

Supporting information for

Influence of Salt on Assembly and Compression of PDADMAC/PSSMA Polyelectrolyte

Multilayers

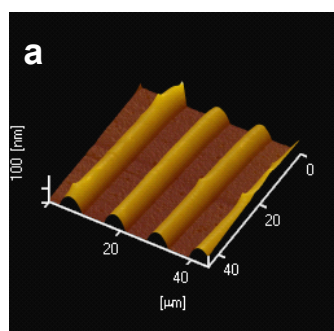
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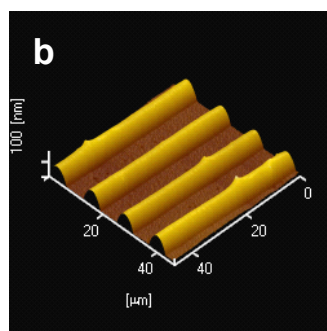
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In this experiment, PEI(PSS/PDADMAC)₇ multilayers were assembled in 1 M NaCl and similarly treated following the process shown in Figure 8 to explore the universal phenomenon of the anions mediated compression. Figure S1 shows that this process is intrinsically dependent on the nature of the anions used during assembly, but hardly dependent on the used polyanions, i.e. PSSMA or PSS.

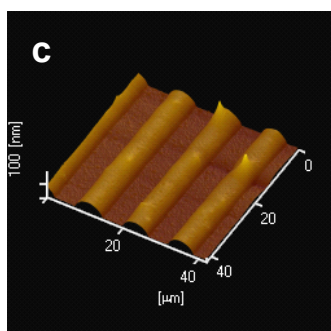
compression ratio: ~61%



compression ratio: ~64%



compression ratio: ~40%



compression ratio: ~59%

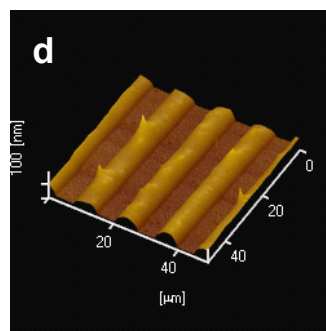
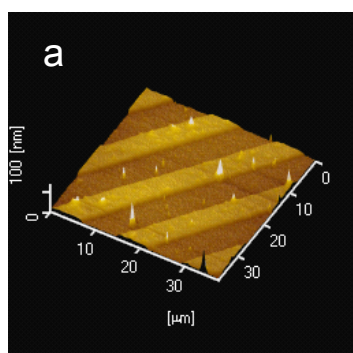


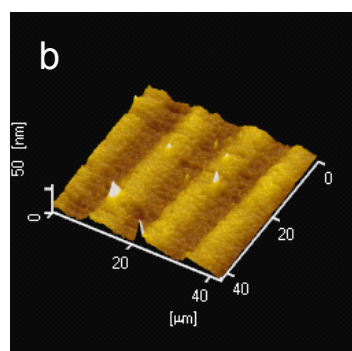
Figure S1. SFM images of the pattern-compressed PEI(PSS/PDADMAC)₇ multilayers. (a) The multilayers were assembled in 1 M NaCl. The multilayers were further treated by 1 M NaCl (b) or by 1 M NaBr (c) for 8 h before compression. (d) The multilayers were first treated by 1 M NaBr for 8 h and then by 1 M NaCl for 8 h before compression.

In this experiment, the freshly prepared PEI(PSSMA/PDADMAC)₇ multilayers assembled in 1 M NaBr were exposed either to 1 M NaBr or to 1 M NaCl solution for 8 h, and then pattern compressed. By incubation in 1 M NaBr, the compression ratio was slightly decreased from 52% (Figure S2a) to 47% (Figure S2b). However, by incubation in 1 M NaCl solution, the ratio significantly increased to ~68% (Figure S2c). If the freshly prepared multilayers assembled in 1 M NaBr was first exposed to 1 M NaCl solution for 8 h, then to 1 M NaBr solution for 8 h, and then pattern compressed, the compression ratio was back to ~45% again (Figure S2d).

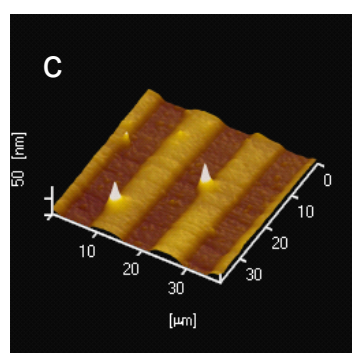
compression ratio: ~52%



compression ratio: ~47%



compression ratio: ~68%



compression ratio: ~45%

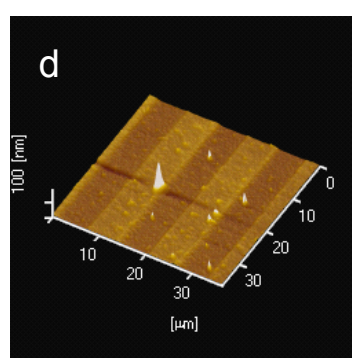


Figure S2. SFM images of the pattern-compressed PEI(PSSMA/PDADMAC)₇ multilayers. (a) The multilayers were assembled in 1 M NaBr. The multilayers were further treated by 1 M NaBr (b) or by 1 M NaCl (c) for 8 h before compression. (d) The multilayers were first treated by 1 M NaCl for 8 h and then by 1 M NaBr for 8 h before compression.

In the following experiment (Figure S3), the PEI(PSSMA/PDADMAC)₇ multilayers assembled in 1 M NaBr was rinsed with water (the 0 point) and then incubated in 1 M NaCl solution. The relative mass and wet thickness were increased to some extent, indicating the hydration effect of the NaCl salt. After further incubation of the multilayers in 1 M NaBr solution, further hydration occurred leading to the increase of mass and wet thickness again, indicating NaBr solution has a stronger hydration effect on the multilayers. The next incubation of the multilayers in pure water resulted in highly hydrated multilayers (notice here the incubation time was much longer than the 0 point). Repeating the experiment for another circle of treatment confirmed that the alteration process was completely

reversible.

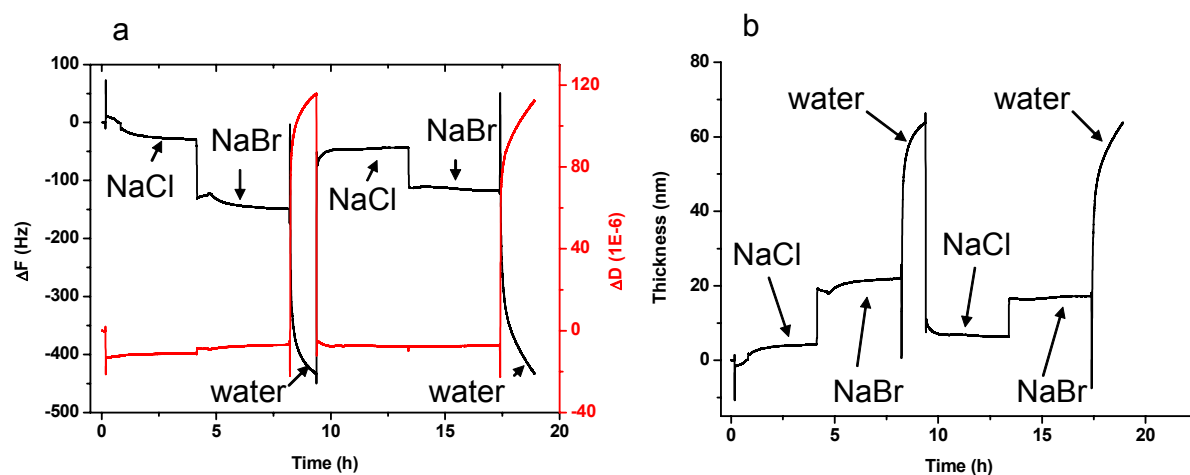


Figure S3. (a) Changes in frequency (ΔF) and dissipation (ΔD) of PEI(PSSMA/PDADMAC)₇ multilayers assembled in 1 M NaBr solution as a function of post-treatment time. The overtone number n was 3. The salt concentrations were all 1 M. (b) Wet thickness of the multilayers derived from (a).