Supplementary Information

Desalination of Water Using Metal Polymers

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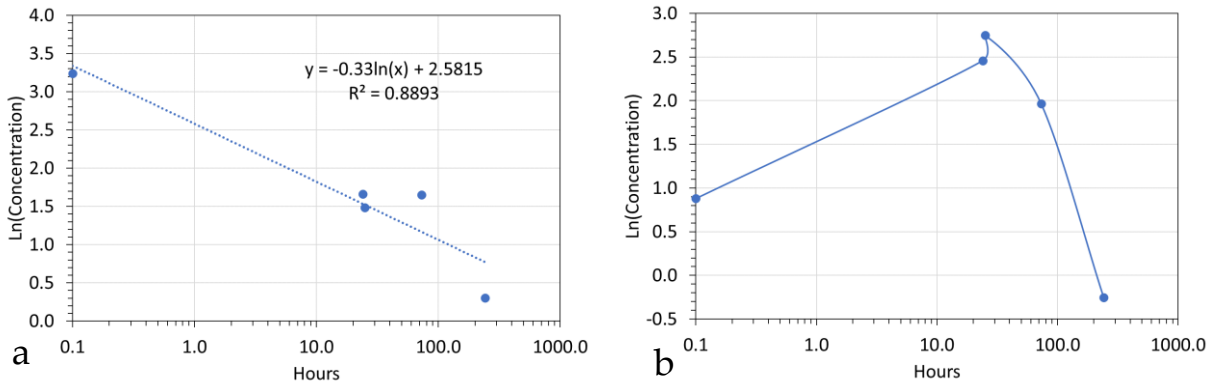
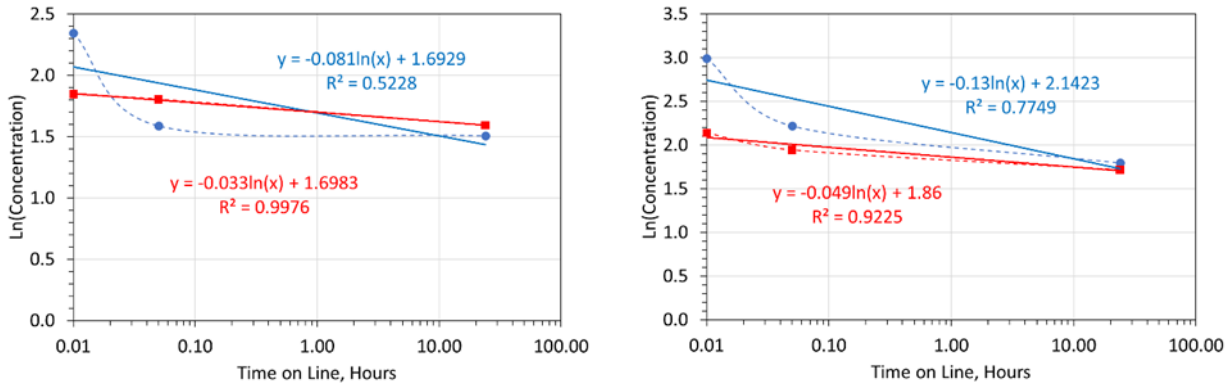


Figure S1. Entrained polymer placed in seawater at a concentration of 0.2 g Fe L^{-1}. Polymer formed from: 0.43 g $FeSO_4$ + 0.73 g CaO + 1.09 g MnO_2 + 0.2 g HCOOH L^{-1}. (a), Cl^- ion concentration, g L^{-1}, vs time.; (b), Na^+ ion concentration, g L^{-1}, vs time. The Cl^- ion removal follows a zero-order reaction. Placement in Sea water (pH = 8.31; Eh = 372 mV; Temperature = 4.8 °C; Cl^- = 26.55 g L^{-1}; Na^+ = 17.21 g L^{-1}) produced a product water after 261 hours (pH = 11.85; Eh = -45 mV; Temperature = 7.0 °C; Cl^- = 1.35 g L^{-1}; Na^+ = 0.78 g L^{-1}).



(**a**) (**b**)

Figure S2. Water salinity desalination polymer quality control check. (a) Feed water salinity = 10.44 g Cl^- L^{-1} + 6.33 g Na^+ L^{-1}; 2.3 L water (2g $FeSO_4$ + 3.34 g CaO + 5.61 g ZnO + 1 cm^3 (40%) HCOOH L^{-1}). (b) Feed water salinity = 19.94 g Cl^- L^{-1} + 8.47 g Na^+ L^{-1}; 2.3 L water (2g $FeSO_4$ + 3.34 g CaO + 5.61 g ZnO + 0.83 g $C_6H_8O_7$ L^{-1}). Cl^- ions (blue dots) and Na^+ ions (red dots). Na^+ and Cl^- ions are removed by separate processes. Ion removal is by zero-order reactions.

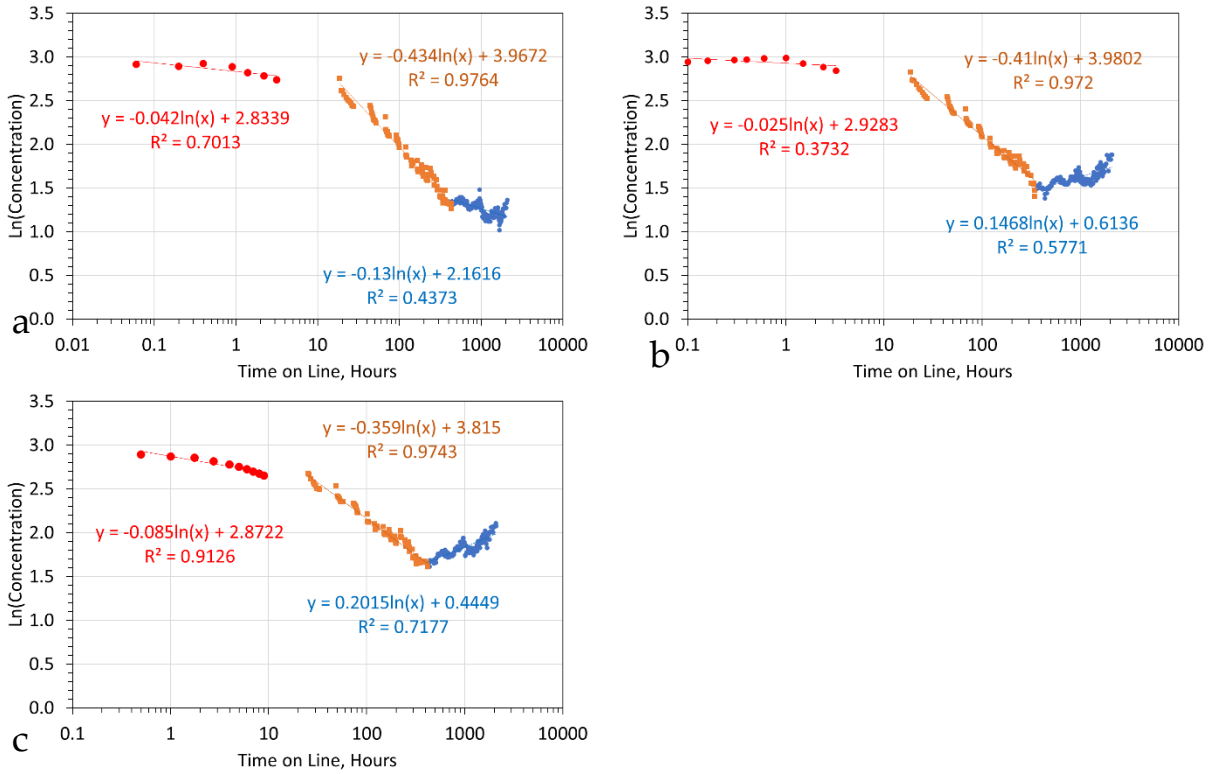


Figure S3. Test trials illustrating the suitability of the entrained n-Fe@blue crop polymer (entrained concentration 0.6 g Fe L^{-1} in the water) for the removal of Cl^- ions from sea water, containing 18.65 g Cl^- L^{-1}. Temperature range = 5 to 15 ^oC. Each example reduced the Cl^- concentration to below 5 g Cl^- L (>70% removal), before the Cl^- concentrations stabilized or started to increase; (a) Blue Crop berry juice; (b) Blue Crop leaf extract; (c) Blue Crop Stem extract.

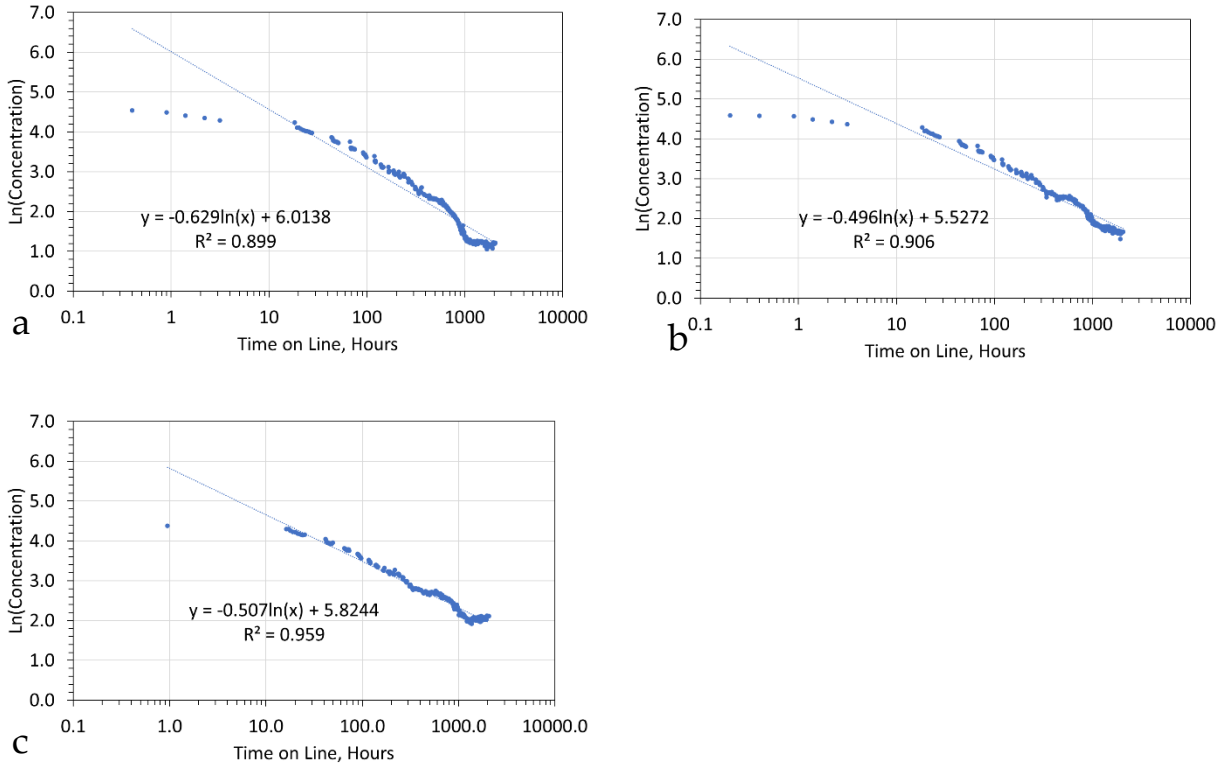


Figure S4. High water salinity desalination C^0:n-Fe@blue crop polymer pellet quality control check. (a) Feed water salinity = 96.64 g L^{-1}; (b) Feed water salinity = 99.54 g L^{-1}; (c) Feed water salinity = 84.12 g L^{-1}; Ratio of Pellets: Water volume (200 cm^3 activated carbon pellets: 1 L water (maximum of 2 g Fe L^{-1})). The regression relationship indicates that after about 10 to 20 hours, the desalination reaction adopts a first-order reaction format.

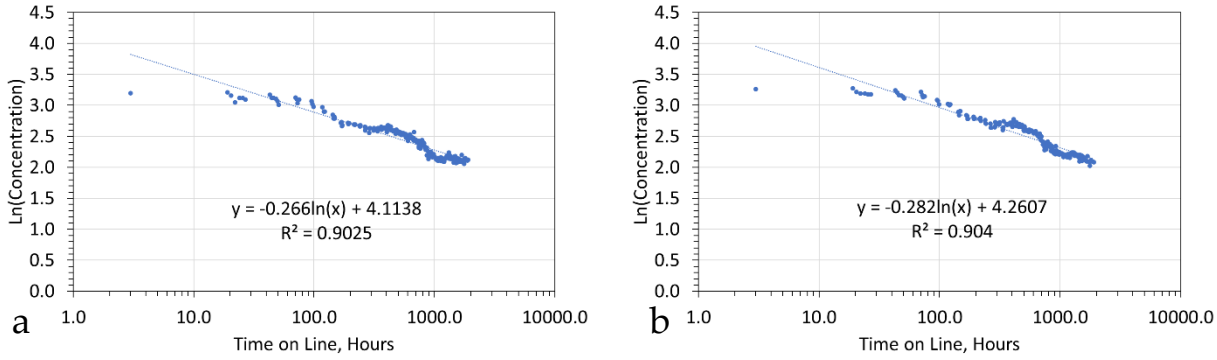


Figure S5. Medium water salinity desalination pellet quality control check. (a) Feed water salinity = 26.45 g L^{-1}; (b) Feed water salinity = 27.76 g L^{-1}; Ratio of Pellets: Water volume (200 cm^3 activated carbon pellets: 1 L water (maximum of 2 g Fe L^{-1})). The regression relationship indicates that after about 80 to100 hours, the desalination reaction adopts a zero-order reaction format.

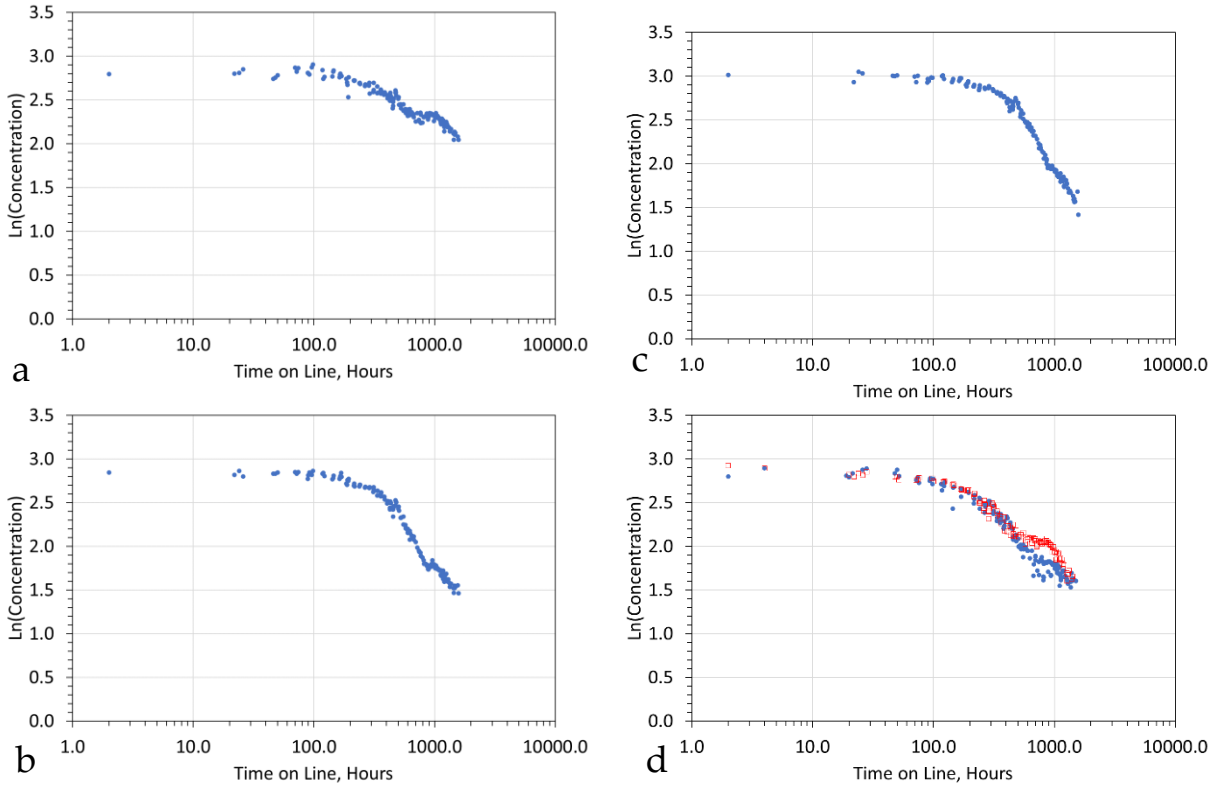


Figure S6. Estuarine water salinity desalination pellet quality control check. (a) Feed water salinity = 18.04 g L^{-1}; (b) Feed water salinity = 18.97 g L^{-1}; (c) Feed water salinity = 21.62 g L^{-1}; (d) Blue dots: Feed

water salinity = 17.82 g L^{-1}; Red dots: Feed water salinity = 18.87 g L^{-1}; Ratio of Pellets: Water volume (200 cm^3 activated carbon pellets: 1 L water (maximum of 2 g Fe L^{-1})). The regression relationship indicates that after about 100 to 300 hours, the desalination reaction adopts a zero-order reaction format.

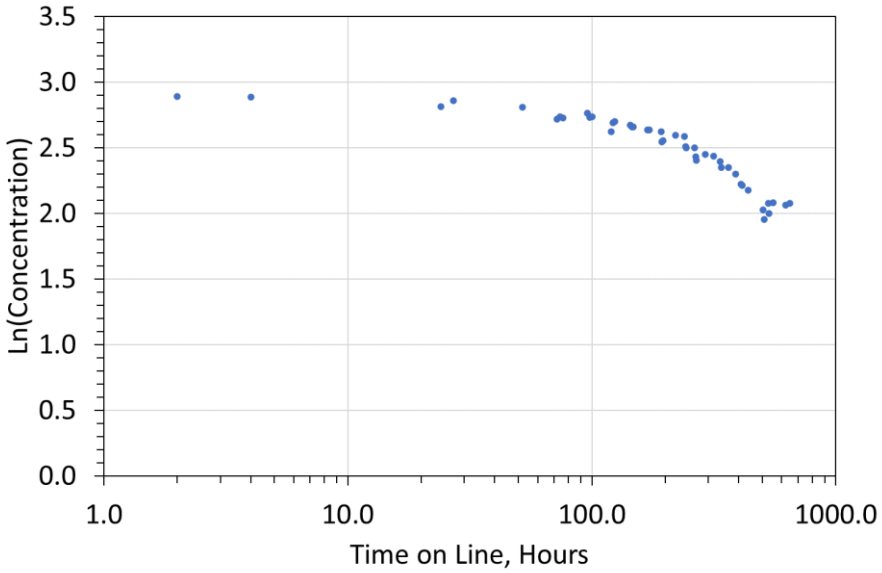


Figure S7. Medium water salinity desalination polymer quality control check. Feed water salinity = 19.12 g L^{-1}; 1 L water (maximum of 2 g Fe L^{-1})). The regression relationship indicates that after about 200 hours, the desalination reaction adopts a zero-order reaction format.

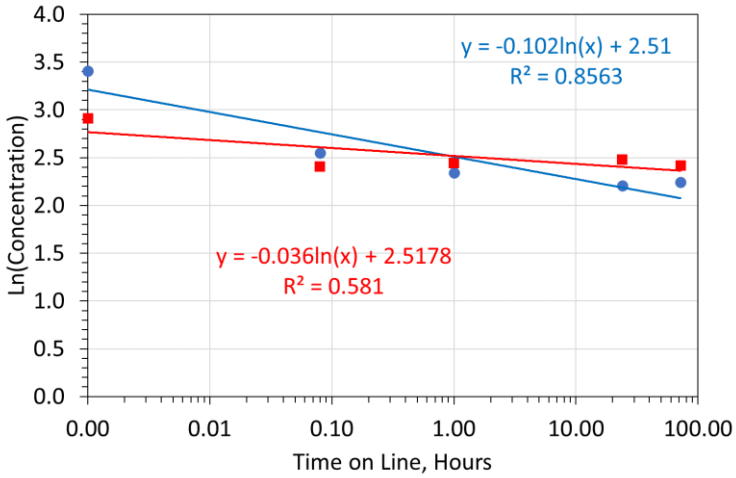


Figure S8. Water salinity desalination polymer quality control check. Feed water salinity = 30.14 g Cl^- L^{-1} + 18.38 g Na^+ L^{-1}; 2.3 L water (maximum of 0.3 g Fe L^{-1})). The desalination reaction adopts a zero-order reaction format, for the removal of both Cl^- ions (blue dots) and Na^+ ions (red dots). Polymer constructed from the weight ratios: 1.42 g $FeSO_4$ + 1.36 g urea + 3.34 g CaO. Removed: 70% Cl^- ions + 40% Na^+ ions.

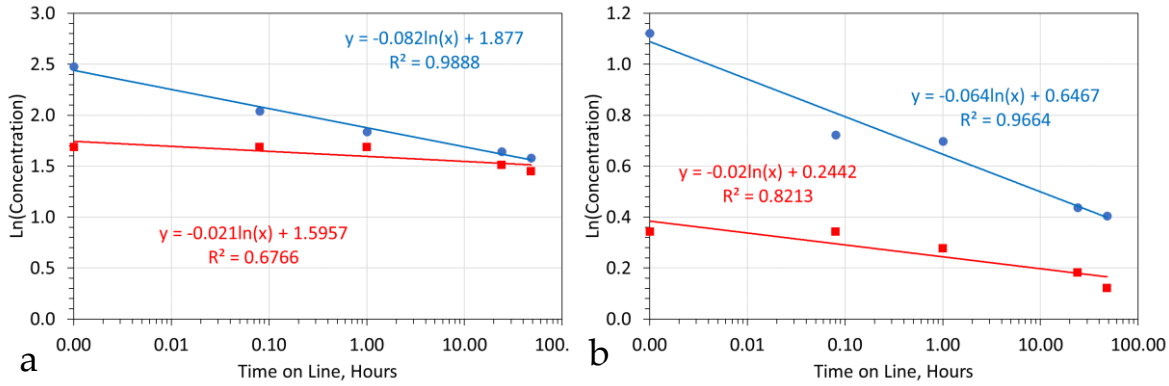


Figure S9. Water salinity desalination polymer quality control check. (a) Feed water salinity = 11.92 g Cl^- L^{-1} + 5.41 g Na^+ L^{-1}; 2.3 L water (maximum of 1 g Ca L^{-1})). (b) Feed water salinity = 3.07 g Cl^- L^{-1} + 1.41 g Na^+ L^{-1}; 2.3 L water (maximum of 1 g Ca L^{-1})). The desalination reaction adopts a zero-order reaction format, for the removal of both Cl^- ions (blue dots) and Na^+ ions (red dots). Polymer constructed from the weight ratios: 1.36 g urea + 3.34 g CaO. Removed: 70% Cl^- ions + 40% Na^+ ions.

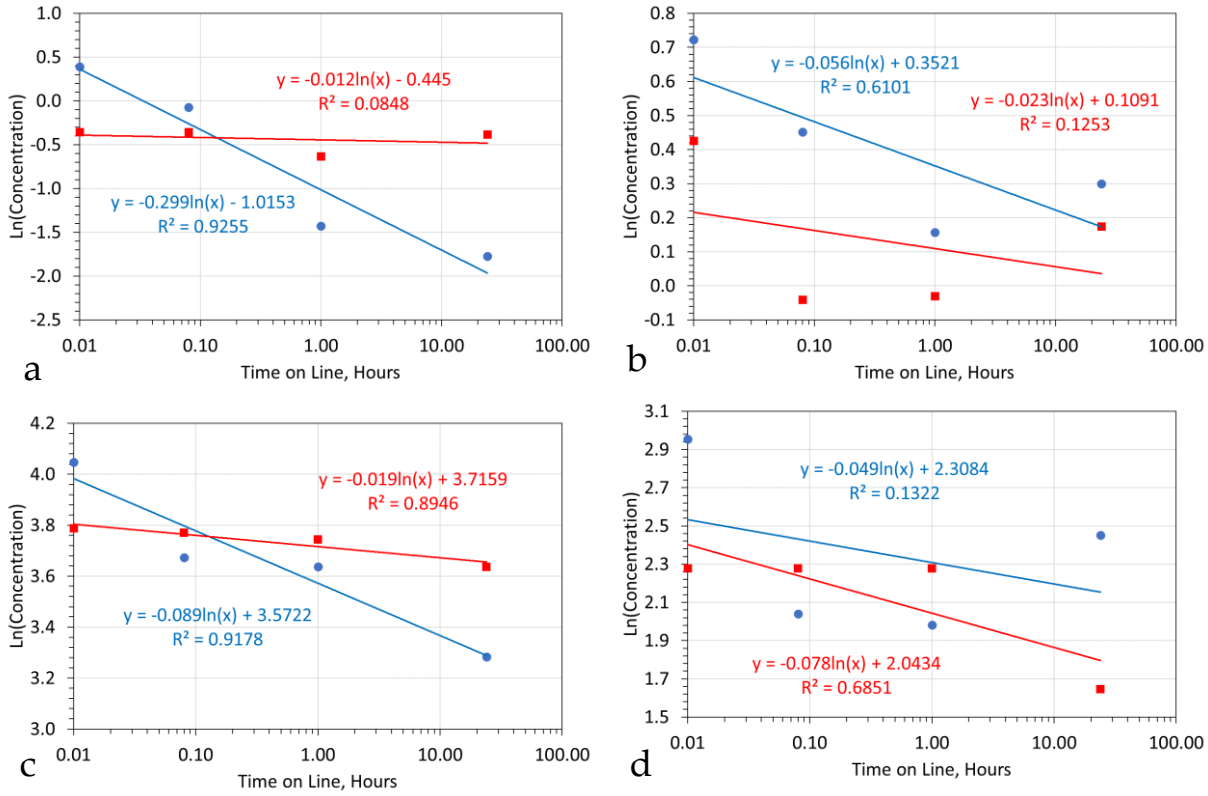


Figure S10. Water salinity desalination polymer quality control check. (a) Feed water salinity = 1.48 g Cl^- L^{-1} + 0.7 g Na^+ L^{-1}; 2.3 L water (1.51 g $MgSO_4$ + 1.2 g $Al(OH)_3$ L^{-1}). (b) Feed water salinity = 2.06 g Cl^- L^{-1} + 1.53 g Na^+ L^{-1}; 2.3 L water (3.02 g $MgSO_4$ + 2.4 g $Al(OH)_3$ L^{-1}). (c) Feed water salinity = 57.26 g Cl^- L^{-1} + 44.14 g Na^+ L^{-1}; 2.3 L water (1.51 g $MgSO_4$ + 1.34 $Al_2(SO_4)_3$ + 1.2 g $Al(OH)_3$ L^{-1}). (d) Feed water salinity = 19.17 g Cl^- L^{-1} + 9.76 g Na^+ L^{-1}; 2.3 L water (3.02 g $MgSO_4$ + 1.34 g $Al_2(SO_4)_3$ + 2.4 g $Al(OH)_3$ L^-

[1]). The desalination reaction adopts a zero-order reaction format, for the removal of both Cl^- ions (blue dots) and Na^+ ions (red dots). Na^+ and Cl^- ions are removed by separate processes.

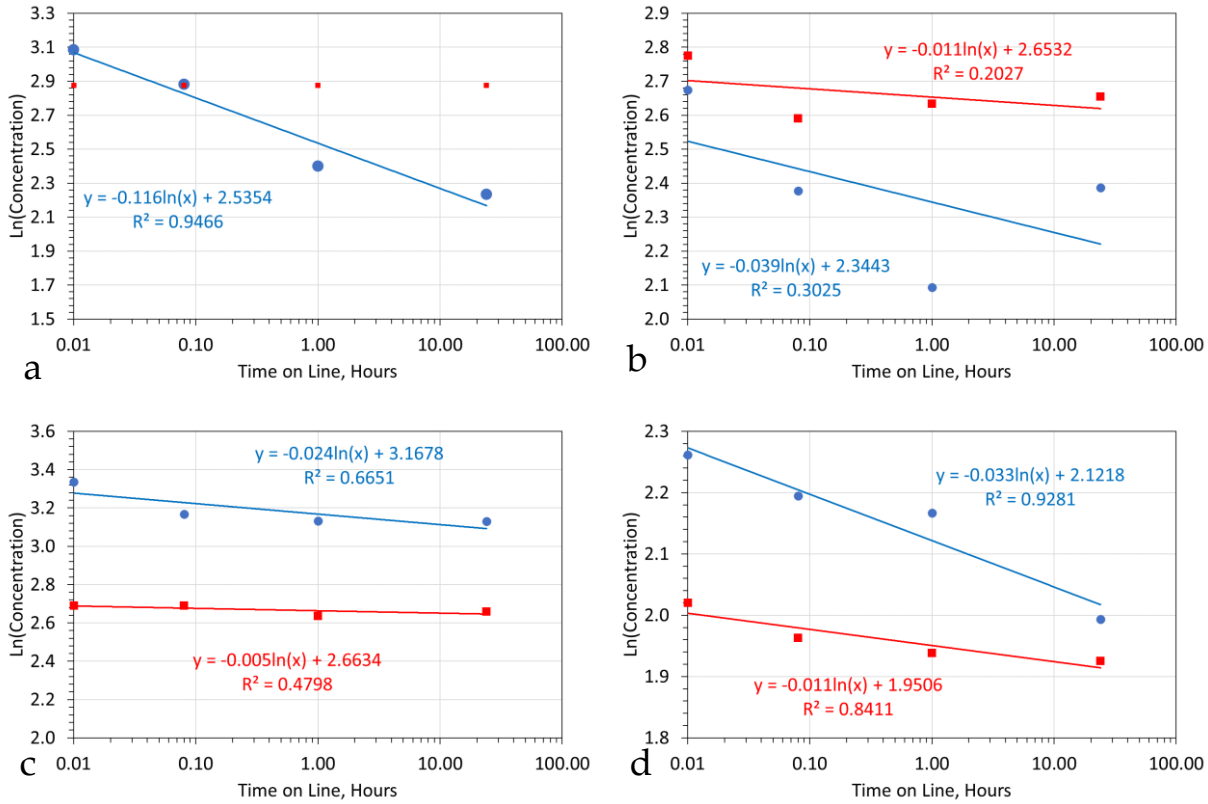


Figure S11. Water salinity desalination polymer quality control check. (a) Feed water salinity = 21.87 g Cl^- L^{-1} + 17.74 g Na^+ L^{-1}; 2.3 L water (1.51 g $MgSO_4$ + 1.34 g $Al_2(SO_4)_3$ + 1.2 g $Al(OH)_3$ L^{-1}). (b) Feed water salinity = 14.5 g Cl^- L^{-1} + 16.04 g Na^+ L^{-1}; 2.3 L water (1.51 g $MgSO_4$ + 1.34 g $Al_2(SO_4)_3$ + 1.2 g $Al(OH)_3$ L^{-1}). (c) Feed water salinity = 28.1 g Cl^- L^{-1} + 14.73 g Na^+ L^{-1}; 2.3 L water (1.51 g $MgSO_4$ + 1.34 g $Al_2(SO_4)_3$ + 1.2 g $Al(OH)_3$ L^{-1}). (d) Feed water salinity = 9.6 g Cl^- L^{-1} + 7.54 g Na^+ L^{-1}; 2.3 L water (1.51 g $MgSO_4$ + 1.34 g $Al_2(SO_4)_3$ + 1.2 g $Al(OH)_3$ L^{-1}). The desalination reaction adopts a zero-order reaction format, for the removal of both Cl^- ions (blue dots) and Na^+ ions (red dots). Na^+ and Cl^- ions are removed by separate processes.

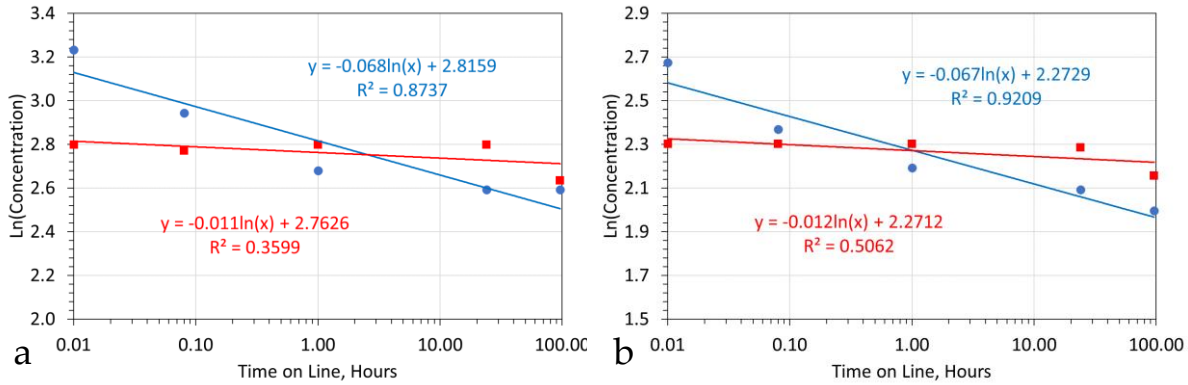


Figure S12. Water salinity desalination polymer quality control check. (a) Feed water salinity = 25.36 g Cl^- L^{-1} + 16.44 g Na^+ L^{-1}; 2.3 L water (1.67 g CaO + 2.52 g MnO_2 + 1.99 g Al_2O_3 L^{-1}). (b) Feed water salinity = 14.5 g Cl^- L^{-1} + 9.99 g Na^+ L^{-1}; 2.3 L water (1.67 g CaO + 2.52 g MnO_2 + 1.99 g Al_2O_3 L^{-1}). Cl^- ions (blue dots) and Na^+ ions (red dots). Na^+ and Cl^- ions are removed by separate processes. Temperature = 13.7 to 15.4 °C.

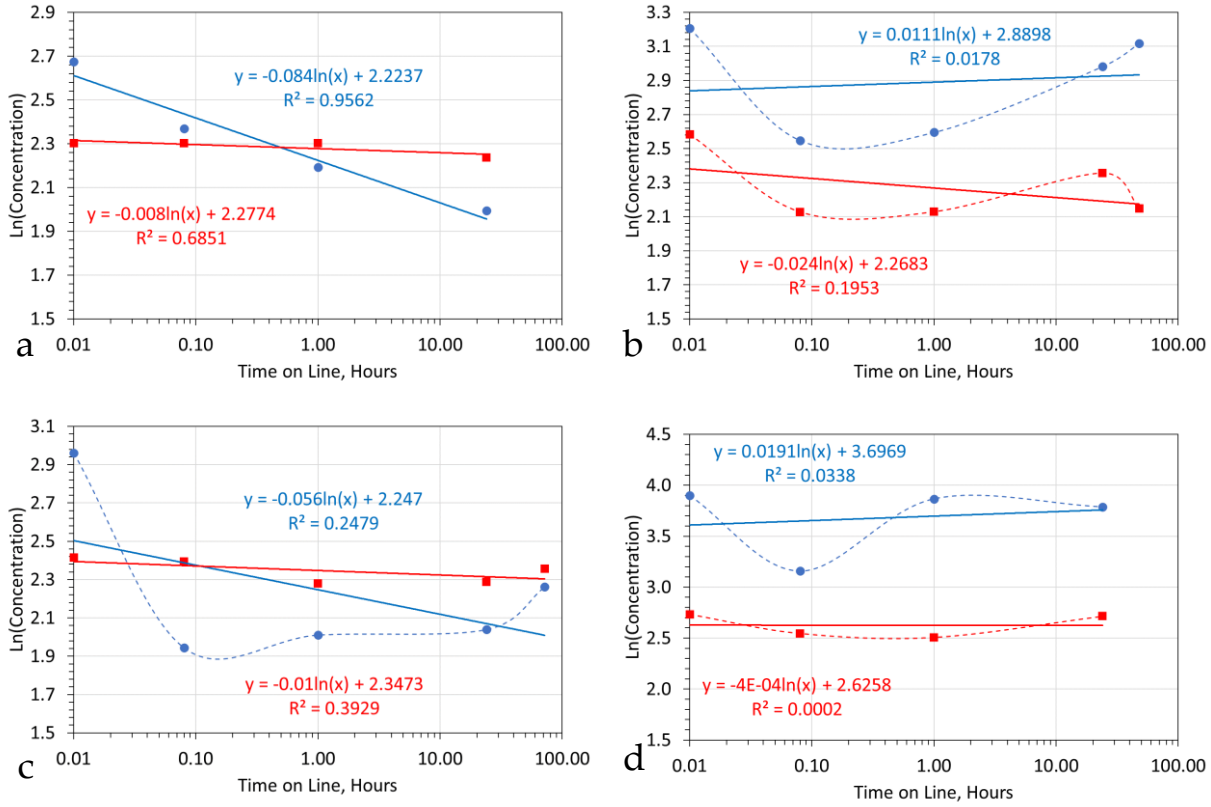


Figure S13. Water salinity desalination polymer quality control check. (a) Feed water salinity = 14.5 g Cl^- L^{-1} + 9.99 g Na^+ L^{-1}; 2.3 L water (1.67 g CaO + 1.99 g Al_2O_3 L^{-1}). (b) Feed water salinity = 24.67 g Cl^- L^{-1} + 13.23 g Na^+ L^{-1}; 2.3 L water (1.67 g CaO + 2.81 g ZnO + 1.34 g $Al_2(SO_4)_3$ + 1.2 g $Al(OH)_3$ L^{-1}). (c) Feed water salinity = 19.3 g Cl^- L^{-1} + 11.18 g Na^+ L^{-1}; 2.3 L water (3.34 g CaO + 4.22 g ZnO + 2.0 g $Al_2(SO_4)_3$ + 1.8 g $Al(OH)_3$ L^{-1}). (d) Feed water salinity = 49.31 g Cl^- L^{-1} + 15.40 g Na^+ L^{-1}; 2.3 L water (1.67 g CaO + 4.22 g ZnO + 2.0 g $Al_2(SO_4)_3$ + 1.8 g $Al(OH)_3$ L^{-1}). Cl^- ions (blue dots) and Na^+ ions (red dots). Na^+ and Cl^- ions are removed by separate processes. Temperature = 14.2 to 18.1 °C.

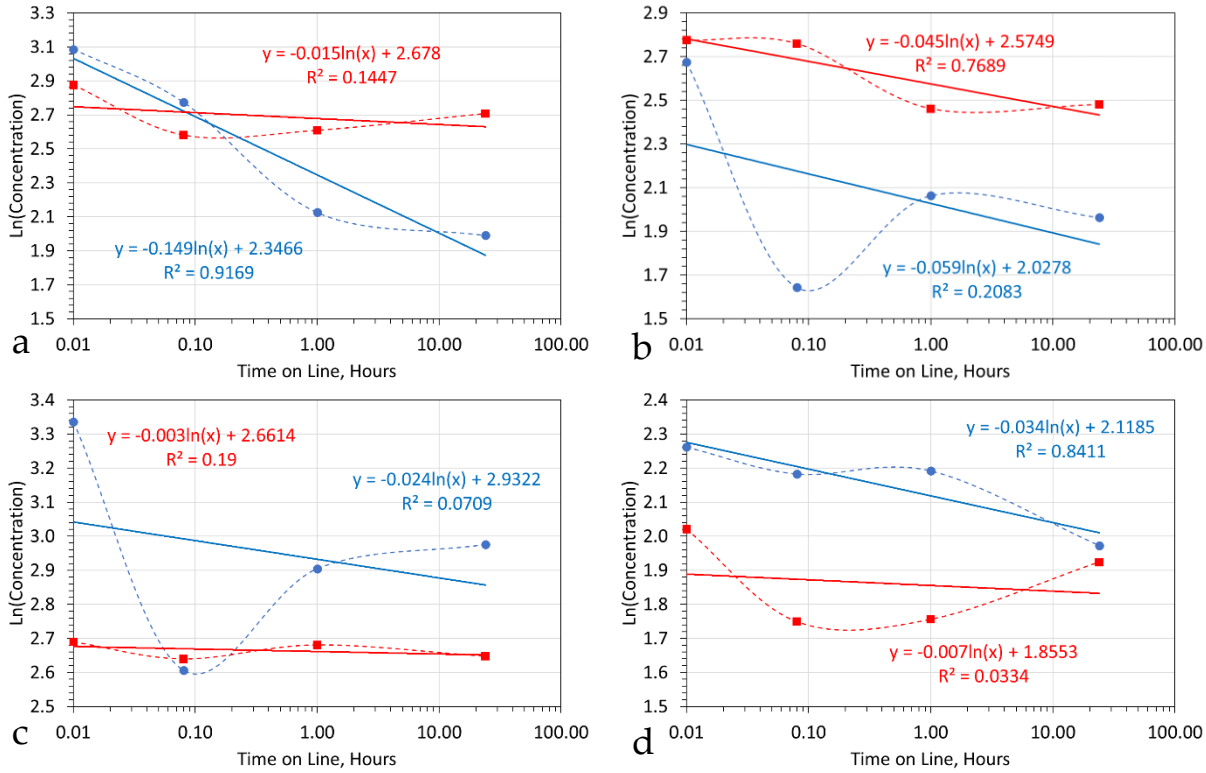


Figure S14. Water salinity desalination polymer quality control check. (a) Feed water salinity = 21.87 g Cl^- L^{-1} + 17.74 g Na^+ L^{-1}; 2.3 L water (1.67 g CaO + 1.51 g $MgSO_4$ + 1.34 g $Al_2(SO_4)_3$ + 1.2 g $Al(OH)_3$ L^{-1}). (b) Feed water salinity = 14.50 g Cl^- L^{-1} + 16.40 g Na^+ L^{-1}; 2.3 L water (1.67 g CaO + 1.51 g $MgSO_4$ + 1.34 g $Al_2(SO_4)_3$ + 1.2 g $Al(OH)_3$ L^{-1}). (c) Feed water salinity = 28.1 g Cl^- L^{-1} + 14.73 g Na^+ L^{-1}; 2.3 L water (1.67 g CaO + 1.51 g $MgSO_4$ + 1.34 g $Al_2(SO_4)_3$ + 1.2 g $Al(OH)_3$ L^{-1}). (d) Feed water salinity = 9.6 g Cl^- L^{-1} + 7.54 g Na^+ L^{-1}; 2.3 L water (2.27 g $MgSO_4$ + 1.22 g K_2CO_3 + 1.2 g $Al(OH)_3$ L^{-1}). Cl^- ions (blue dots) and Na^+ ions (red dots). Na^+ and Cl^- ions are removed by separate processes. Temperature = 14.3 to 18.3 ^oC.

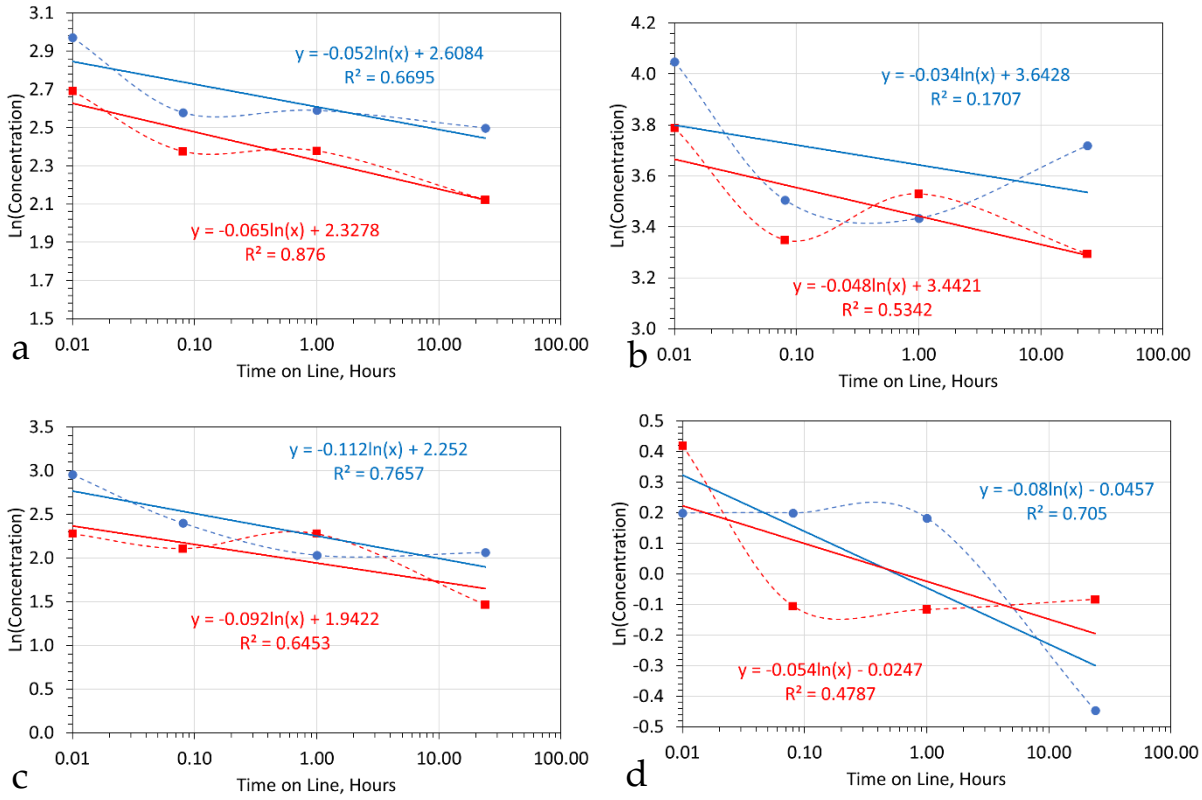


Figure S15. Water salinity desalination polymer quality control check. (a) Feed water salinity = 19.5 g Cl^- L^{-1} + 14.75 g Na^+ L^{-1}; 2.3 L water (1.67 g CaO + 3.02 g $MgSO_4$ + 3.60 g $Al(OH)_3$ L^{-1}). (b) Feed water salinity = 57.26 g Cl^- L^{-1} + 44.14 g Na^+ L^{-1}; 2.3 L water (1.67 g CaO + 1.51 g $MgSO_4$ + 1.34 g $Al_2(SO_4)_3$ + 1.2 g $Al(OH)_3$ L^{-1}). (c) Feed water salinity = 19.17 g Cl^- L^{-1} + 9.76 g Na^+ L^{-1}; 2.3 L water (1.67 g CaO + 3.02 g $MgSO_4$ + 1.34 g $Al_2(SO_4)_3$ + 2.4 g $Al(OH)_3$ L^{-1}). (d) Feed water salinity = 1.22 g Cl^- L^{-1} + 1.52 g Na^+ L^{-1}; 2.3 L water (1.51 g $MgSO_4$ + 1.22 g K_2CO_3 + 1.22 g Al_2O_3 L^{-1}). Cl^- ions (blue dots) and Na^+ ions (red dots). Na^+ and Cl^- ions are removed by separate processes. Temperature = 14.3 to 18.3 ^oC.

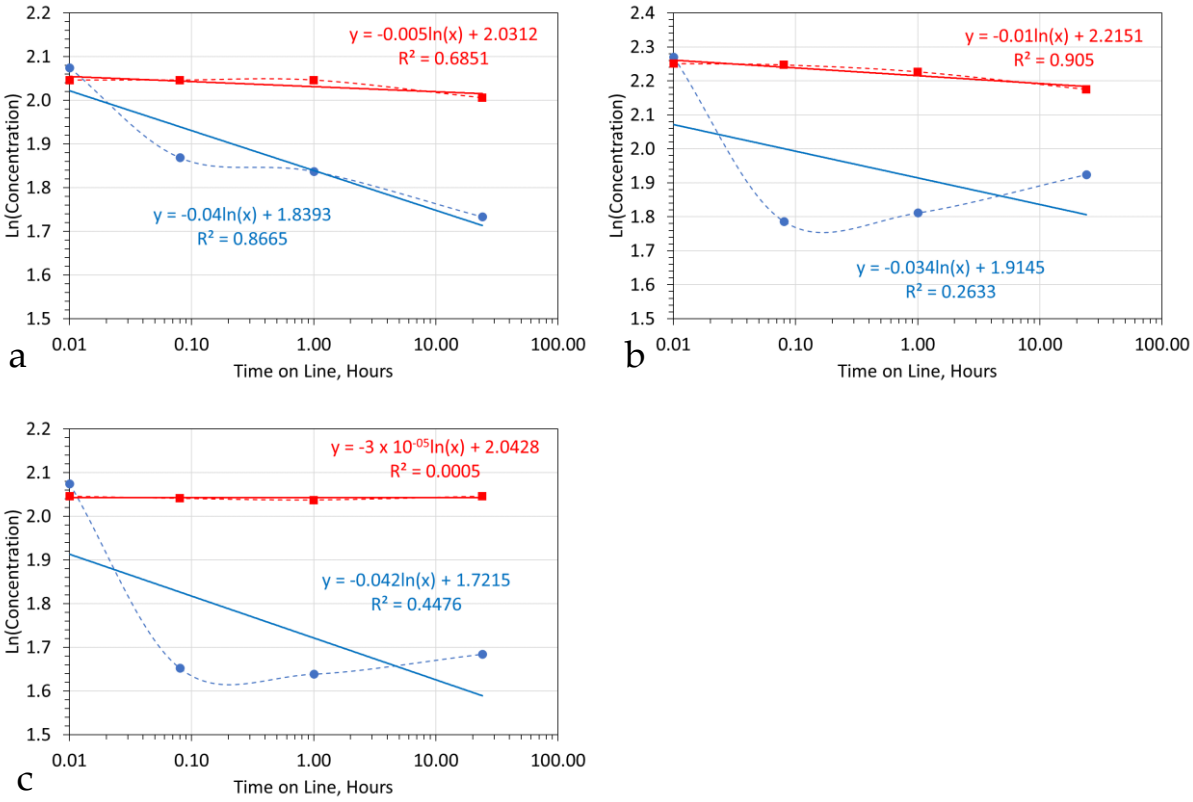


Figure S16. Water salinity desalination polymer quality control check. (a) Feed water salinity = 7.96 g Cl^- L^{-1} + 7.74 g Na^+ L^{-1}; 2.3 L water (2.52 g MnO_2 + 2.81 g ZnO + 1.34 g $Al_2(SO_4)_3$). (b) Feed water salinity = 9.68 g Cl^- L^{-1} + 9.5 g Na^+ L^{-1}; 2.3 L water (1.51 g $MgSO_4$ + 2.52 g MnO_2 + 3.66 g K_2CO_3 + 1.2 g $Al(OH)_3$ L^{-1}). (c) Feed water salinity = 9.68 g Cl^- L^{-1} + 9.5 g Na^+ L^{-1}; 2.3 L water (1.51 g $MgSO_4$ + 2.52 g MnO_2 + 1.2 g $Al(OH)_3$ L^{-1}). Cl^- ions (blue dots) and Na^+ ions (red dots). Na^+ and Cl^- ions are removed by separate processes. Temperature = 14.3 to 18.3 ^oC.

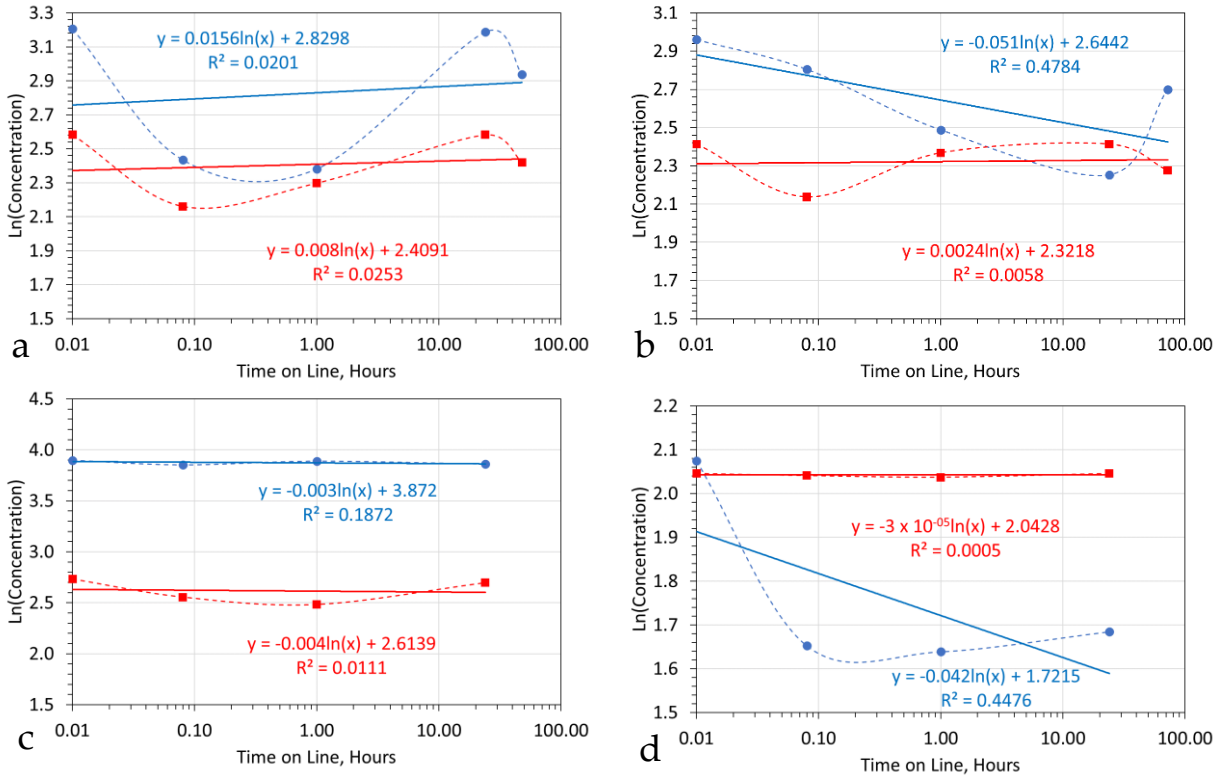


Figure S17. Water salinity desalination polymer quality control check. (a) Feed water salinity = 24.67 g Cl^- L^{-1} + 13.32 g Na^+ L^-; 2.3 L water (2.81 g ZnO + 1.34 g $Al_2(SO_4)_3$ + 1.2 g $Al(OH)_3$ L^{-1}). (b) Feed water salinity = 19.3 g Cl^- L^{-1} + 11.18 g Na^+ L^{-1}; 2.3 L water (4.22 g ZnO + 2.00 g $Al_2(SO_4)_3$ + 1.8 g $Al(OH)_3$ L^{-1}). (c) Feed water salinity = 49.31 g Cl^- L^{-1} + 15.4 g Na^+ L^{-1}; 2.3 L water (2.81 g ZnO + 1.20 g $Al(OH)_3$ L^{-1}). (d) Feed water salinity = 7.96 g Cl^- L^{-1} + 7.74 g Na^+ L^-; 2.3 L water (1.42 g $FeSO_4$ + 1.67 g CaO + 2.81 g ZnO + 1.34 g $Al_2(SO_4)_3$). Cl^- ions (blue dots) and Na^+ ions (red dots). Na^+ and Cl^- ions are removed by separate processes. Temperature = 14 to 15.8 °C.

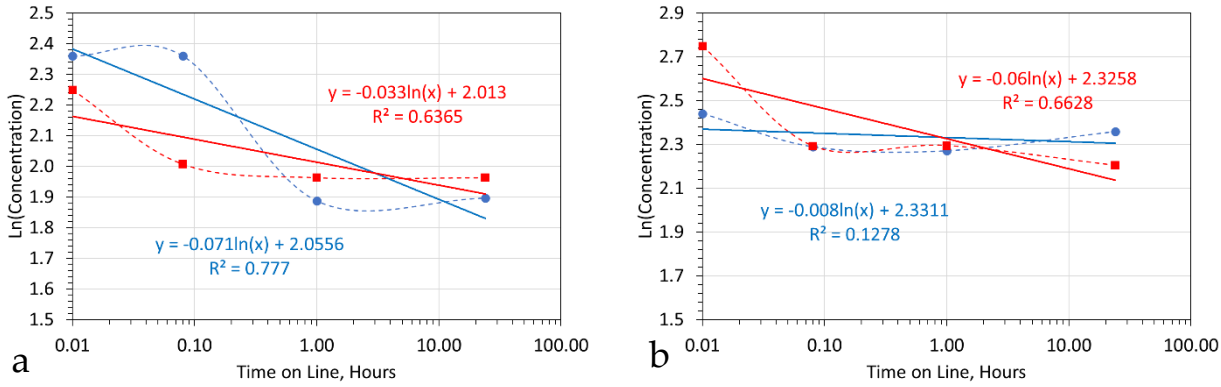


Figure S18. Water salinity desalination polymer quality control check. (a) Feed water salinity = 10.59 g Cl^- L^{-1} + 9.47 g Na^+ L^-; 2.3 L water (1.42 g $FeSO_4$ + 1.51 g $MgSO_4$ + 1.22 g K_2CO_3 + 1.2 g $Al(OH)_3$ L^{-1}). (b) Feed water salinity = 11.48 g Cl^- L^{-1} + 15.61 g Na^+ L^{-1}; 2.3 L water 1.42 g $FeSO_4$ + 1.51 g $MgSO_4$ + 3.66 g K_2CO_3 + 1.2 g $Al(OH)_3$ L^{-1}). Cl^- ions (blue dots) and Na^+ ions (red dots). Na^+ and Cl^- ions are removed by separate processes. Temperature = 14.8 to 16.7 °C

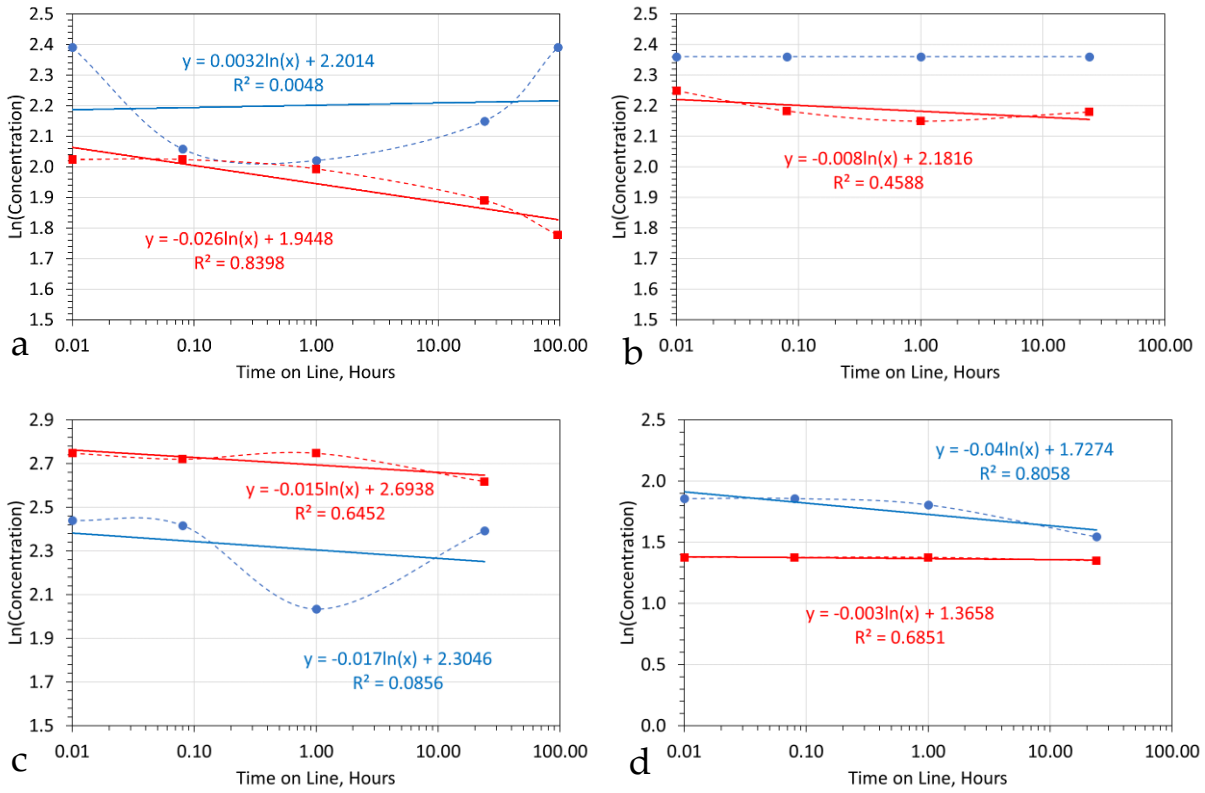


Figure S19. Water salinity desalination polymer quality control check. (a) Feed water salinity = 10.92 g Cl^- L^{-1} + 7.57 g Na^+ L^-; 2.3 L water (1.42 g $FeSO_4$ + 1.51 g $MgSO_4$ + 1.2 g $Al(OH)_3$ L^{-1}). (b) Feed water salinity = 10.59 g Cl^- L^{-1} + 9.47 g Na^+ L^{-1}; 2.3 L water (1.42 g $FeSO_4$ + 1.51 g $MgSO_4$ + 1.2 g $Al(OH)_3$ L^{-1}). (c) Feed water salinity = 11.48 g Cl^- L^{-1} + 15.61 g Na^+ L^{-1}; 2.3 L water (1.42 g $FeSO_4$ + 1.51 g $MgSO_4$ + 1.2 g $Al(OH)_3$ L^{-1}). (d) Feed water salinity = 6.41 g Cl^- L^{-1} + 3.96 g Na^+ L^{-1}; 2.3 L water (1.42 g $FeSO_4$ + 1.51 g $MgSO_4$ + + 2.81 g ZnO + 1.34 g $Al_2(SO_4)_3$ L^{-1}). Cl^- ions (blue dots) and Na^+ ions (red dots). Na^+ and Cl^- ions are removed by separate processes. Temperature = 14.7 to 16.3 °C

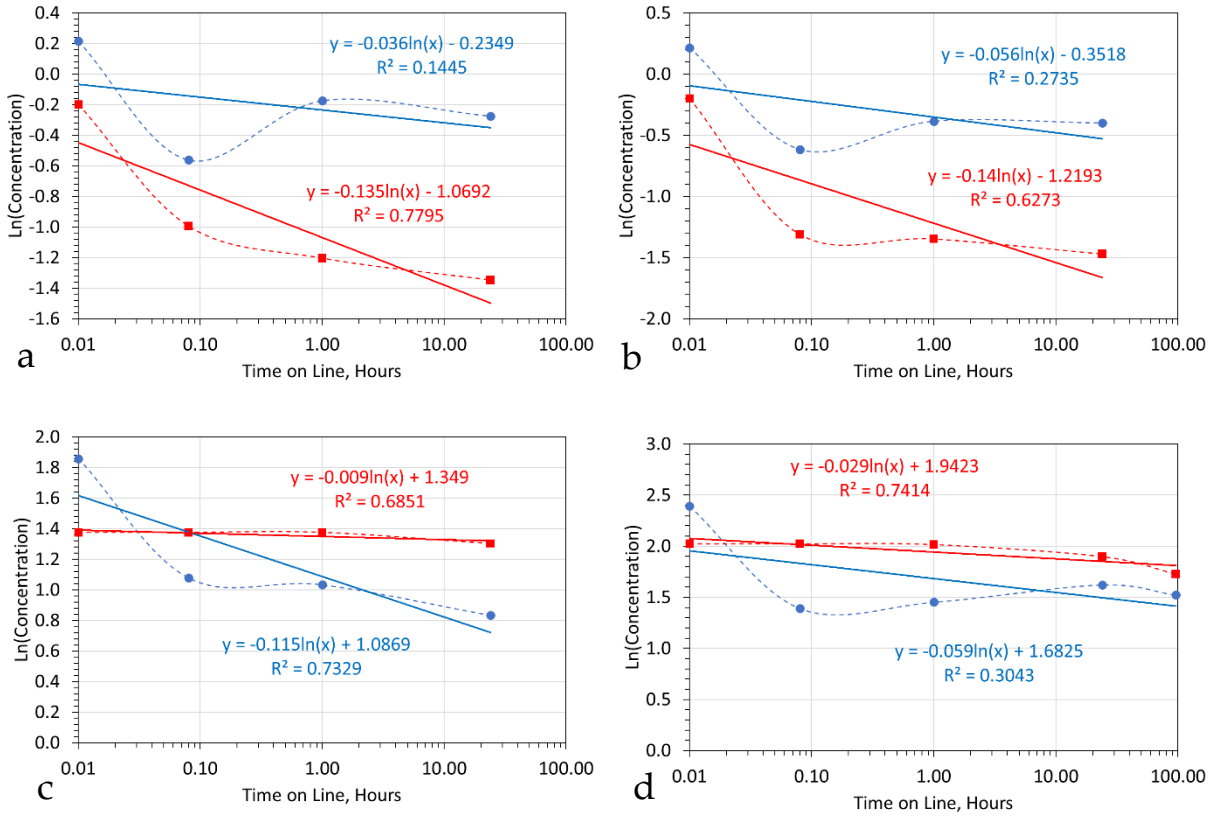


Figure S20. Water salinity desalination polymer quality control check. (a) Feed water salinity = 1.24 g Cl^- L^{-1} + 0.82 g Na^+ L^{-1} ; 2.3 L water (1.42 g $FeSO_4$ + 3.02 g $MgSO_4$ + 1.67 g CaO + 1.36 g $CaCO_3$ + 2.51 g MnO_2 + 2.81 g ZnO + 1.34 g $Al_2(SO_4)_3$ + 3.6 g $Al(OH)_3$ L^{-1}). (b) Feed water salinity = 1.24 g Cl^- L^{-1} + 0.82 g Na^+ L^{-1}; 2.3 L water (1.42 g $FeSO_4$ + 3.02 g $MgSO_4$ + 1.67 g CaO + 1.36 g $CaCO_3$ + 2.51 g MnO_2 + 2.81 g ZnO + 1.34 g $Al_2(SO_4)_3$ + 3.6 g $Al(OH)_3$ L^{-1}). (1.42 g $FeSO_4$ + 1.51 g $MgSO_4$ + 1.2 g $Al(OH)_3$ L^{-1}). (c) Feed water salinity = 6.41 g Cl^- L^{-1} + 3.96 g Na^+ L^{-1}; 2.3 L water (1.42 g $FeSO_4$ + 1.51 g $MgSO_4$ + 1.67 g CaO + 1.36 g $CaCO_3$ + 2.51 g MnO_2 + 2.81 g ZnO + 1.34 g $Al_2(SO_4)_3$ + 1.2 g $Al(OH)_3$ L^{-1}). (d) Feed water salinity = 10.92 g Cl^- L^{-1} + 7.57 g Na^+ L^{-1}; 2.3 L water (1.42 g $FeSO_4$ + 1.51 g $MgSO_4$ + 1.67 g CaO + 1.34 g $Al_2(SO_4)_3$ L^{-1}). Cl^- ions (blue dots) and Na^+ ions (red dots). Na^+ and Cl^- ions are removed by separate processes. Temperature = 14.2 to 17.0 ^oC

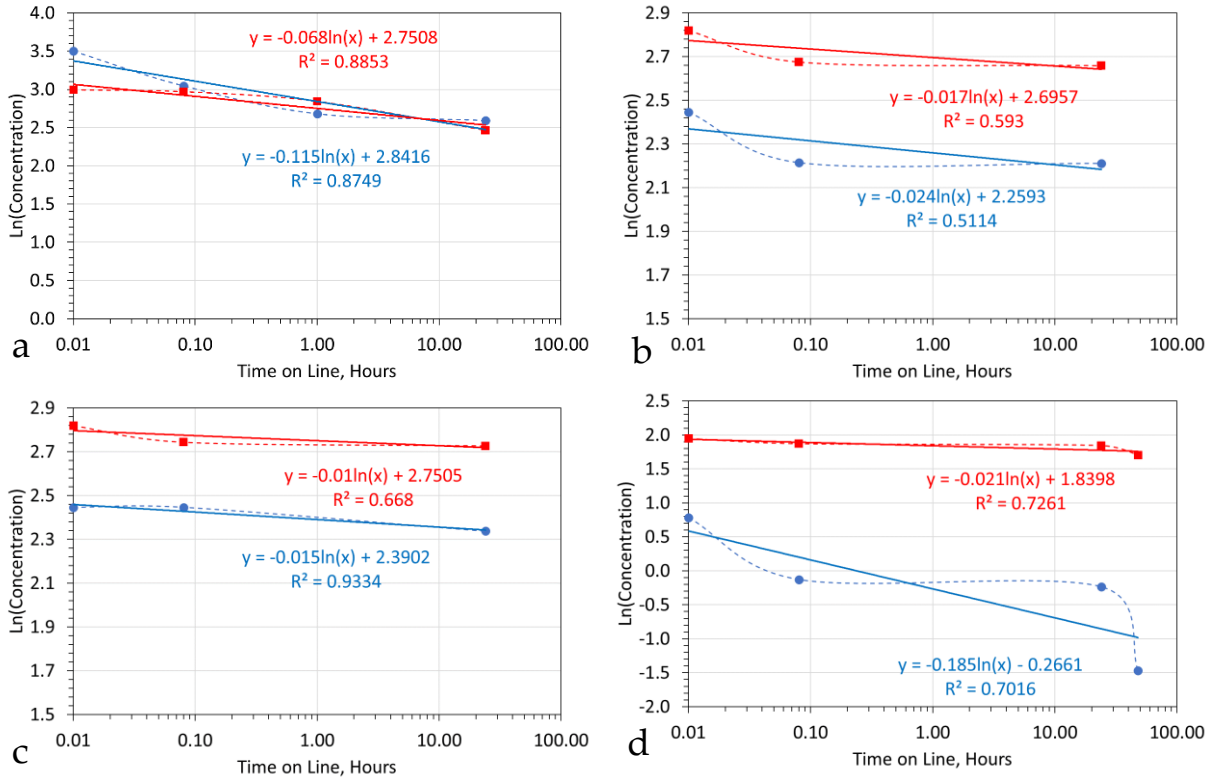


Figure S21. Water salinity desalination polymer quality control check. (a) Feed water salinity = 33.17 g Cl^- L^{-1} + 19.96 g Na^+ L^{-1} ; 2.3 L water (1.42 g $FeSO_4$ + 1.51 g $MgSO_4$ + 1.32 g Urea L^{-1}). (b) Feed water salinity = 11.54 g Cl^- L^{-1} + 16.77 g Na^+ L^{-1}; 2.3 L water (1.42 g $FeSO_4$ + 1.51 g $MgSO_4$ + 1.22 g K_2CO_3 + 1.32 g Urea L^{-1}). (c) Feed water salinity = 11.54 g Cl^- L^{-1} + 16.77 g Na^+ L^{-1}; 2.3 L water (1.42 g $FeSO_4$ + 1.51 g $MgSO_4$ L^{-1}). (d) Feed water salinity = 0.88 g Cl^- L^{-1} + 6.49 g Na^+ L^{-1}; 2.3 L water (1.42 g $FeSO_4$ L^{-1}). Cl^- ions (blue dots) and Na^+ ions (red dots). Na^+ and Cl^- ions are removed by separate processes. Temperature = 14.2 to 17.0 °C

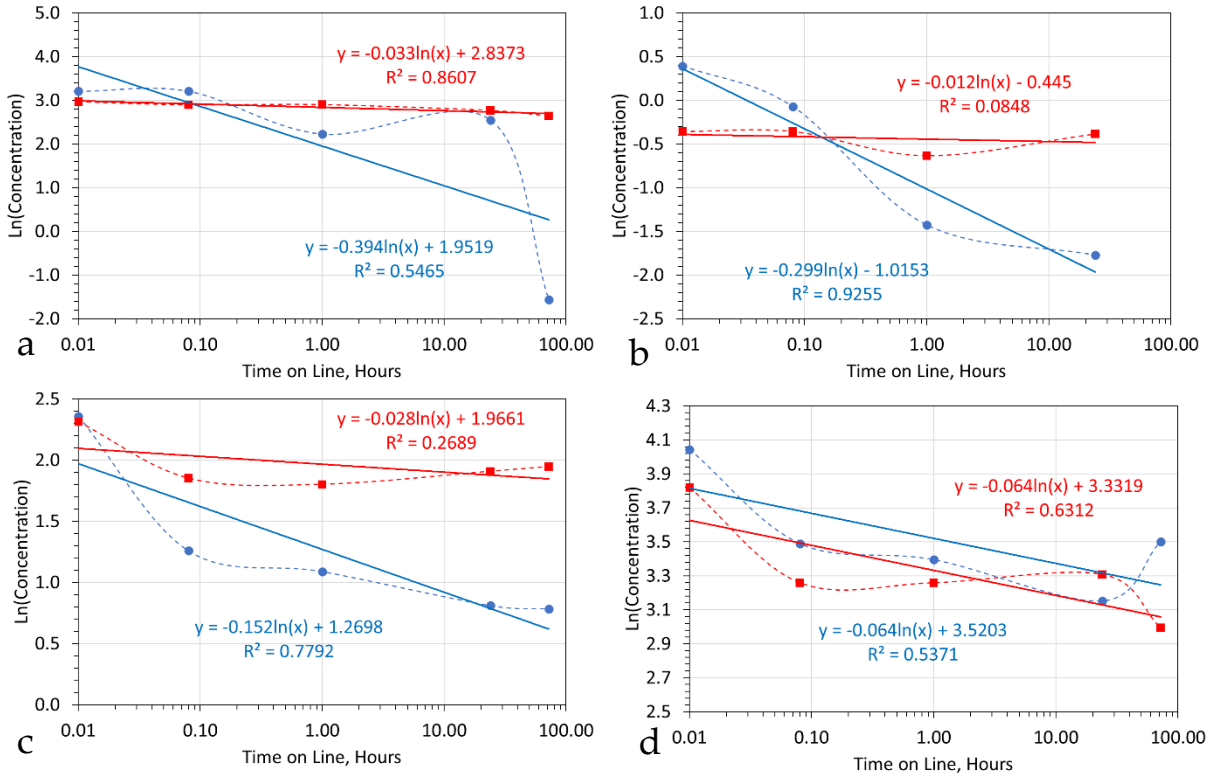


Figure S22. Water salinity desalination polymer quality control check. (a) Feed water salinity = 24.72 g Cl^- L^{-1} + 19.5 g Na^+ L^{-1} ; 2.3 L water (2.84 g $FeSO_4$ + 1.51 g $MgSO_4$ + 3.34 g CaO + 2.71 g $CaCO_3$ + 2.5 g K-Feldspar L^{-1}). (b) Feed water salinity = 1.48 g Cl^- L^{-1} + 0.7 g Na^+ L^{-1}; 2.3 L water (5.68 g $FeSO_4$ + 1.51 g $MgSO_4$ + 1.67 g CaO L^{-1}). (c) Feed water salinity = 10.57 g Cl^- L^{-1} + 10.1 g Na^+ L^{-1}; 2.3 L water (1.42 g $FeSO_4$ + 1.51 g $MgSO_4$ + 1.67 g CaO + 2.80 g ZnO L^{-1}).). (d) Feed water salinity = 57.04 g Cl^- L^{-1} + 45.57 g Na^+ L^{-1}; 2.3 L water (1.42 g $FeSO_4$ + 1.51 g $MgSO_4$ + 1.67 g CaO + 1.22 g K_2CO_3 + 2.80 g ZnO L^{-1}). Cl^- ions (blue dots) and Na^+ ions (red dots). Na^+ and Cl^- ions are removed by separate processes. Temperature = 15 to 19.5 ^oC

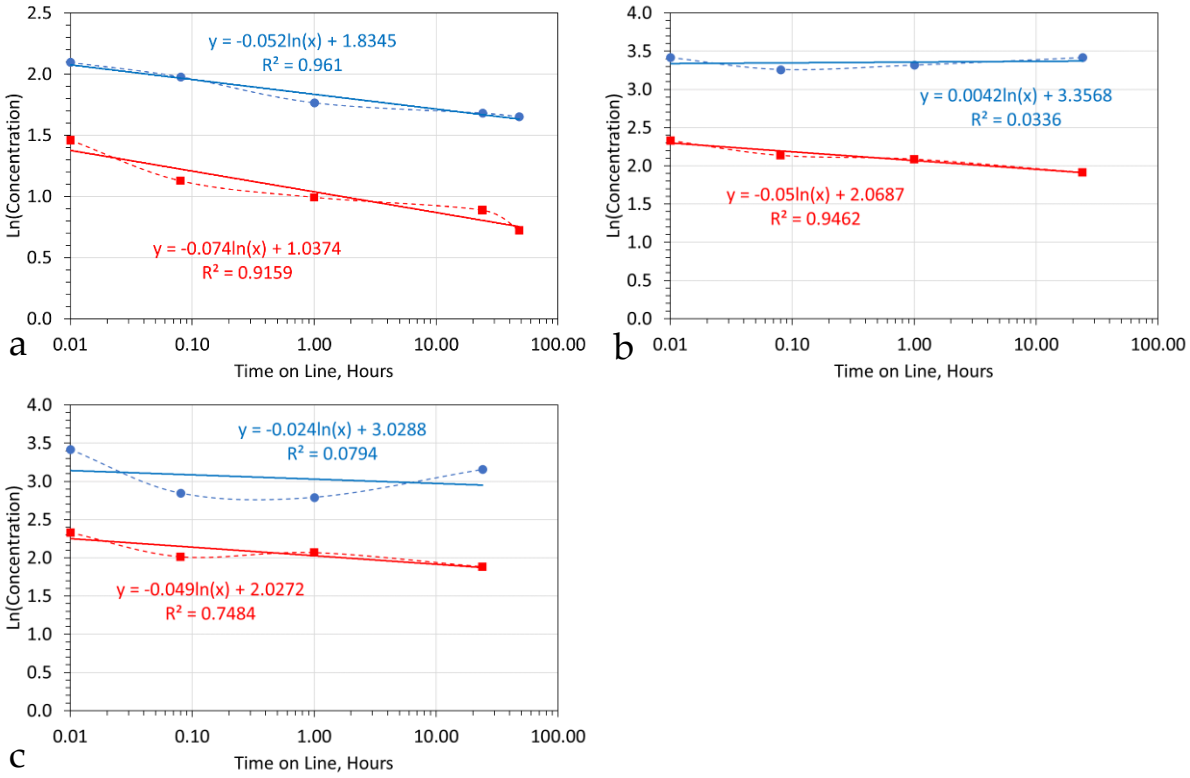


Figure S23. Water salinity desalination polymer quality control check. (a) Feed water salinity = 8.14 g Cl^- L^{-1} + 4.31 g Na^+ L^{-1} ; 2.3 L water (1.42 g $FeSO_4$ + 5.61 g ZnO L^{-1}). (b) Feed water salinity = 30.47 g Cl^- L^{-1} + 10.3 g Na^+ L^{-1}; 2.3 L water (1.42 g $FeSO_4$ + 5.61 g ZnO L^{-1}). (c) Feed water salinity = 30.47 g Cl^- L^{-1} + 10.3 g Na^+ L^{-1}; 2.3 L water (1.42 g $FeSO_4$ + 1.36 g Al^0 + 3.34 g CaO + 8.42 g ZnO L^{-1}). Cl^- ions (blue dots) and Na^+ ions (red dots). Na^+ and Cl^- ions are removed by separate processes. Temperature = 11.5 to 16.4 ^oC

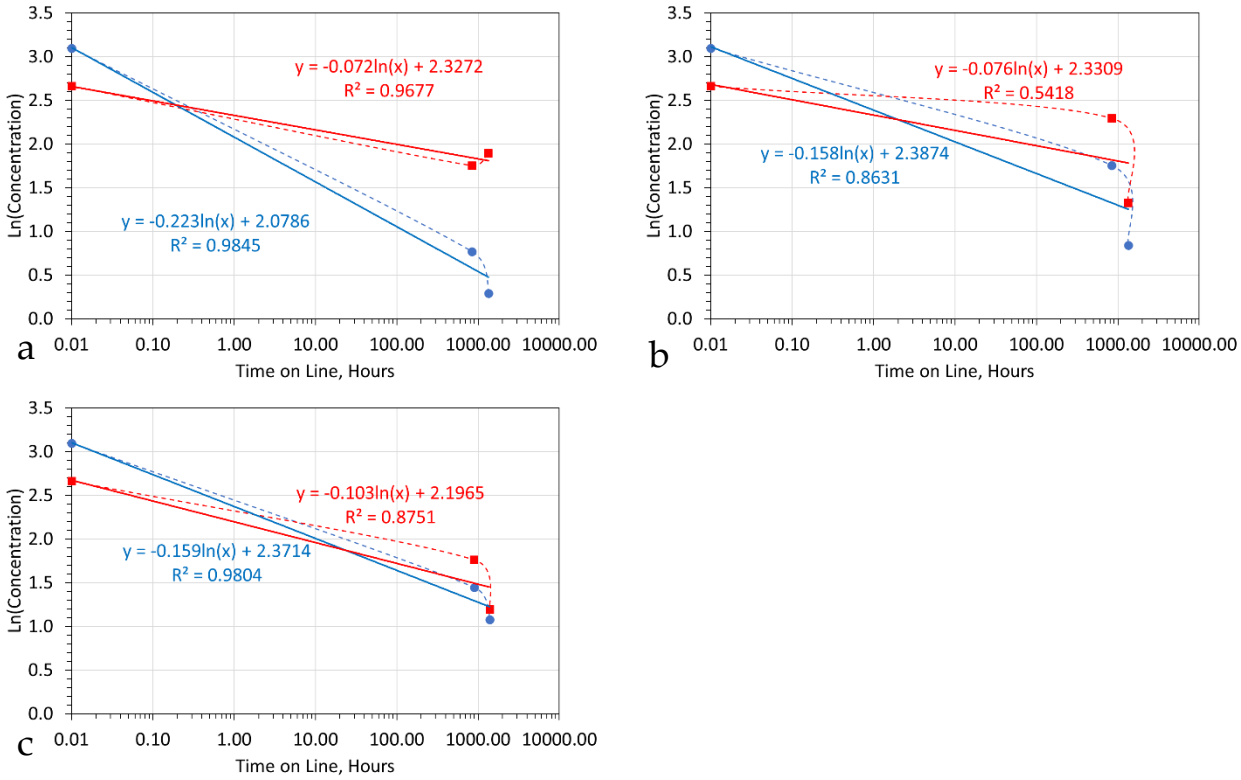


Figure S24. Water salinity desalination polymer quality control check. (a) Feed water salinity = 22.11 g Cl^- L^{-1} + 14.33 g Na^+ L^{-1} ; 14 L water (1.42 g $FeSO_4$ + 3.34 g CaO + 0.94 g gallic acid L^{-1}). (b) Feed water salinity = 22.11 g Cl^- L^{-1} + 14.33 g Na^+ L^{-1}; 14 L water (1.42 g $FeSO_4$ + 3.34 CaO + 0.94 g gallic acid L^{-1}). (c) Feed water salinity = 22.11 g Cl^- L^{-1} + 14.33 g Na^+ L^{-1}; 14 L water (1.42 g $FeSO_4$ + 3.34 g CaO + 0.94 g gallic acid L^{-1}). Cl^- ions (blue dots) and Na^+ ions (red dots). Na^+ and Cl^- ions are removed by separate processes. Temperature = 3.7 to 12.5 °C.

Table S1. Regressed ($C_{t=n}/C_{t=0}$) ion concentration for chloride as a function of reaction time (hours)

	Hours						
Trial	0.1	1	5	10	20	30	50
1	95.36%	83.59%	63.55%	50.86%	36.49%	27.99%	18.10%
2	96.99%	89.28%	75.34%	65.70%	53.63%	45.62%	35.02%
3	68.72%	52.39%	38.84%	32.82%	26.92%	23.59%	19.60%
4	74.52%	61.41%	49.94%	44.55%	39.00%	35.73%	31.62%
5							
6							
7	11.66%	9.53%	8.18%	7.64%	7.12%	6.82%	6.46%
8							
9							
10	12.12%	10.50%	9.44%	9.01%	8.59%	8.34%	8.05%
11							
12							
13	1.97%	2.73%	3.36%	3.67%	3.99%	4.18%	4.44%
14	81.91%	72.36%	63.55%	59.19%	54.53%	51.67%	47.95%
15	57.26%	35.21%	19.83%	14.17%	9.44%	7.16%	4.83%
16	92.01%	83.67%	73.81%	68.26%	61.87%	57.75%	52.20%
17	31.89%	21.69%	15.37%	12.95%	10.74%	9.55%	8.17%
18	66.77%	67.15%	67.41%	67.52%	67.63%	67.70%	67.78%
19	81.67%	59.07%	35.83%	25.45%	16.13%	11.55%	6.94%
20	87.59%	66.16%	40.06%	27.57%	16.29%	10.90%	5.77%

21	95.09%	84.92%	68.90%	58.79%	46.90%	39.39%	29.82%
22	97.62%	89.43%	72.17%	59.61%	44.01%	34.12%	22.07%
23	52.33%	42.90%	36.05%	33.09%	30.16%	28.47%	26.36%
24	52.32%	36.43%	25.23%	20.72%	16.54%	14.29%	11.69%
25	63.23%	46.05%	32.64%	26.94%	21.51%	18.53%	15.04%
26	48.48%	44.90%	42.35%	41.25%	40.13%	39.48%	38.66%
27	82.08%	72.36%	63.33%	58.86%	54.07%	51.14%	47.32%
28	65.81%	64.79%	64.08%	63.76%	63.45%	63.26%	63.03%
29	55.59%	54.58%	53.86%	53.56%	53.25%	53.06%	52.83%
30	93.78%	85.19%	73.80%	67.02%	59.04%	53.85%	46.85%
31	99.99%	99.92%	99.53%	99.00%	97.86%	96.67%	94.22%
32	97.40%	92.78%	85.57%	80.77%	74.62%	70.32%	64.13%
33							
34							
35	40.58%	36.70%	33.99%	32.82%	31.66%	30.99%	30.14%
36	62.69%	54.92%	49.00%	46.35%	43.65%	42.06%	40.03%
37	68.37%	61.95%	56.97%	54.72%	52.40%	51.01%	49.24%
38	85.95%	79.07%	72.67%	69.47%	65.99%	63.82%	60.96%
39	86.00%	90.55%	92.86%	93.67%	94.40%	94.79%	95.24%
40	52.23%	62.70%	69.03%	71.49%	73.80%	75.07%	76.61%
41	70.72%	64.28%	59.22%	56.91%	54.52%	53.09%	51.26%
42	71.43%	65.16%	60.23%	57.97%	55.63%	54.23%	52.44%
43	72.06%	63.69%	56.88%	53.73%	50.46%	48.50%	45.99%
44	99.91%	98.59%	90.68%	79.86%	59.64%	43.14%	21.18%
45	32.69%	28.12%	25.01%	23.70%	22.41%	21.67%	20.74%
46	55.14%	53.37%	52.12%	51.58%	51.03%	50.71%	50.30%
47	41.01%	32.99%	27.47%	25.16%	22.91%	21.62%	20.04%
48	59.52%	50.67%	43.99%	41.04%	38.05%	36.30%	34.10%
49							
50	79.36%	79.27%	79.21%	79.18%	79.16%	79.14%	79.12%
51	65.74%	46.62%	31.36%	24.94%	18.96%	15.76%	12.12%
52	52.95%	31.61%	17.48%	12.42%	8.26%	6.27%	4.25%
53	71.58%	67.44%	64.30%	62.88%	61.42%	60.55%	59.44%
54	76.80%	68.12%	60.72%	57.22%	53.53%	51.29%	48.41%
55	68.47%	66.38%	64.86%	64.19%	63.51%	63.11%	62.60%
56	70.12%	62.10%	55.70%	52.76%	49.72%	47.91%	45.59%
57	54.70%	61.37%	65.63%	67.36%	69.02%	69.96%	71.12%
58	36.58%	45.75%	51.91%	54.45%	56.92%	58.33%	60.06%
59	53.34%	47.01%	42.40%	40.38%	38.36%	37.17%	35.67%
60	53.00%	58.62%	62.30%	63.81%	65.28%	66.12%	67.16%
61	46.67%	50.60%	53.28%	54.40%	55.52%	56.16%	56.96%
62	38.89%	69.14%	82.58%	86.57%	89.70%	91.20%	92.79%
63	44.64%	66.10%	77.13%	80.86%	84.05%	85.68%	87.52%
64	79.30%	74.20%	70.06%	68.13%	66.10%	64.87%	63.28%
65	35.53%	39.21%	41.78%	42.87%	43.97%	44.60%	45.40%
66	74.47%	86.36%	91.39%	92.97%	94.26%	94.91%	95.62%
67	97.45%	97.52%	97.57%	97.59%	97.62%	97.63%	97.64%
68	76.55%	62.70%	50.18%	44.23%	38.10%	34.48%	29.97%
69	66.80%	51.78%	39.59%	34.18%	28.82%	25.77%	22.06%
70	68.23%	69.14%	69.76%	70.02%	70.28%	70.44%	70.63%
71	41.03%	46.05%	49.47%	50.91%	52.33%	53.16%	54.19%
72	83.89%	82.66%	81.75%	81.34%	80.93%	80.68%	80.37%
73	51.89%	60.87%	66.46%	68.68%	70.79%	71.97%	73.41%
74	69.73%	73.04%	75.17%	76.05%	76.90%	77.38%	77.98%
75	37.33%	39.72%	41.38%	42.09%	42.80%	43.22%	43.74%
76	98.61%	94.97%	87.92%	82.64%	75.38%	70.07%	62.18%
77	46.32%	42.25%	39.37%	38.13%	36.88%	36.15%	35.23%
78							
79	61.95%	62.36%	62.64%	62.76%	62.88%	62.96%	63.04%
80	94.08%	92.77%	91.69%	91.18%	90.64%	90.31%	89.88%
81	84.34%	87.67%	89.60%	90.34%	91.03%	91.41%	91.87%
82	93.82%	89.34%	84.55%	81.93%	78.94%	76.99%	74.33%
83	93.79%	89.52%	85.04%	82.62%	79.86%	78.07%	75.62%
84	62.32%	65.43%	67.49%	68.35%	69.19%	69.68%	70.28%
85	61.00%	65.03%	67.67%	68.75%	69.82%	70.42%	71.17%
86	81.56%	77.85%	74.89%	73.51%	72.08%	71.21%	70.09%
87	64.97%	65.95%	66.62%	66.90%	67.19%	67.35%	67.56%

Table S2. Regressed ($C_{t=n}/C_{t=0}$) ion concentration for sodium as a function of reaction time (hours)

Trial	Hours 0.1	1	5	10	20	30	50
1	38.27%	42.94%	46.16%	47.53%	48.88%	49.67%	50.65%
2	62.87%	57.88%	54.17%	52.51%	50.83%	49.83%	48.57%
3	63.75%	60.17%	57.54%	56.37%	55.19%	54.49%	53.60%
4	54.92%	45.88%	39.22%	36.31%	33.41%	31.72%	29.61%
5							
6							
7	52.92%	50.51%	48.78%	48.04%	47.28%	46.84%	46.28%
8							
9							
10	79.44%	72.52%	66.66%	63.86%	60.91%	59.11%	56.77%
11							
12							
13	69.99%	60.70%	53.20%	49.75%	46.19%	44.07%	41.36%
14	57.91%	47.47%	39.64%	36.20%	32.78%	30.79%	28.31%
15	37.14%	25.63%	18.26%	15.39%	12.76%	11.33%	9.66%
16	33.71%	27.15%	22.76%	20.94%	19.18%	18.18%	16.95%
17	17.09%	11.38%	8.11%	6.90%	5.81%	5.23%	4.55%
18	51.28%	44.55%	39.70%	37.58%	35.47%	34.24%	32.68%
19	69.55%	62.57%	57.08%	54.58%	52.00%	50.46%	48.48%
20	52.52%	47.92%	44.59%	43.15%	41.69%	40.83%	39.75%
21	41.24%	35.29%	31.15%	29.39%	27.64%	26.63%	25.37%
22	70.97%	64.44%	59.29%	56.94%	54.51%	53.05%	51.18%
23	86.22%	82.06%	78.52%	76.82%	75.01%	73.90%	72.44%
24	97.24%	87.74%	68.12%	54.31%	37.88%	27.99%	16.66%
25	83.53%	96.47%	98.84%	99.29%	99.56%	99.67%	99.77%
26	86.47%	84.39%	82.77%	82.03%	81.25%	80.79%	80.19%
27							
28	77.15%	73.62%	70.90%	69.67%	68.39%	67.63%	66.64%
29	94.47%	98.62%	99.48%	99.66%	99.78%	99.83%	99.87%
30							
31							
32							
33							
34							
35	61.23%	61.94%	62.43%	62.64%	62.84%	62.96%	63.12%
36	99.93%	99.51%	98.10%	96.61%	94.00%	91.66%	87.45%
37	96.80%	93.68%	89.92%	87.71%	85.06%	83.28%	80.77%
38	70.71%	63.95%	58.62%	56.18%	53.66%	52.15%	50.22%
39	82.51%	76.89%	72.11%	69.82%	67.39%	65.90%	63.95%
40	75.30%	71.92%	69.35%	68.19%	67.00%	66.28%	65.37%
41	97.05%	94.85%	92.42%	91.07%	89.49%	88.44%	86.99%
42	100.00%	99.99%	99.90%	99.70%	99.09%	98.25%	96.05%
43							
44	58.97%	59.40%	59.69%	59.82%	59.95%	60.02%	60.12%
45	60.99%	63.57%	65.30%	66.03%	66.75%	67.16%	67.68%
46	58.65%	56.10%	54.26%	53.45%	52.64%	52.16%	51.56%
47	92.77%	90.29%	88.10%	87.02%	85.85%	85.12%	84.15%
48	96.82%	89.53%	77.01%	68.50%	57.81%	50.63%	40.90%
49	92.68%	92.09%	91.65%	91.45%	91.25%	91.13%	90.98%
50	86.53%	85.96%	85.55%	85.37%	85.19%	85.08%	84.95%
51	94.19%	90.30%	86.23%	84.03%	81.52%	79.89%	77.67%
52	22.65%	75.00%	91.27%	94.58%	96.66%	97.49%	98.25%
53	60.72%	67.91%	72.33%	74.08%	75.73%	76.66%	77.78%
54	85.04%	81.92%	79.41%	78.24%	77.01%	76.26%	75.30%
55	74.68%	68.83%	64.17%	62.01%	59.77%	58.42%	56.68%
56	98.24%	95.74%	92.19%	89.90%	86.98%	84.93%	81.94%
57	70.08%	68.41%	67.21%	66.68%	66.14%	65.83%	65.43%
58							
59	83.54%	71.29%	59.07%	52.90%	46.29%	42.27%	37.13%
60	44.11%	38.67%	34.83%	33.19%	31.55%	30.60%	29.40%
61	32.77%	30.89%	29.58%	29.02%	28.46%	28.14%	27.73%
62	66.75%	75.06%	79.79%	81.58%	83.22%	84.12%	85.19%
63	63.07%	66.83%	69.28%	70.30%	71.28%	71.85%	72.55%
64	86.52%	88.23%	89.31%	89.74%	90.16%	90.39%	90.68%
65	96.31%	94.74%	93.27%	92.53%	91.70%	91.18%	90.48%
66	76.58%	90.30%	94.93%	96.18%	97.12%	97.57%	98.03%
67	78.12%	88.18%	92.45%	93.79%	94.91%	95.46%	96.08%
68							
69	73.69%	78.49%	81.38%	82.52%	83.59%	84.19%	84.92%
70	83.89%	86.20%	87.64%	88.21%	88.76%	89.07%	89.45%

71	96.83%	90.42%	79.97%	72.98%	64.14%	58.11%	49.70%
72	92.32%	94.75%	95.99%	96.43%	96.82%	97.03%	97.28%
73	97.35%	97.37%	97.39%	97.40%	97.41%	97.42%	97.42%
74	98.92%	96.94%	93.73%	91.50%	88.53%	86.37%	83.12%
75	99.89%	99.24%	97.17%	95.03%	91.35%	88.12%	82.45%
76							
77							
78	92.71%	92.65%	92.61%	92.60%	92.58%	92.57%	92.56%
79	77.74%	76.47%	75.54%	75.13%	74.72%	74.47%	74.16%
80	97.17%	94.73%	91.90%	90.28%	88.35%	87.07%	85.26%
81	64.12%	61.94%	60.37%	59.68%	58.98%	58.57%	58.05%
82	94.10%	92.86%	91.84%	91.36%	90.85%	90.55%	90.14%
83	73.68%	82.05%	86.41%	87.97%	89.36%	90.10%	90.97%
84	96.18%	94.98%	93.94%	93.43%	92.88%	92.53%	92.08%
85	99.41%	98.18%	96.04%	94.48%	92.33%	90.73%	88.25%
86							
87	99.42%	99.08%	98.72%	98.53%	98.31%	98.16%	97.97%