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Investigation on the rejection of mixed salt solution by g-C_3N_4 functionalized nanofiltration membrane

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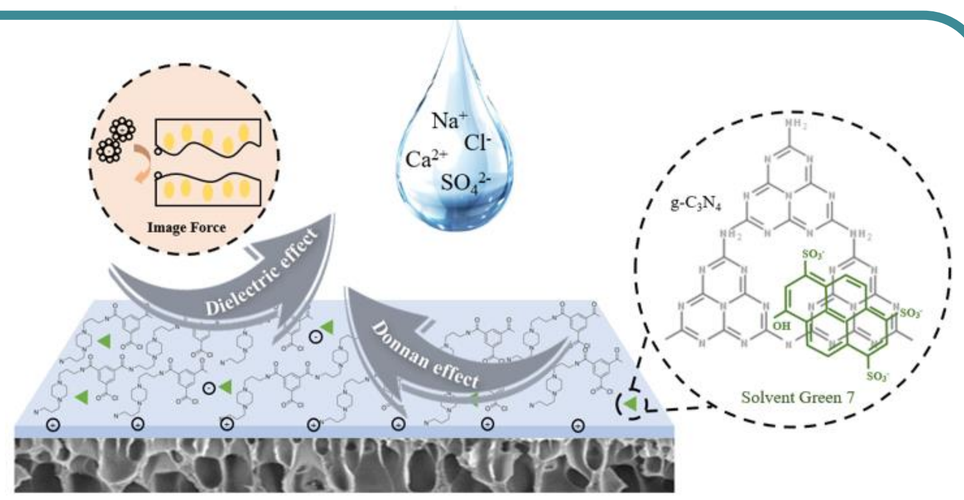
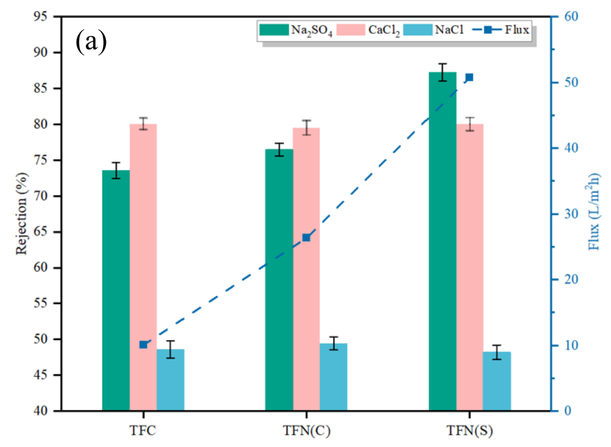
INTRODUCTION

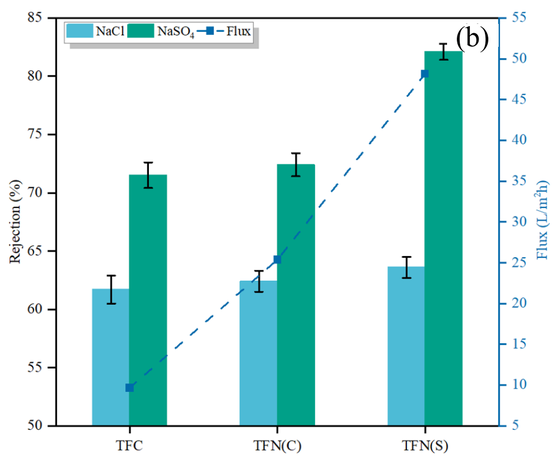
- Traditional commercial nanofiltration membranes cannot maintain excellent rejection for various salt ions in mixed solutions while ensuring high permeance flux.
- The trade-off effect between high rejection and low flux restricts practical applications.
- The g-C_3N_4 with the regularly triangular nanopores (3.11 Å) and laminar structure can provide channels for water transport.

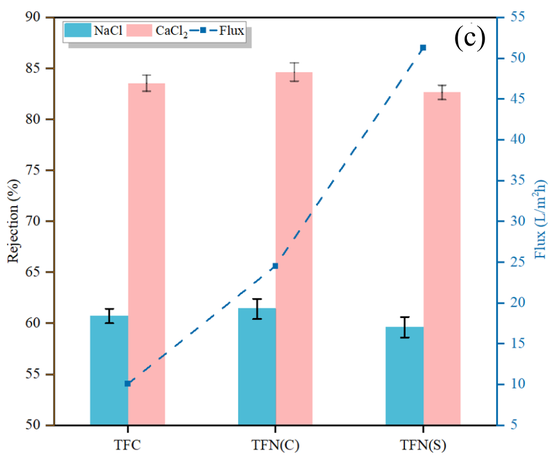


- The g-C_3N_4 functionalized membranes with special charge distribution on the surface were prepared to enhance the rejection performance of mixed salt solution while optimizing the trade-off effect and enhancing the anti-fouling ability.

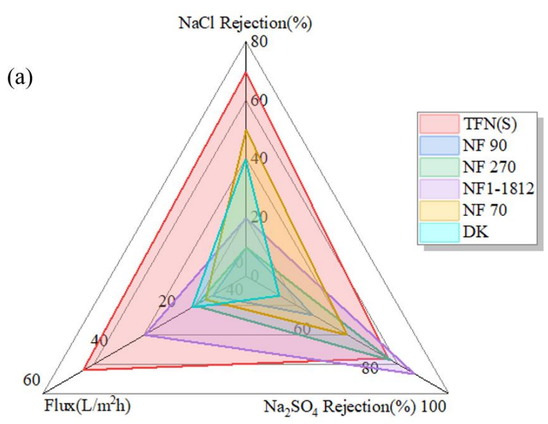
RESULTS & DISCUSSION

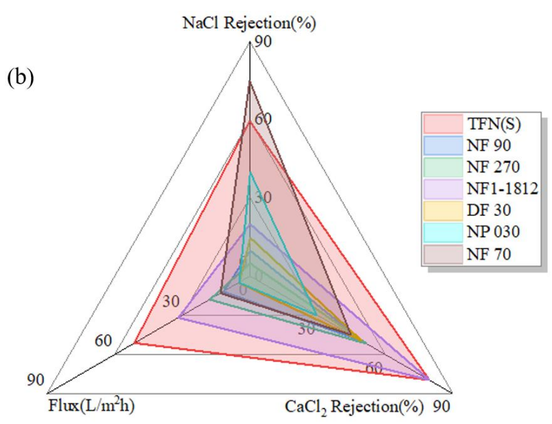




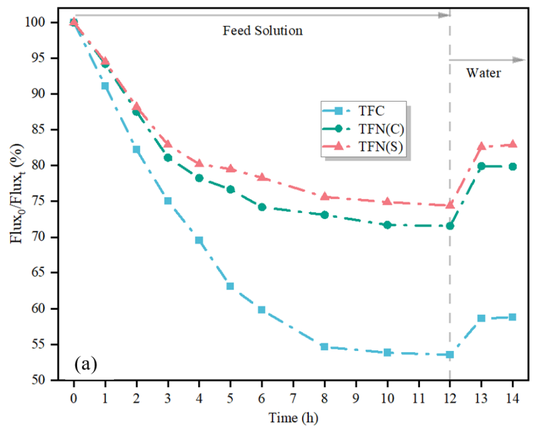


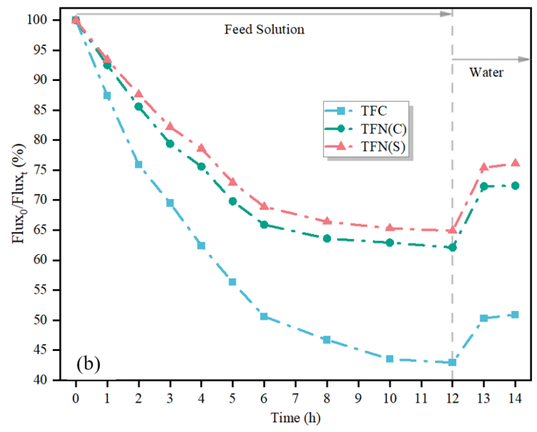
Rejection and flux of TFC in single(a) and mixed salt solutions (b) Na_2SO_4/NaCl ;(c) $CaCl_2$/NaCl





Comparison of separation performance between TFN (S) and commercial membranes (a) Na_2SO_4/NaCl solution; (b) $CaCl_2$/NaCl solution





The antifouling performance of membranes was tested in (a) BSA and (b) HA solutions

CONCLUSION

- The SG/CNs improves the hydrophilicity significantly, which increases permeance flux from 15.46 $L{\cdot}m^{-2}h^{-1}$ to 50.76 $L{\cdot}m^{-2}h^{-1}$.
- The special charge distribution on the surface enhances the dielectric exclusion of the image force to divalent ions.
- Compared with commercial membranes, TFN (S) exhibits the excellent rejection for both divalent and monovalent ions in mixed salt solution.