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Layer-by-Layer Self-Assembly, Controllable Disintegration of Polycarboxybetaine Multilayers and Preparation of Free-Standing Films at Physiological Conditions

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1. FT-IR spectra of PVPMC and P4VP.
2. PVPMC/PAA multilayer films disintegration in NaCl solution.
3. Different disintegration behavior of PVPMC/PAA multilayer film between film center and film edge

1. FT-IR spectra of PVPMC and P4VP.

The FT-IR spectra of PVPMC and P4VP are shown in Figure.1S. The disappearance of 1600 cm^{-1} and the new appearance of 1640 cm^{-1} indicated the totally quaternary ammoniation of P4VP.

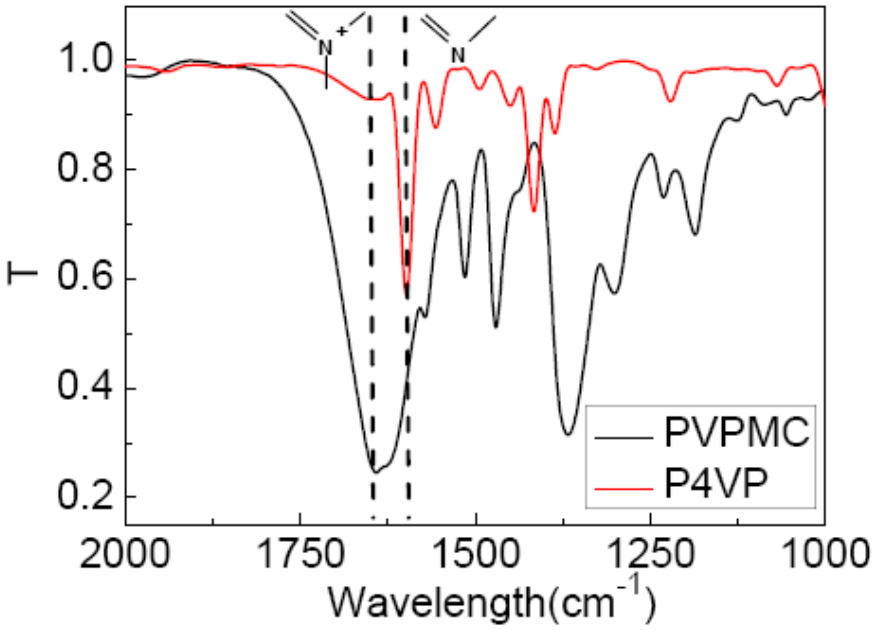
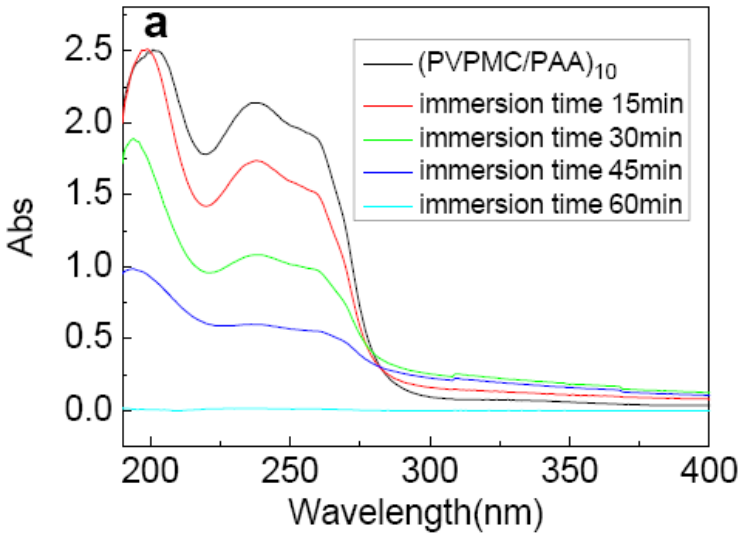
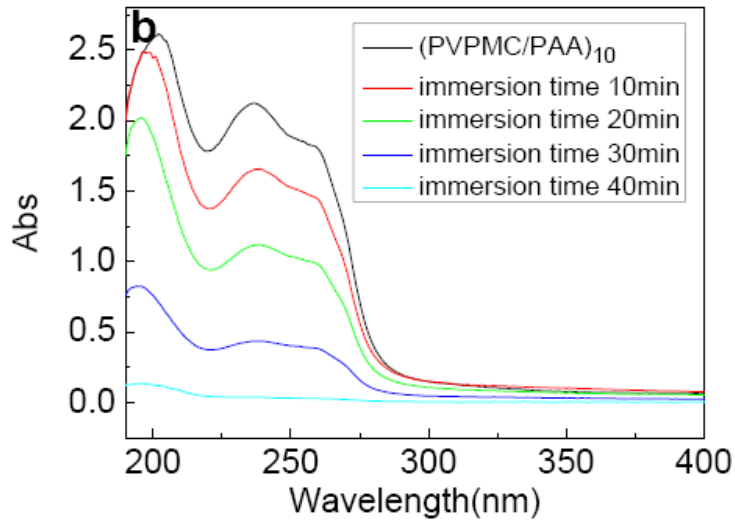


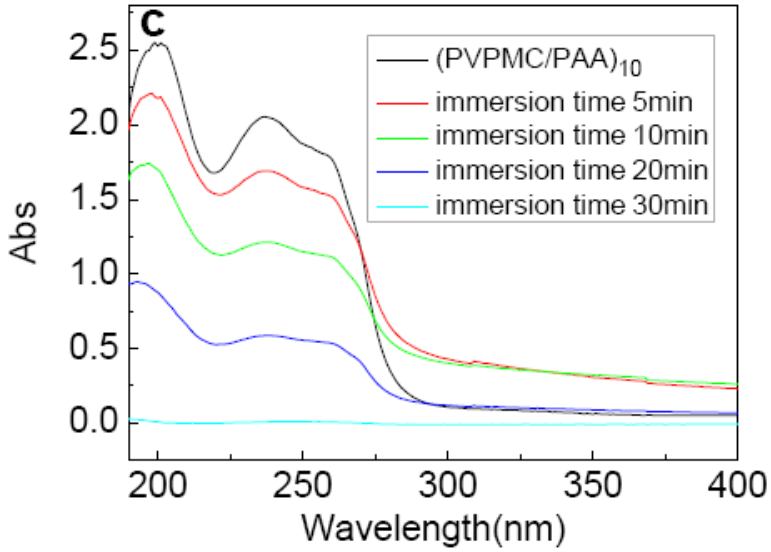
Figure 1S. The FT-IR spectra of PVPMC and P4VP.

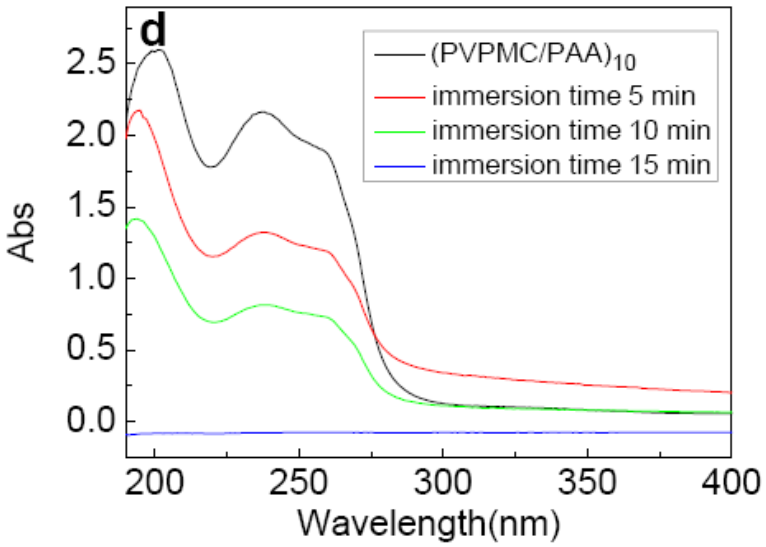
2. PVPMC/PAA multilayer films disintegration in NaCl solution.

The disintegration of PVPMC/PAA multilayer films was performed in salt aqueous solution with various concentration of NaCl. Five concentrations (0.01M, 0.05M, 0.1M, 0.15M, and 0.2M) of NaCl solution are used.









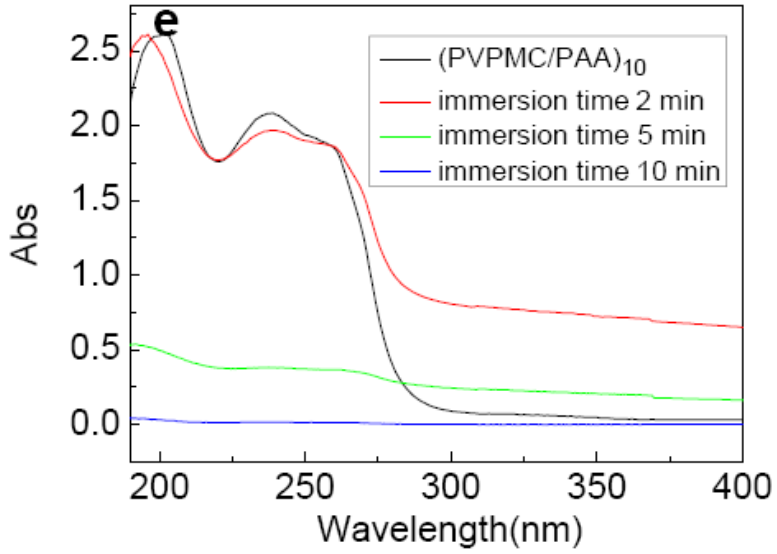


Figure 2S. The UV-vis spectra of $(PVPMC/PAA)_{10}$ multilayer films as the function of immersing time in neutral salt aqueous solutions with various NaCl concentration. (a) 0.01M NaCl, (b) 0.05M NaCl, (c) 0.1M NaCl, (d) 0.15M NaCl and (e) 0.2M NaCl.

3. Different disintegration behavior of PVPMC/PAA multilayer film between film center and film edge

The different disintegration behavior of PVPMC/PAA multilayer film between film center and film edge are investigated. The UV-vis spectra of $(PVPMC/PAA)_{10}$ multilayer films as the function of immersing time in 0.15M NaCl with different measuring position (film center and film edge) are showed in Figure 3S. Figure 4S (a) and Figure 4S (b) further show the photographs of $(PVPMC/PAA)_{10}$ multilayer films deposited on quartz slide treated by 0.15M NaCl for 5 min and 10 min. To improve the contrast of the photographs, Figure 4S (c) and Figure 4S (d) show the corresponding inverted colour photographs of multilayer films. Figure 4S (c) clearly indicates that the partial disintegration of multilayer film firstly occur at the edge of quartz slide and Figure 4S (d) illustrates most of multilayer film on the quartz slide disintegrates and become invisible.

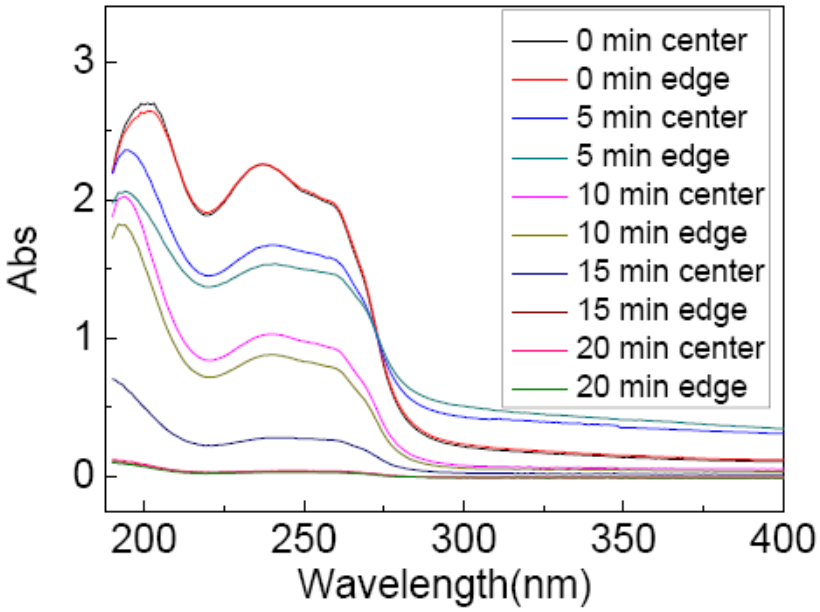


Figure 3S. The UV-vis spectra of $(PVPMC/PAA)_{10}$ multilayer films as the function of immersing time in 0.15M NaCl with different measuring position (film center and film edge).

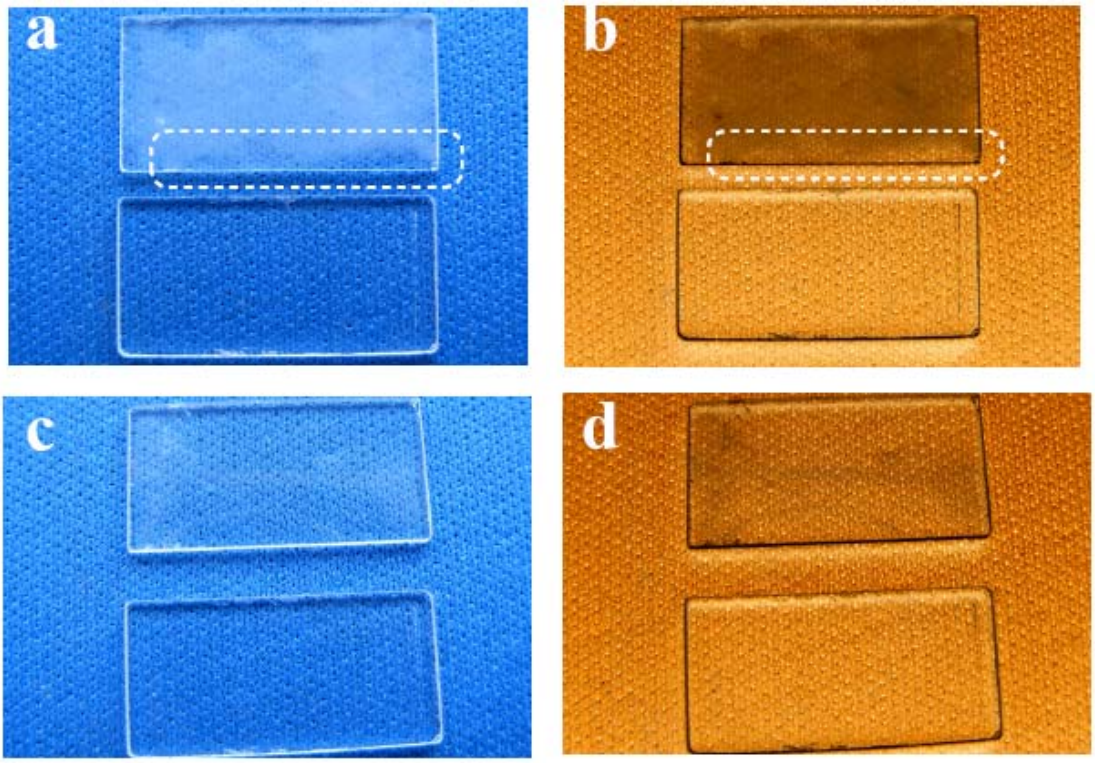


Figure 4S. The photographs of $(PVPMC/PAA)_{10}$ multilayer films deposited on quartz slide treated by 0.15M NaCl for (a) 5 min and (c) 10 min, the corresponding inverted colour photographs of multilayer films deposited on quartz slide treated by 0.15M NaCl for (b) 5 min and (d) 10 min.