Supporting Information

Co-deposition of Levodopa and Polyethyleneimine: Reaction Mechanism and Coating Construction

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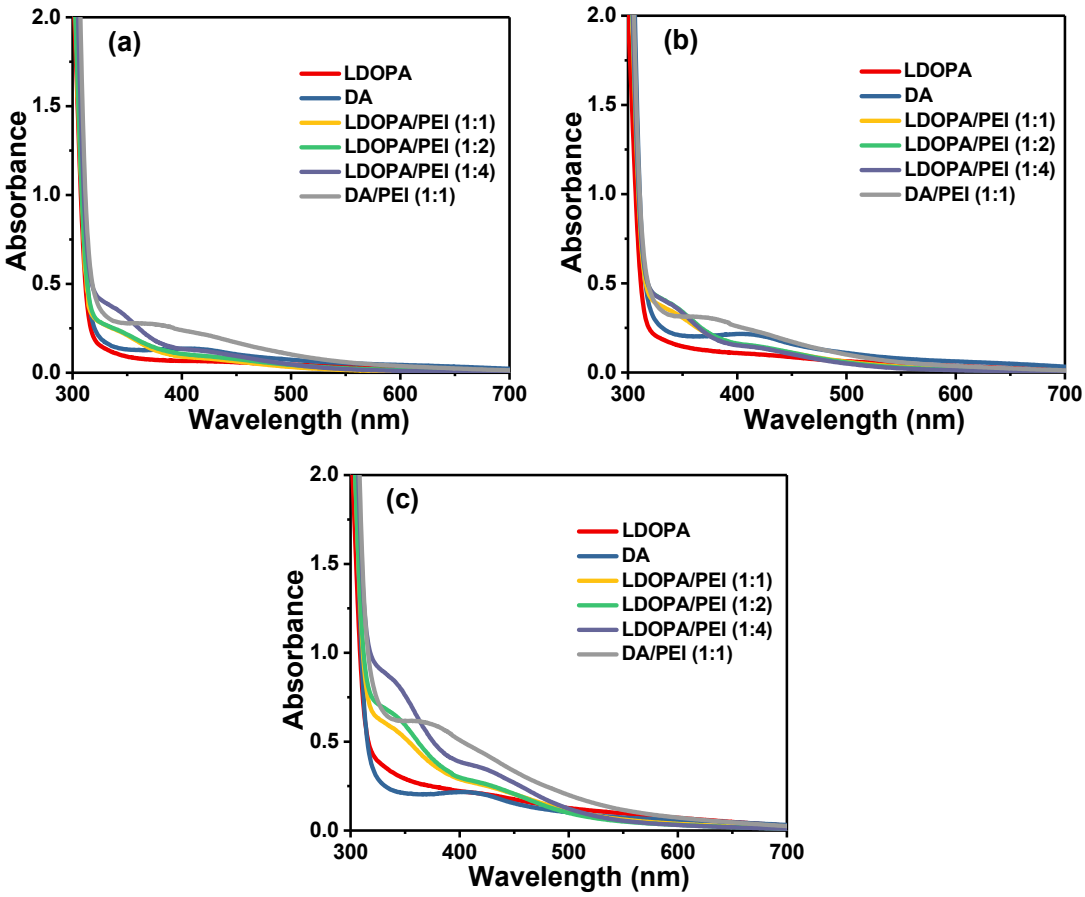


Figure S1. UV-vis spectra of solutions from L-DOPA, DA, L-DOPA/PEI and DA/PEI, respectively, after (a) 1 h, (b) 2 h, and (c) 3 h oxidation. (The concentrations of L-DOPA and DA were 0.25 mg/mL)

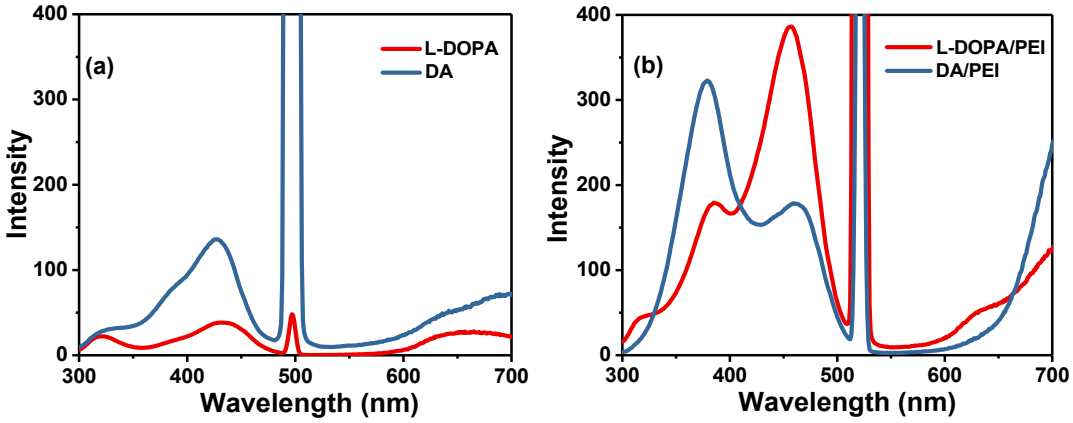


Figure S2. Fluorescence excitation spectra of solutions from (a) L-DOPA, DA and (b) L-DOPA/PEI, DA/PEI. (The concentrations of L-DOPA and DA were 0.25 mg/mL; and the reaction time was 4 h.)

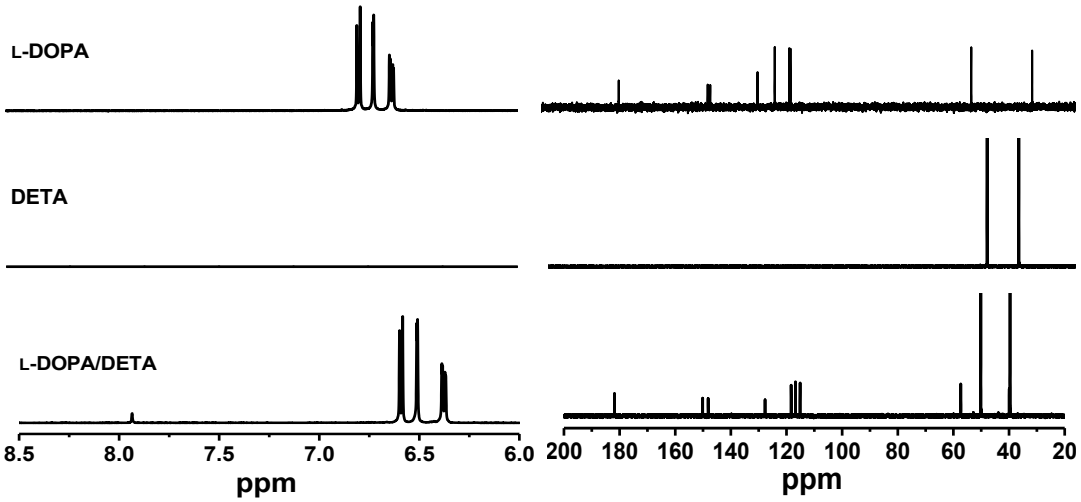


Figure S3. ^{1}H NMR (left) and ^{13}C NMR (right) spectra of L-DOPA, DETA, and L-DOPA/DETA in D_2O. (The reaction time was 30 min; and the molar concentration ratio of L-DOPA:DETA was 1:1.)

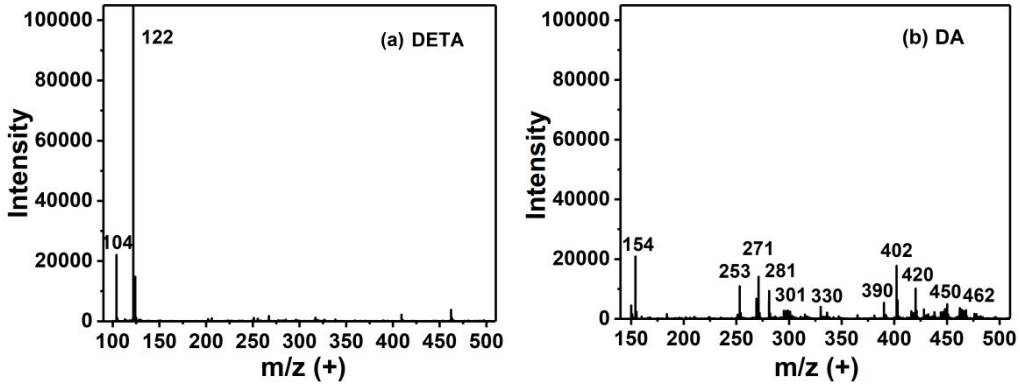


Figure S4. LC-MS spectra of Tris solution from (a) DETA and (b) DA, respectively, reacted for 30 min.

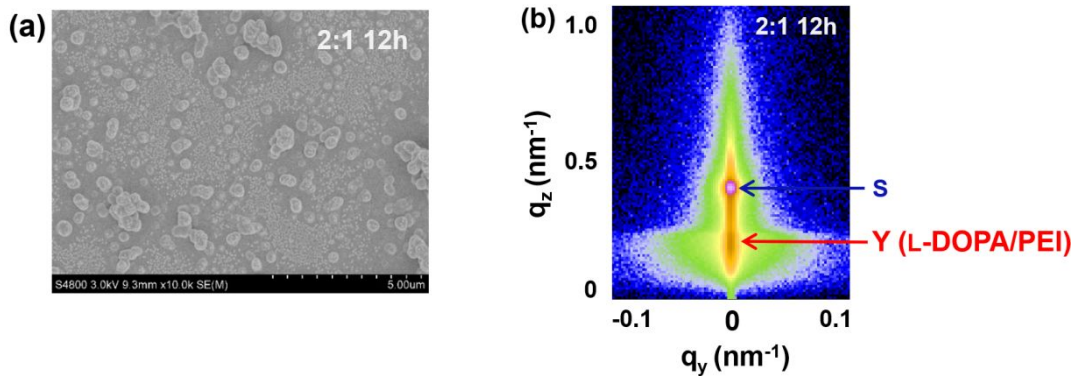


Figure S5. (a) FESEM image of L-DOPA/PEI coating on a silicon wafer. (b) 2D GISAXS pattern of L-DOPA/PEI coating. Yoneda peaks of mixed L-DOPA/PEI and specular peak are indicated with Y(L-DOPA/PEI) and S, respectively.

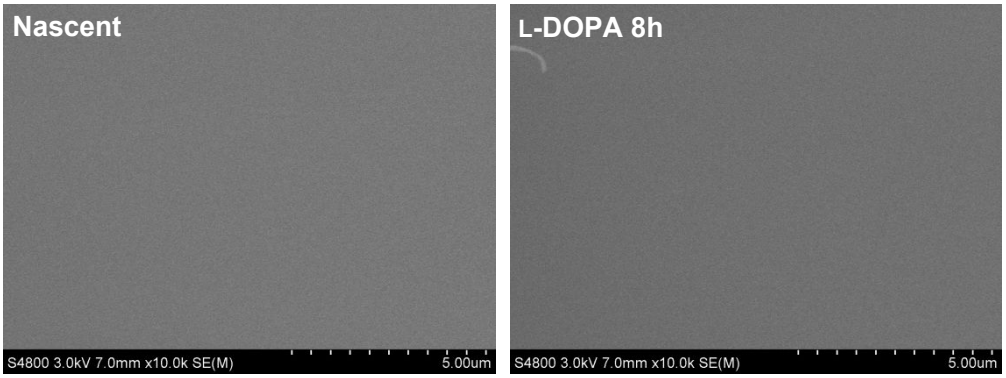
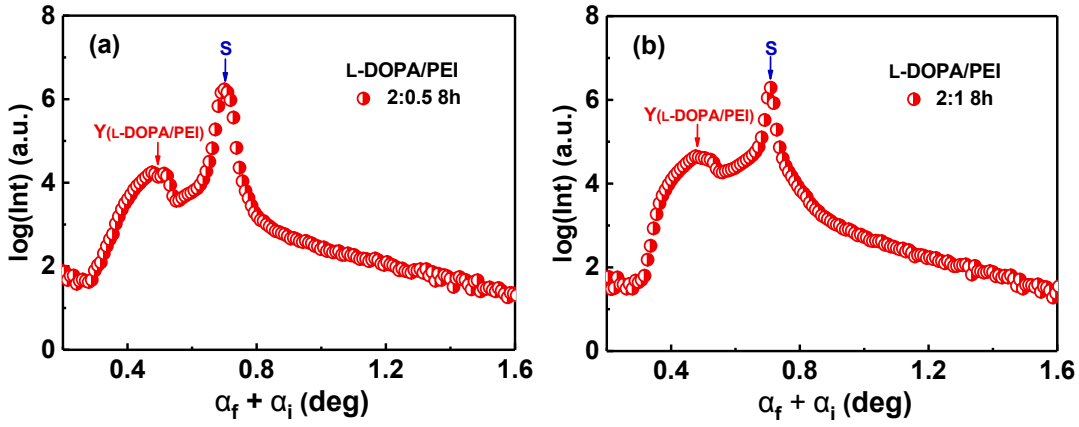


Figure S6. FESEM image of nascent and L-DOPA deposited silicon wafers. (L-DOPA was fixed at 2.0 mg/mL in the deposition solution)



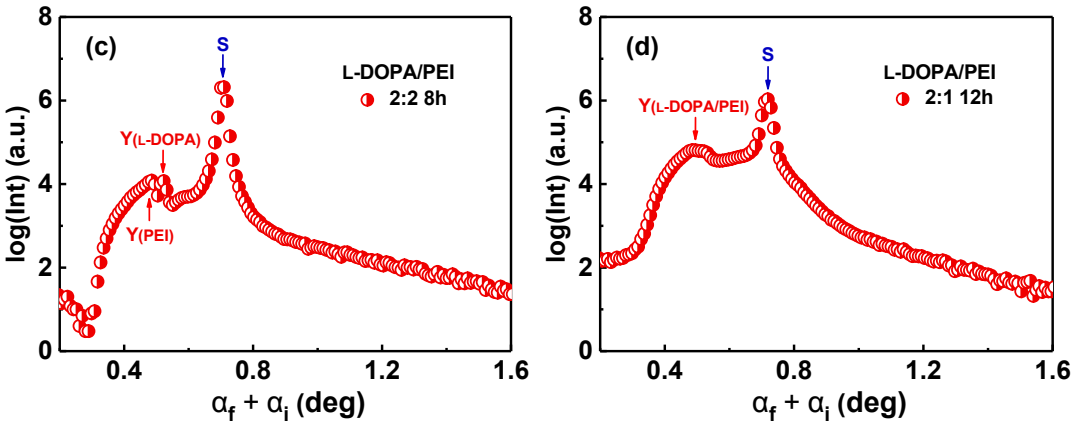


Figure S7. Vertical line cut as a function of $\alpha_f + \alpha_i$ in the center of the GISAXS patterns. The Yoneda peaks of L-DOPA/PEI, L-DOPA, and PEI as well as the specular peak are indicated with Y(L-DOPA/PEI), Y(L-DOPA), Y(PEI) and S, respectively. (L-DOPA was fixed at 2.0 mg/mL in the deposition solution.)

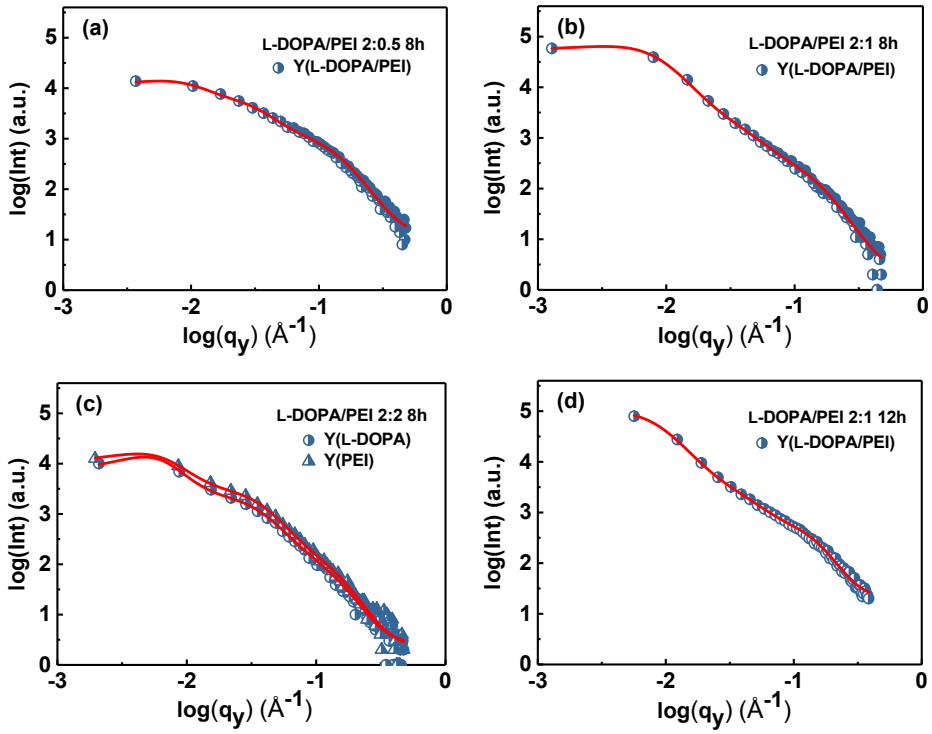


Figure S8. Horizontal line cut of 2D GISAXS patterns with the model fit (red line) at the Yoneda peak positions of L-DOPA/PEI. (L-DOPA was fixed at 2.0 mg/mL in the deposition solution.)

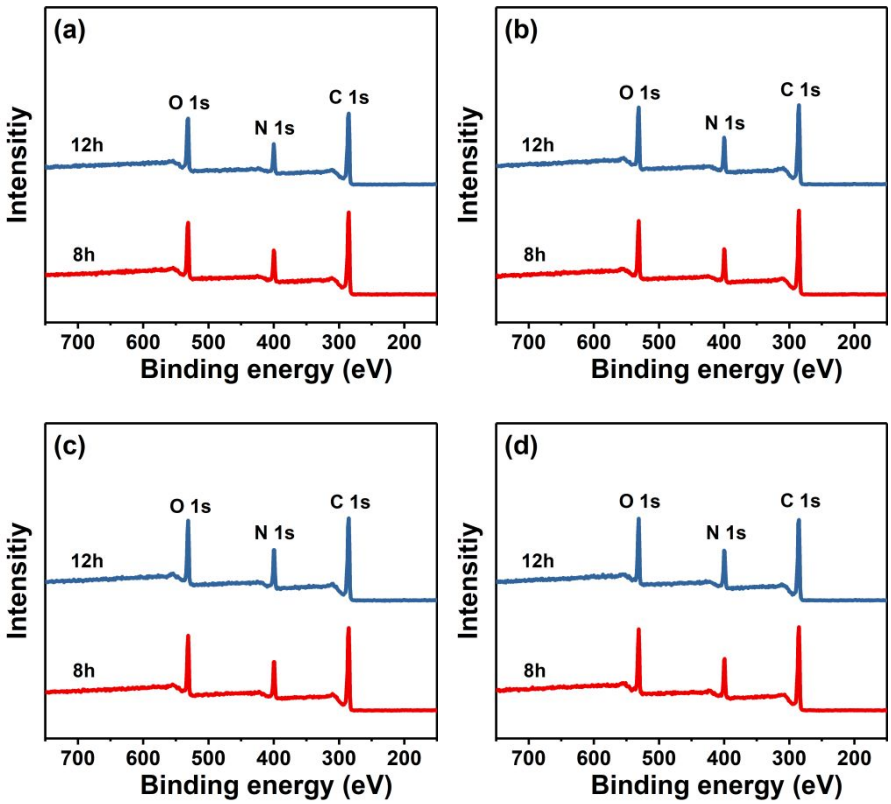


Figure S9. XPS spectra of L-DOPA/PEI coating on silicon wafers with concentration ratios of (a) 2:0.5, (b) 2:1, (c) 2:2 and (d) 2:4. (L-DOPA was fixed at 2.0 mg/mL in the deposition solution.)

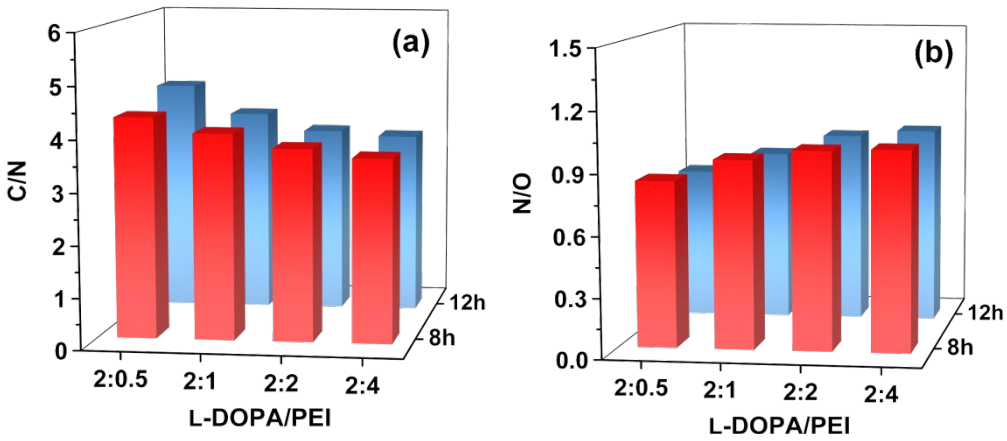


Figure S10. (a) C/N ratio and (b) N/O ratio of the L-DOPA/PEI coating on silicon wafers with different concentration ratios and deposition times. (L-DOPA was fixed at 2.0 mg/mL in the deposition solution.)

Table S1. Chemical compositions of the L-DOPA/PEI coating fabricated with different PEI concentrations and deposition times. The data calculated from the XPS spectra (in atomic percentage).

Coating	C 1s (%)	N 1s (%)	O 1s (%)	C/N	N/O
L-DOPA/PEI=2:0.5 (8h)	66.17	15.38	18.46	4.30	0.83

L-DOPA/PEI=2:1 (8h)	66.03	16.45	17.52	4.01	0.94
L-DOPA/PEI=2:2 (8h)	65.16	17.41	17.43	3.74	0.99
L-DOPA/PEI=2:4 (8h)	65.18	17.93	17.89	3.58	1.00
L-DOPA/PEI=2:0.5 (12h)	66.21	14.56	19.23	4.55	0.76
L-DOPA/PEI=2:1 (12h)	64.87	16.27	18.86	3.99	0.86
L-DOPA/PEI=2:2 (12h)	64.2	17.56	18.24	3.66	0.96
L-DOPA/PEI=2:4 (12h)	63.89	17.92	18.19	3.57	0.99

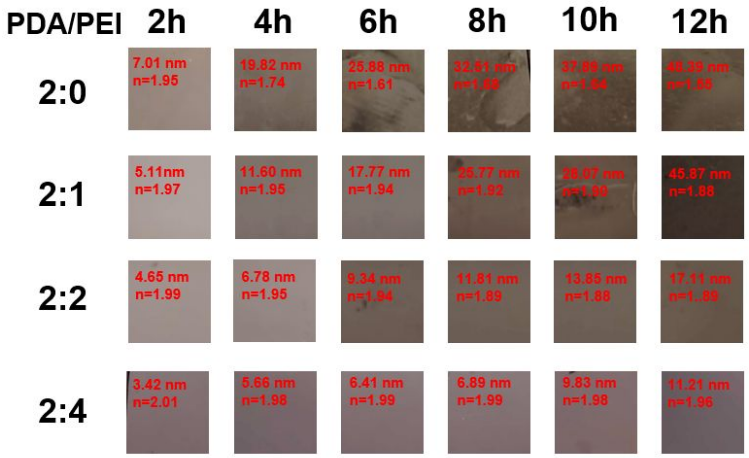


Figure S11. Color variations of the DA/PEI coatings on silicon wafers with different thicknesses and refractive indexes (n) determined by ellipsometry.

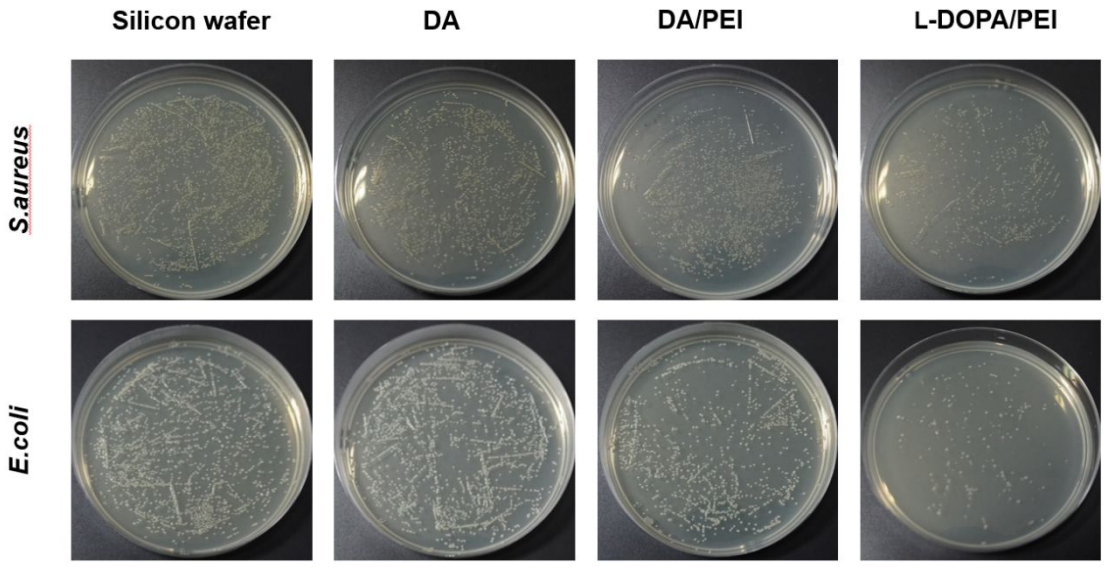


Figure S12. Digital images of bacteria colonies treated with different surface coatings.

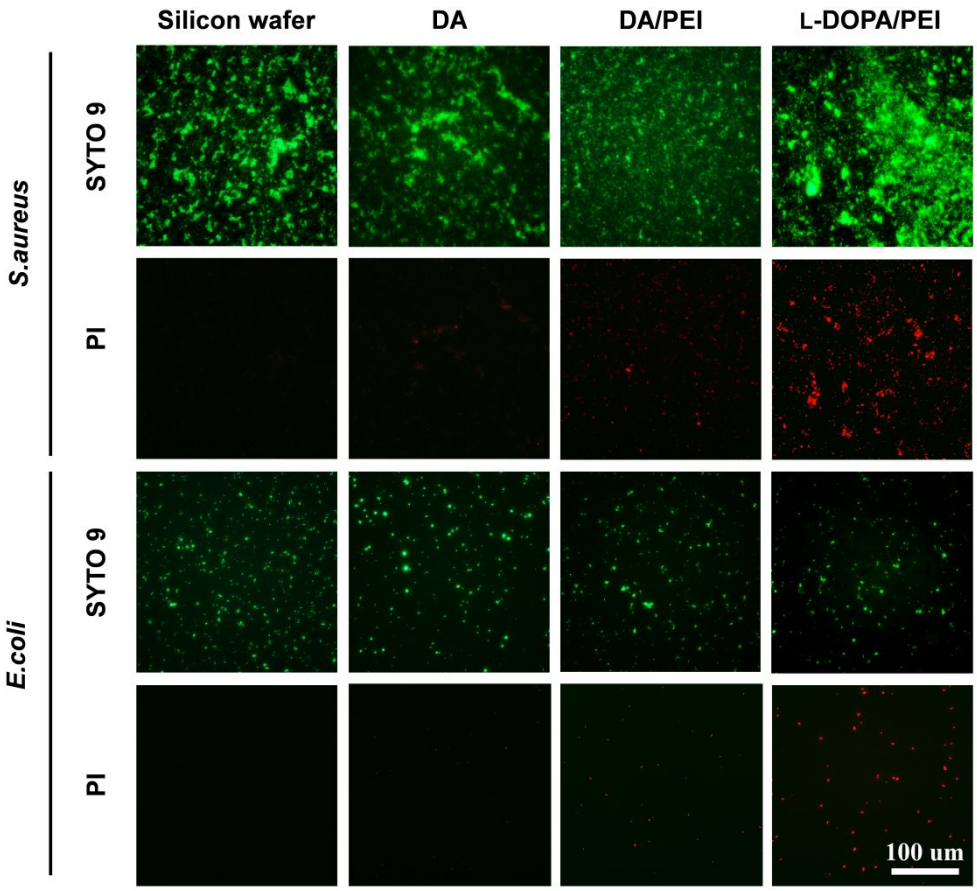
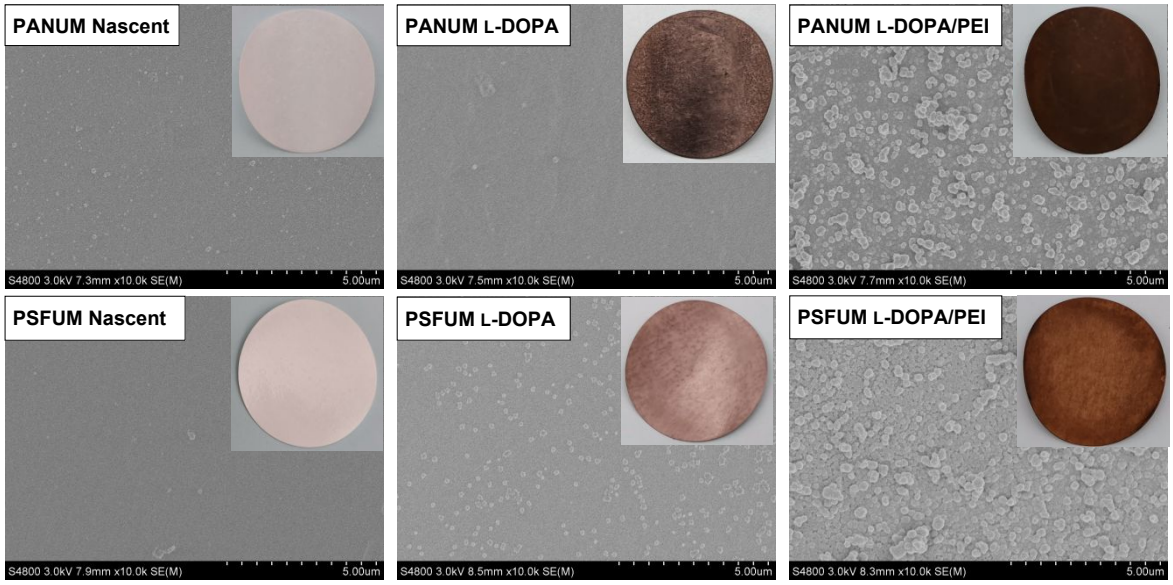


Figure S13. Live/dead bacterial staining fluorescence images of *S.aureus/E.coli* incubated with different coatings. Green and red fluorescence represent live and dead bacteria, respectively. (The scale bar is 100 μm.)



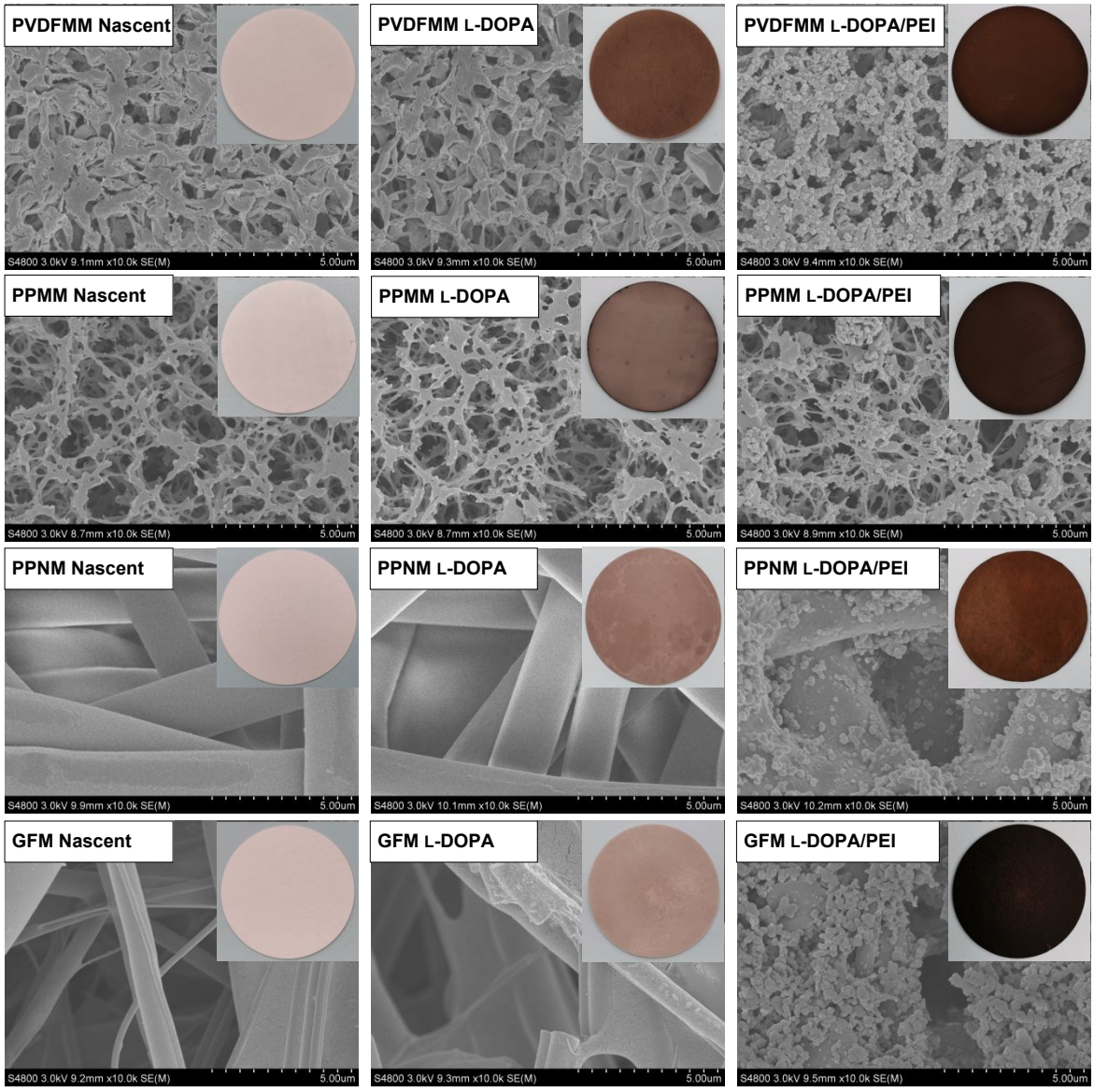


Figure S14. Surface morphologies of the nascent, L-DOPA and L-DOPA/PEI modified membranes. (L-DOPA was fixed at 2.0 mg/mL in the deposition solution; L-DOPA/PEI mass ratio was fixed at 2:1; and the deposition time was 6 h.)

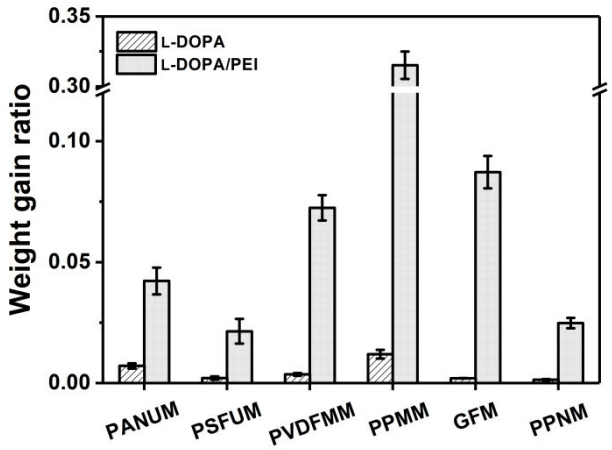


Figure S15. Weight gain ratios of the separation membranes deposited by L-DOPA and L-

DOPA/PEI for 6 h, respectively. (L-DOPA was fixed at 2.0 mg/mL in the deposition solution. L-DOPA/PEI mass ratio was fixed at 2:1.)

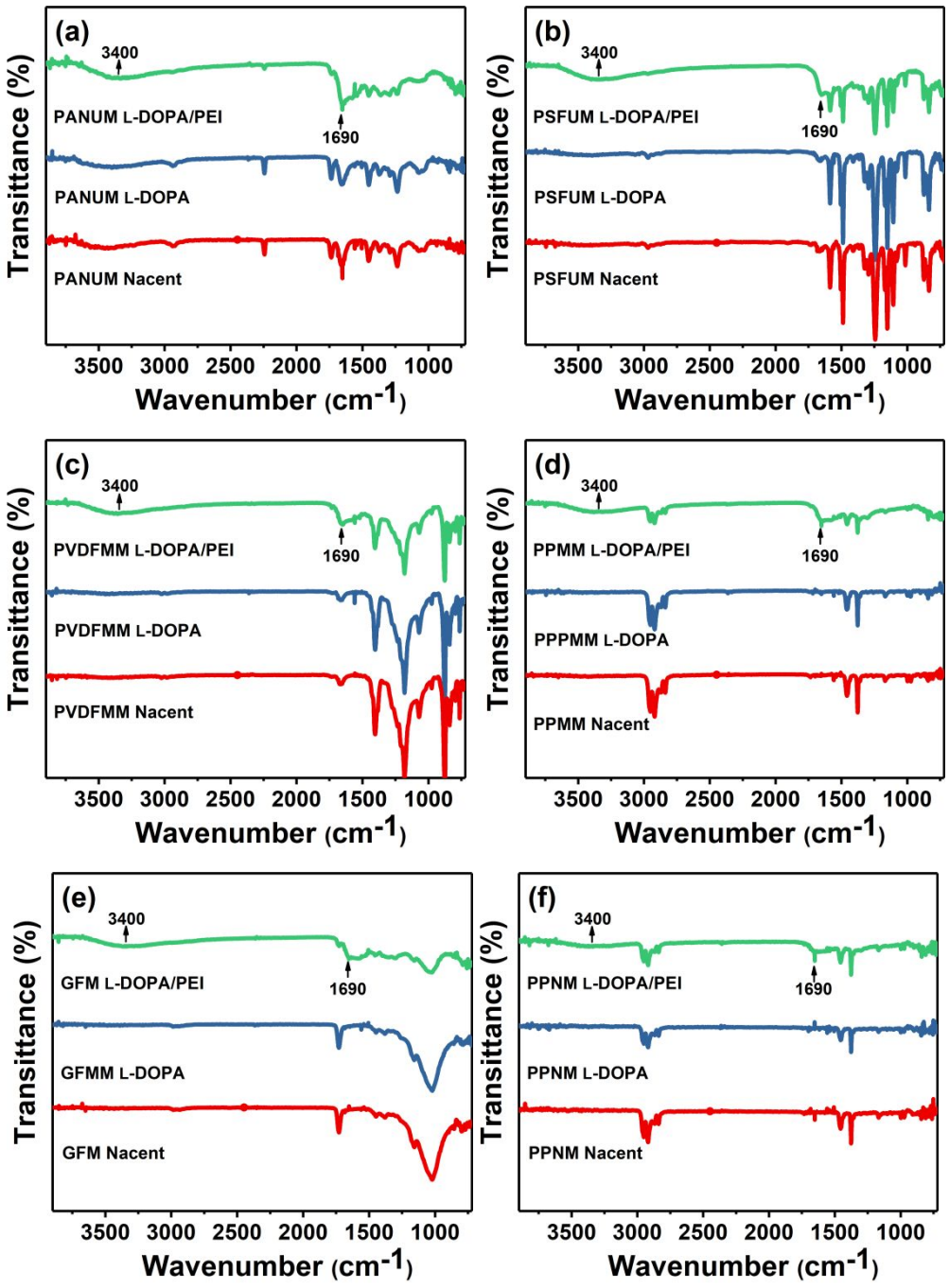


Figure S16. FT-IR/ATR spectra of the nascent, L-DOPA and L-DOPA/PEI modified membranes. (L-DOPA was fixed at 2.0 mg/mL in the deposition solution; L-DOPA/PEI mass ratio was fixed at 2:1; and the deposition time was 6 h.)

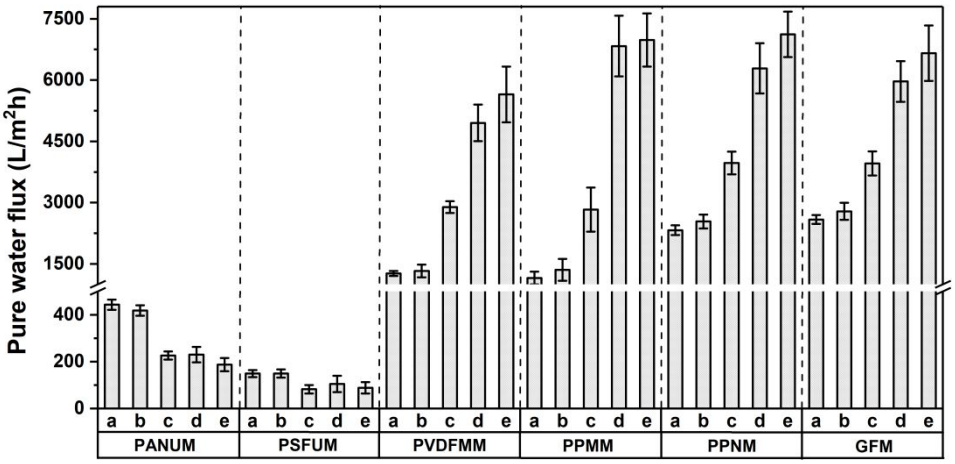


Figure S17. Pure water permeation fluxes of the (a) nascent, (b) poly(L-DOPA), (c) PDA, (d) DA/PEI and (e) L-DOPA/PEI modified membranes. (The concentrations of L-DOPA and DA were fixed at 2 mg/mL; PEI concentration was fixed at 1 mg/mL in the deposition solution; and the deposition time was 6 h.)