer of the film was calculated to be 14±2 Å according to the relationship between the thickness and frequency change,[3]

$$d(\text{Å}) \approx -0.16\Delta f(\text{Hz}) \quad (2)$$

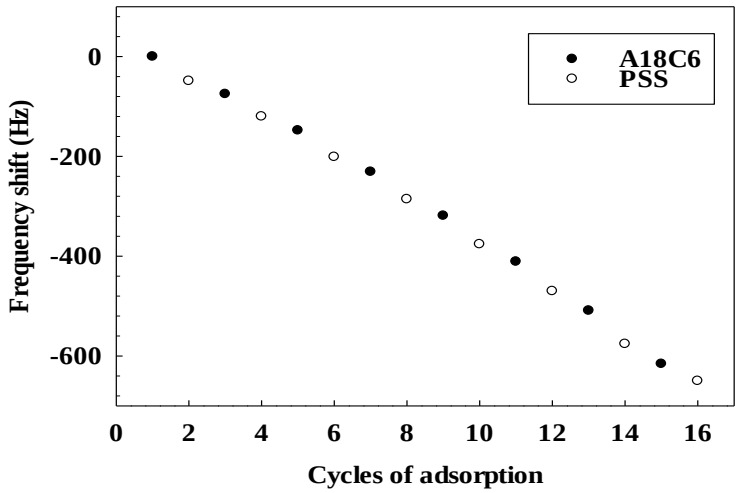

Figure S2. Frequency change of a QCM plate during the formation of a LbL film of

$(A18C6/PSS)_n$ (n=0-8).