Supporting Information:

The multilayer was found to build up when Fe^{3+} / L_2EO_4 is 1, as illustrated in Fig 4. The UV absorbance is linear increasing with the bilayer number at each wavelength, as exampled in Fig S1.

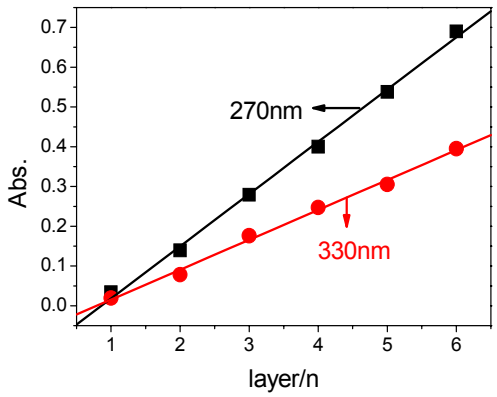
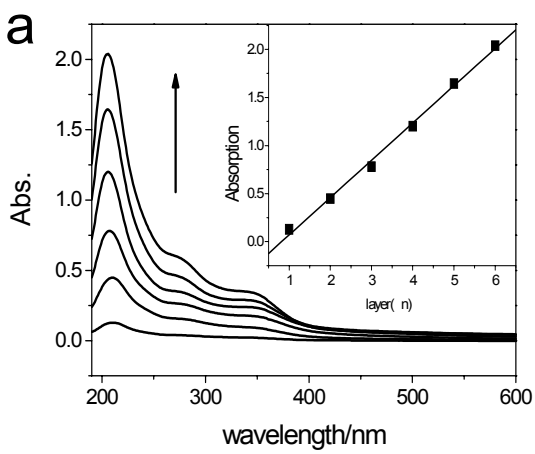
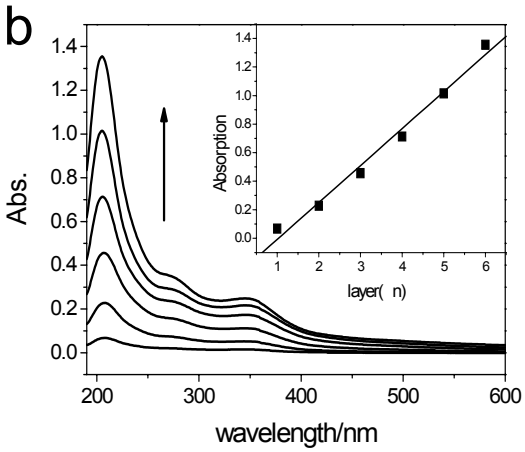
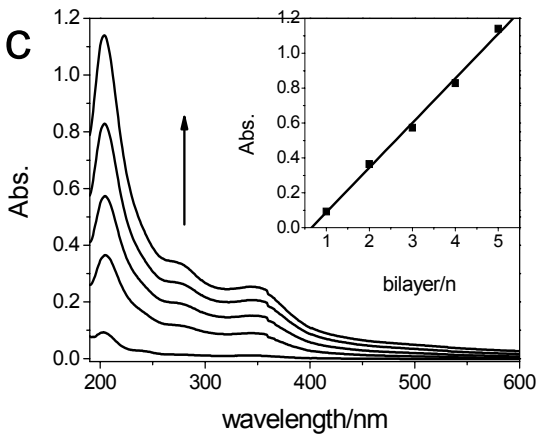


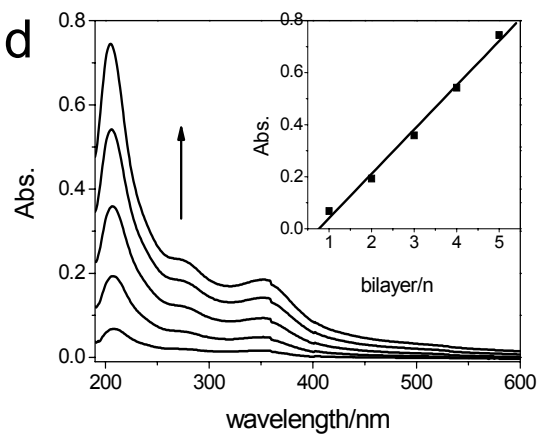
Fig. S1. The UV absorption of $(PEI/Fe^{3+}\text{-}L_2EO_4)_n$ at different wavelength (black: 270 nm; red: 330nm) as a function of the number of adsorbed layers

We found that the LBL films can be formed even the metal to ligand ratios in the aqueous solutions ranging from 1:16 to 16:1. The UV absorbance of some metal to ligand ratios are listed in Fig S2a-f, as examples. Besids, the Fe^{3+}/ L_2EO_4 values are listed in Table S 1.









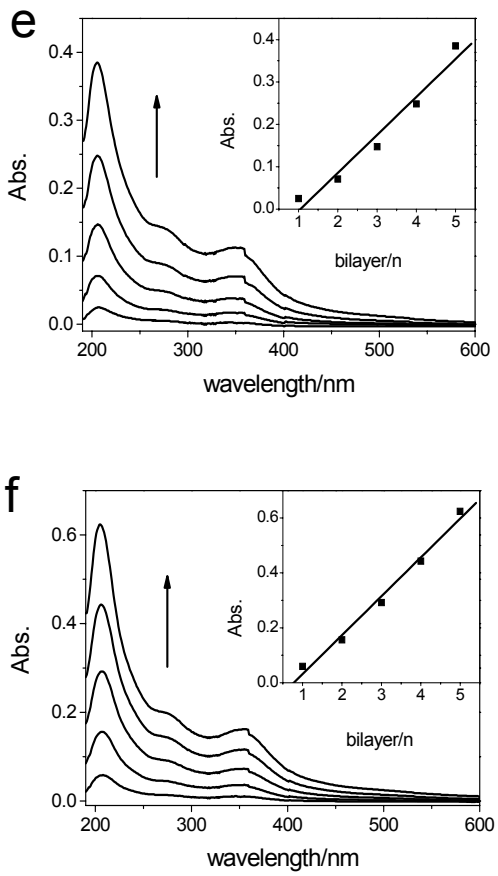


Fig. S2 UV-vis spectra of $(PEI/Fe^{3+}\text{-}L_2EO_4)_n$ multilayers fabricated using solutions with different ratios of Fe^{3+}:L_2EO_4(a, 2:1; b, 1:2; c, 8:1; d, 1:8; e, 16:1; f, 1:16). Insets: absorption at 206 nm as a function of the number of adsorbed $Fe^{3+}\text{-}L_2EO_4$ layers.

Table S1. Fe^{3+}/ L_2EO_4 molar ratios determined by XPS in multilayers prepared at different Fe^{3+} / L_2EO_4 in bulk solutions

Fe^{3+}/L_2EO_4 (solution)	Fe^{3+}/L_2EO_4 (multilayer)
16.0	1.87
8.0	1.41
4.0	1.75
2.0	1.39
1.0	1.22
0.5	1.15
0.25	1.24
0.125	0.93
0.0625	1.31

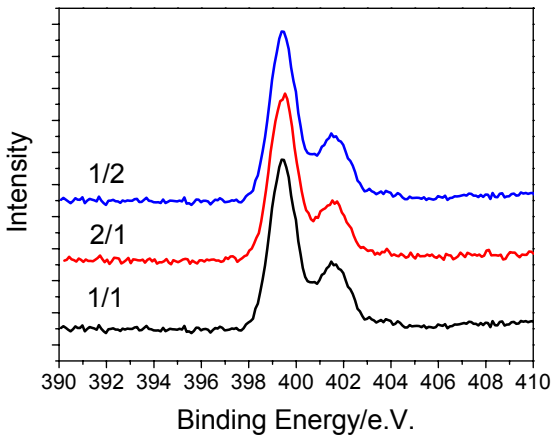


Fig. S3. N 1s core-level spectrum of the multilayers fabricated using solutions with different ratios of Fe^{3+}:L_2EO_4(blue, 1:2; red, 2:1;black, 1:1).