Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting Information

Co-deposition of Catechol/Polyethyleneimine on Porous Membranes for Efficient Decolorization of Dye Water

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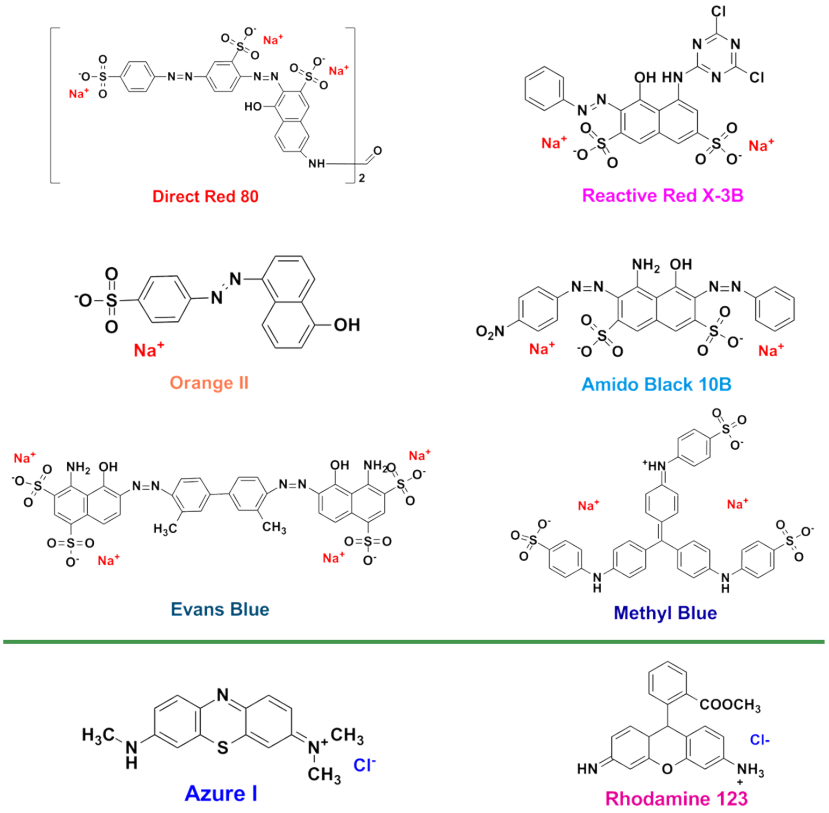

Figure S1. Chemical structures of eight dyestuffs used in this work.

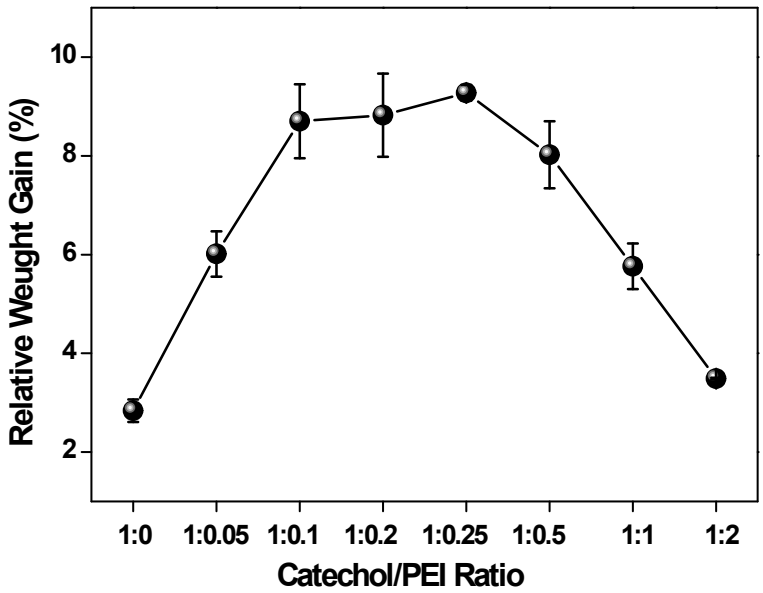

Figure S2. Weight gain of the membranes modified by immersing in CCh/PEI solution for 7 h with different mass ratios.

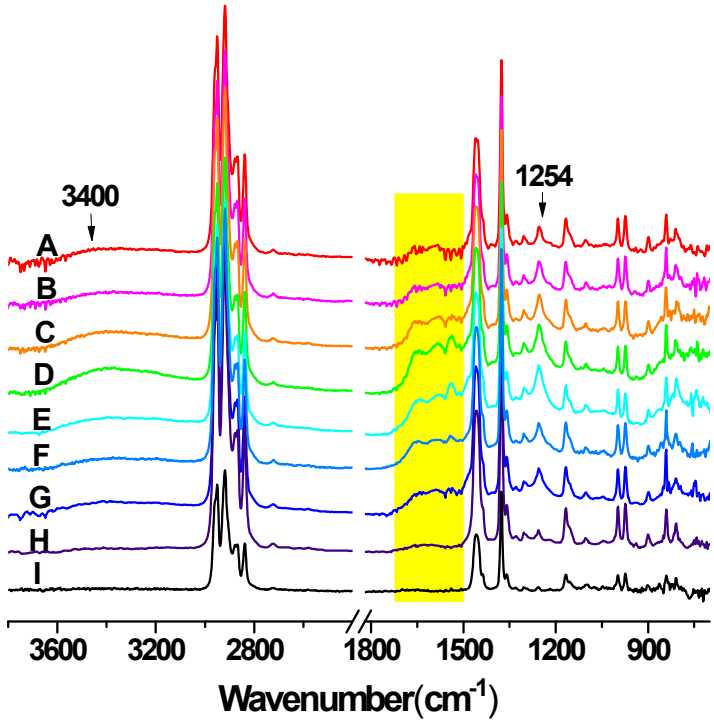

Figure S3. FT-IR/ATR spectra of the membrane surface modified with different CCh/PEI ratios for 7 hr deposition: A) 1:2, B) 1:1, C) 1:0.5, D) 1:0.25, E) 1:0.2, F) 1:0.1, G) 1:0.05, H) 1:0, I) nascent MPPM.

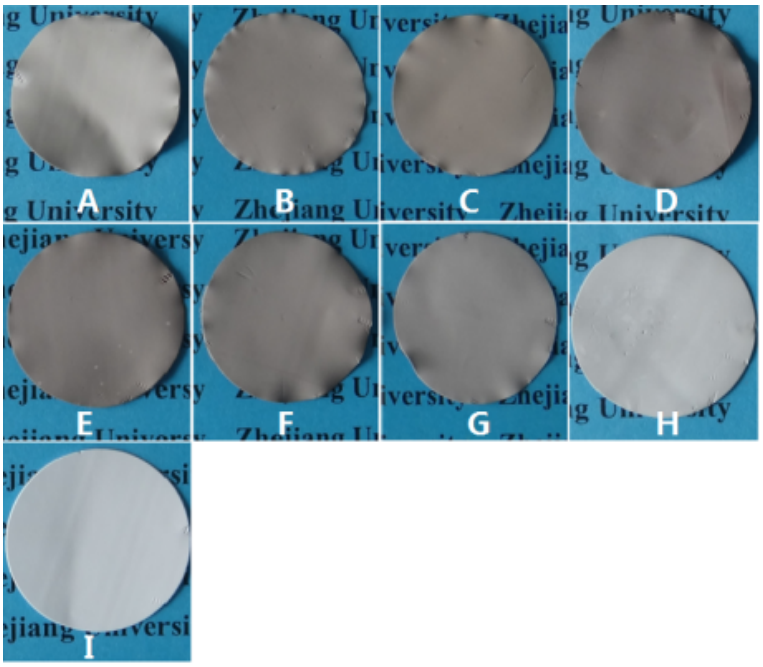

Figure S4. Digital pictures of the modified PPMMs after 7 hr deposition with different CCh/PEI ratios: A) 1:2, B) 1:1, C) 1:0.5, D) 1:0.25, E) 1:0.2, F) 1:0.1, G) 1:0.05, H) 1:0, I) nascent MPPM.

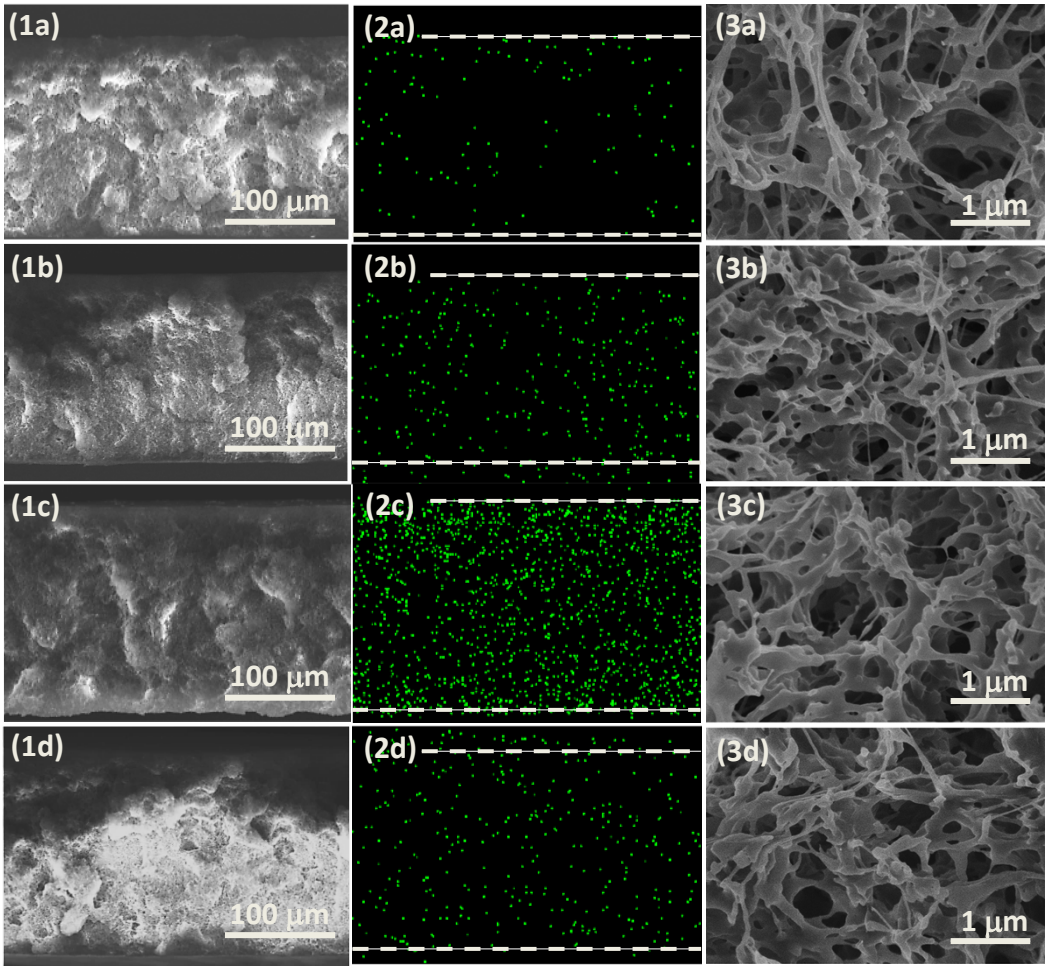

Figure S5. (1) Cross-section morphology, (2) silver element (points measured by EDX mapping analysis) on the cross-section and (3) higher magnification SEM images of the cross-sections (before the treatment of silver nitrate) before and after modification with different CCh/PEI ratios: a) blank, b) 1:0, c) 1:0.25, d) 1:2.

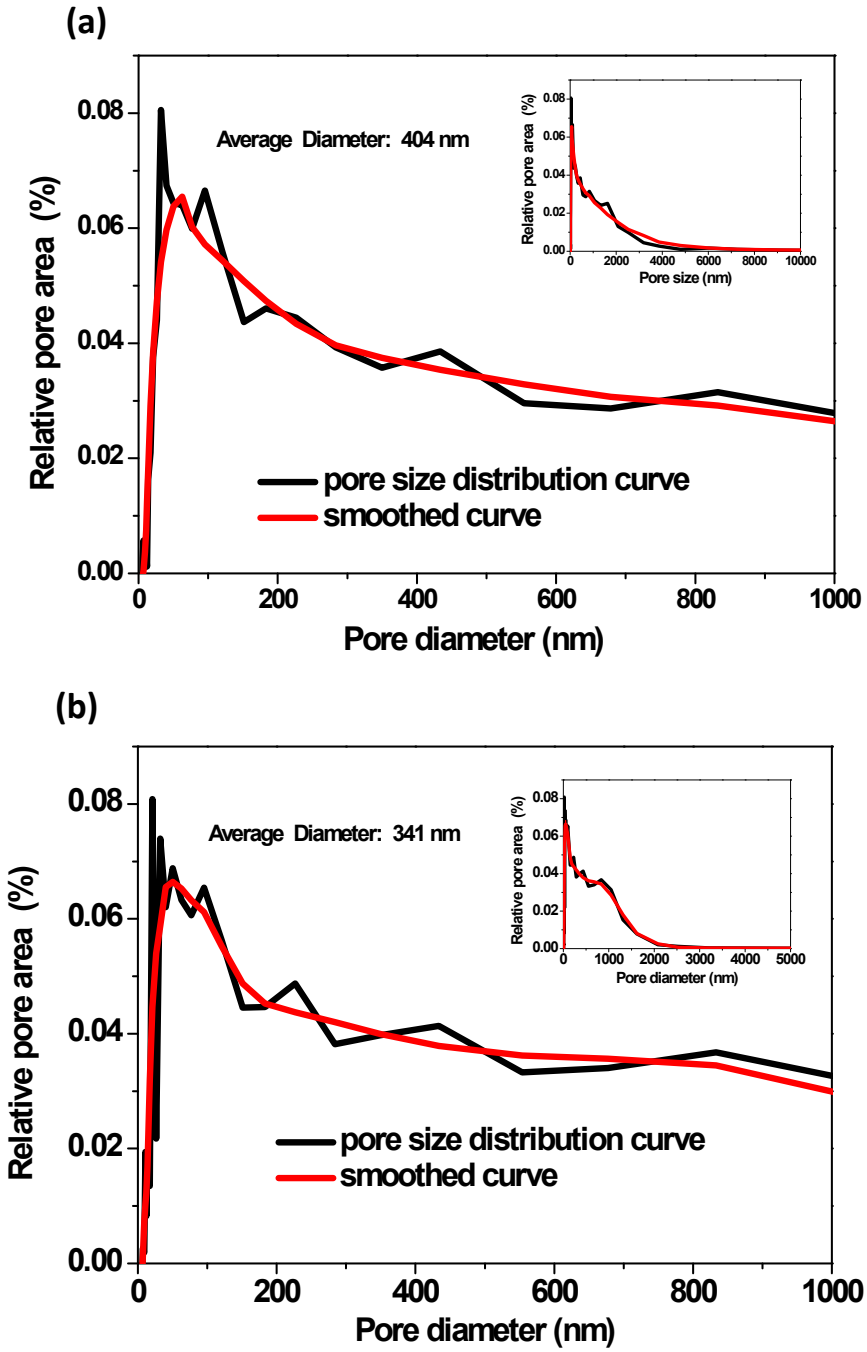

Figure S6. Pore size distribution of (a) blank membrane and (b) the membrane modified with 1:0.25 CCh/PEI.

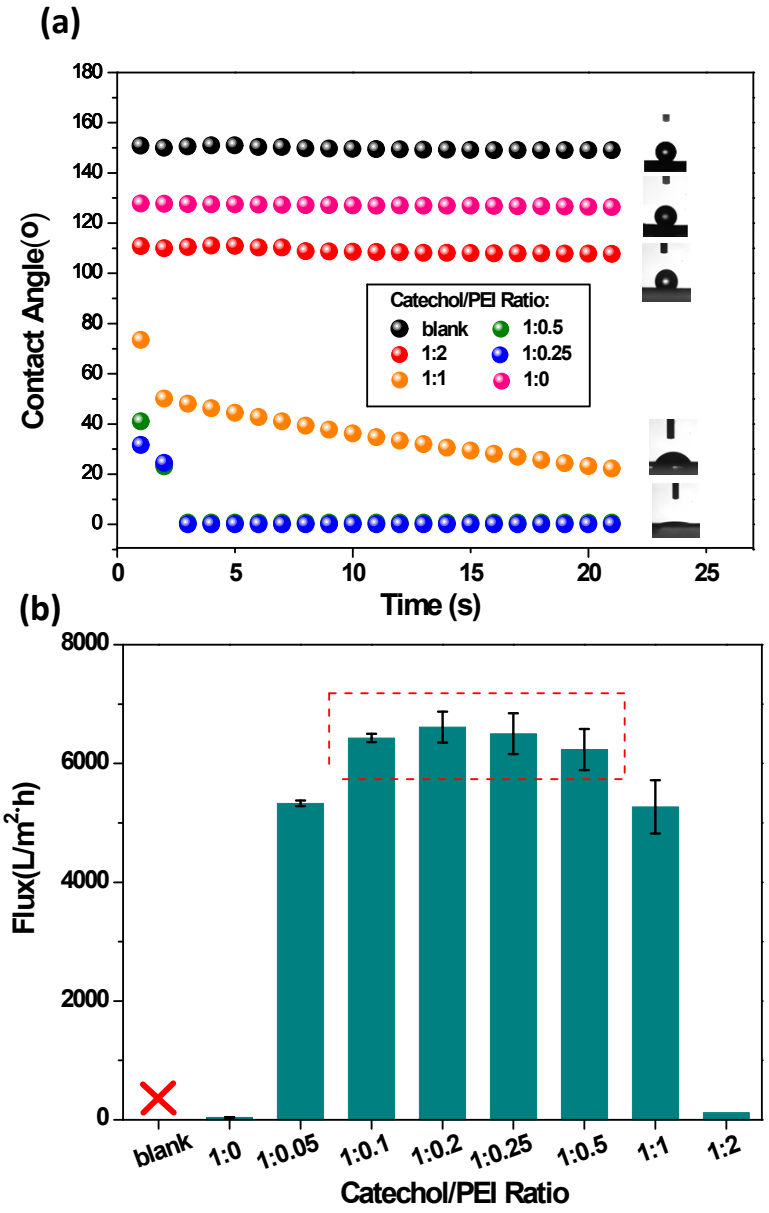

Figure S7. (a) Water contact angle and (b) pure water flux of the blank and modified membranes with different CCh/PEI ratios.

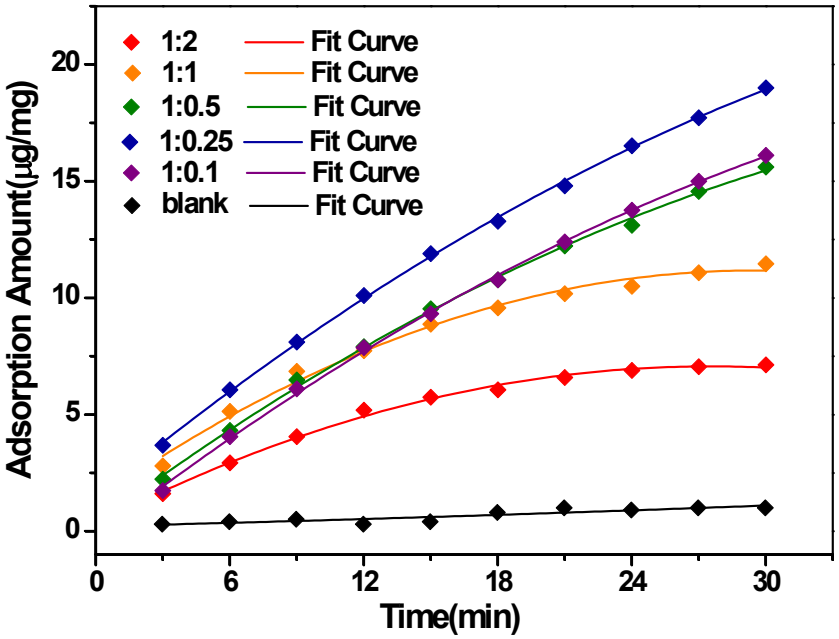

Figure S8. Pseudo-first order kinetic of DR80 adsorption on the blank and modified membranes with different CCh/PEI ratios (20 mL solution, T: 25 °C, initial dye concentration: 25 mg/L and 7 mg of membranes).

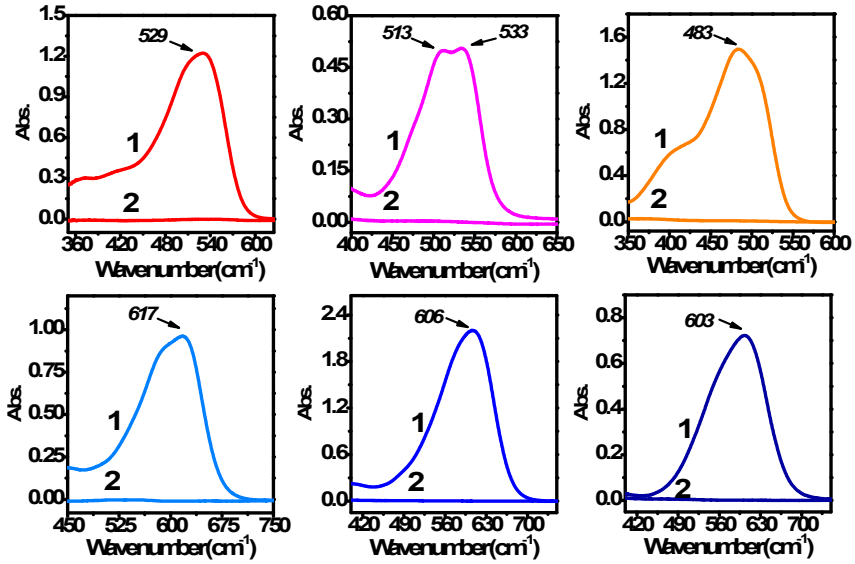

Figure S9. UV-vis spectra of the dye solutions before and after membrane treatment..

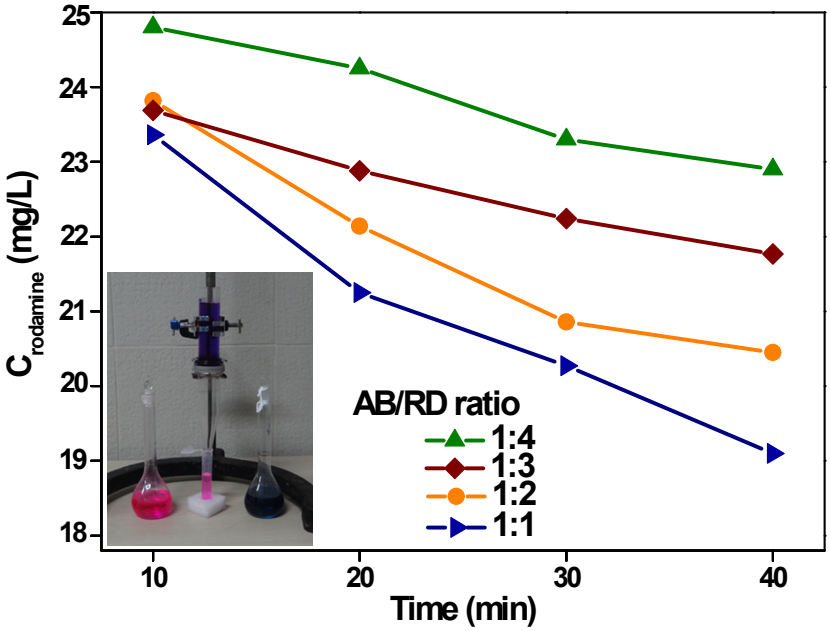

Figure S10. The concentration of rodamine in the filtrates with operation time and different AB/RD mass ratios, initial concentration of rodamine: 25 mg/mL.

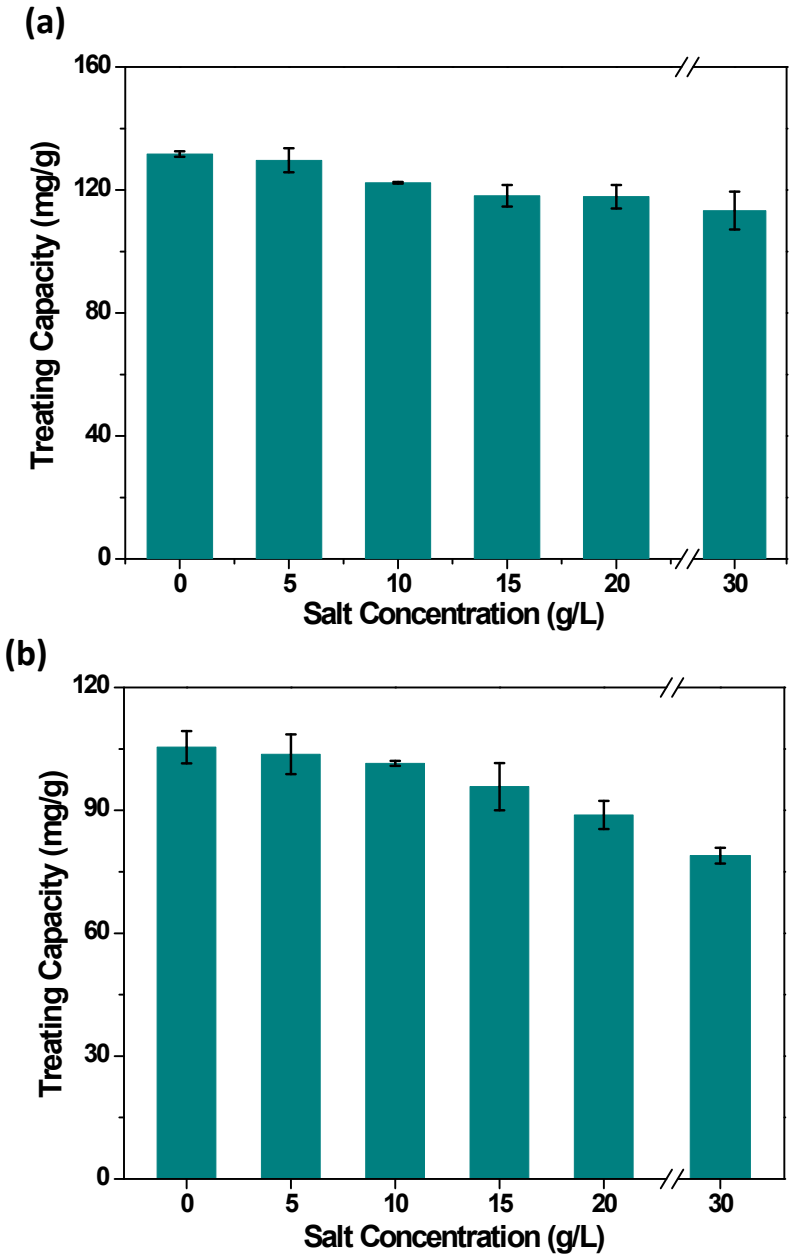

Figure S11. Influence of ionic strength on the treating capacity of (a) orange ii and (b) x-3b by the CCh-PEI modified membranes.

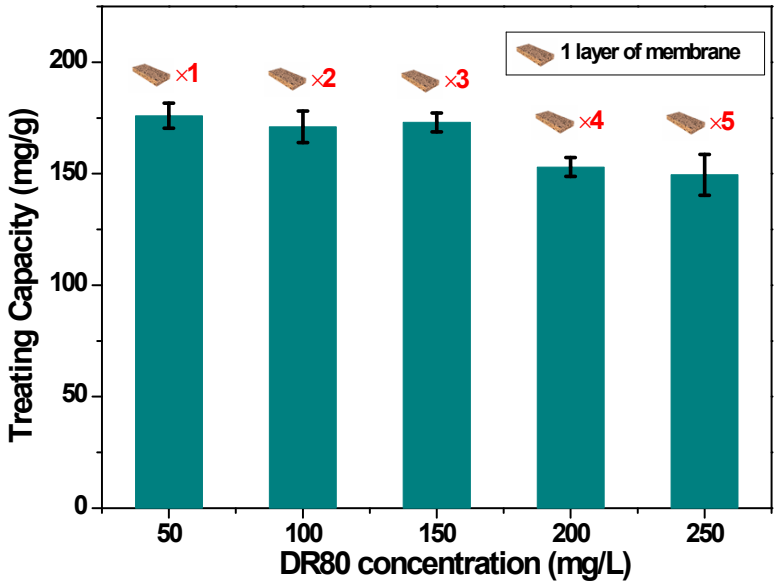

Figure S12. Influence of dye concentration on the treating capacity of DR80 with different layer of membranes. The height of water column for each concentration: 6 cm, 12 cm, 18 cm, 24 cm and 30 cm (with modified separation unit), respectively.

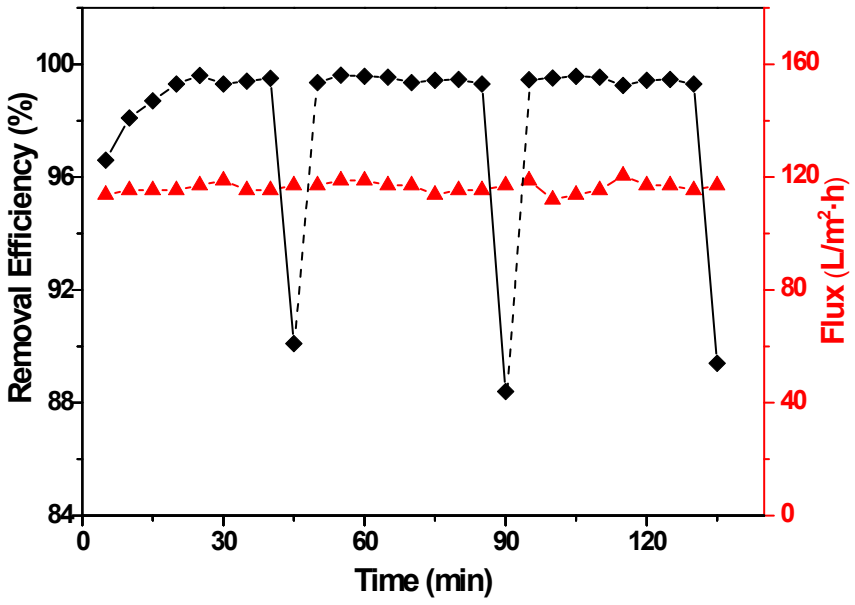

Figure S13. Removal efficiency and permeation flux of DR80 by the treatment of CCh-PEI modified membrane over three cycles of operation: 5 pieces of membranes, 30 cm water column.

Table S1. Chemical composition of the unmodified and modified membrane surface from XPS spectra.

Sample	C 1s (%)	O 1s (%)	N 1s (%)	N/O
Nascent PPMM	100	0	0	—
CCh/PEI=1:2	94.89	1.60	3.51	2.19
CCh/PEI=1:0.25	83.44	7.07	9.49	1.34
CCh/PEI=1:0	96.99	1.56	1.44	0.92

Table S2. Adsorption kinetic parameters of DR80 by the modified membranes.

CCh/PEI ratio	q_e	k_1	R_1^2
1:2	7.929	0.0824	0.995
1:1	12.123	0.0885	0.997
1:0.5	25.557	0.0310	0.999
1:0.25	34.259	0.0213	0.999
1:0.1	34.226	0.0277	0.996
Blank	1.112	0.2033	0.991