

Fabrication of composite nanofiltration membranes by dopamine-assisted poly(ethylene imine) deposition and cross-linking

Pei-bin ZHANG, Cui-jing LIU, Jian SUN, Bao-ku ZHU, Li-ping ZHU*

Cite this as: Pei-bin Zhang, Cui-jing Liu, Jian Sun, Bao-ku Zhu, Li-ping Zhu, 2017. Fabrication of composite nanofiltration membranes by dopamine-assisted poly(ethylene imine) deposition and cross-linking. *Journal of Zhejiang University-SCIENCE A (Applied Physics & Engineering)*, 18(2):138-150.

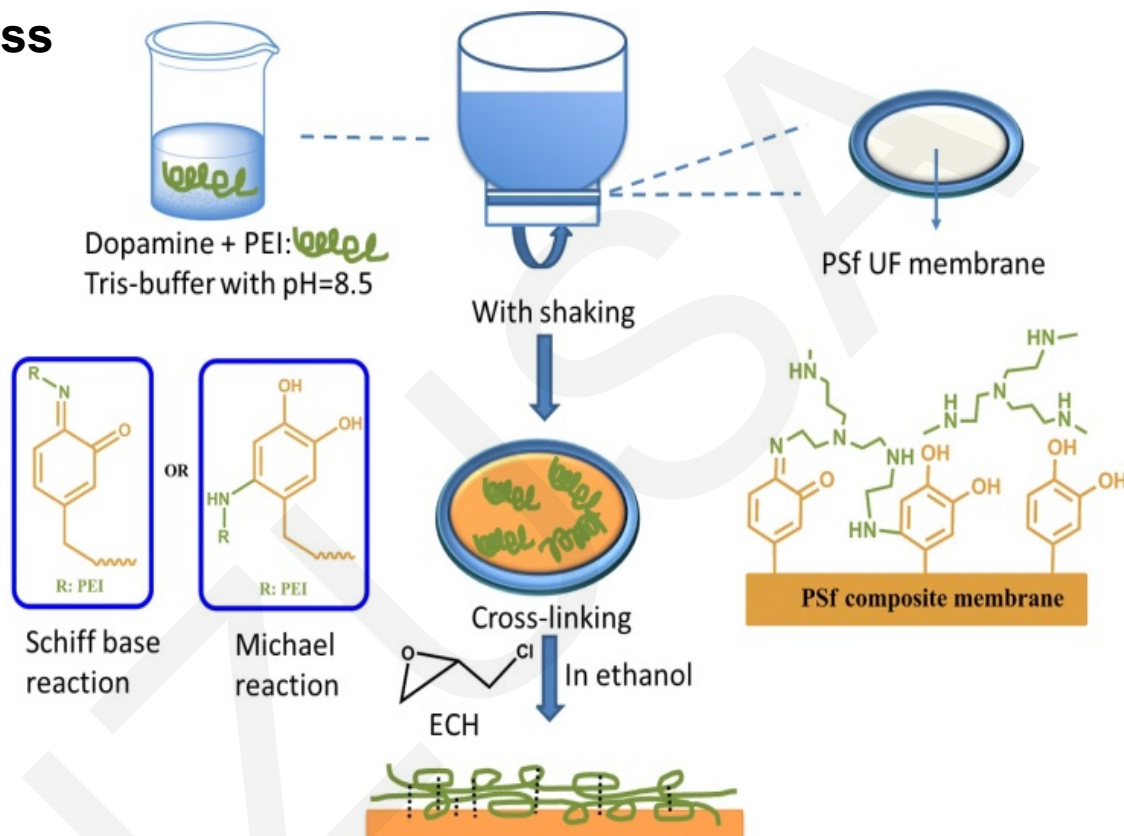
<http://dx.doi.org/10.1631/jzus.A1600308>

Objectives

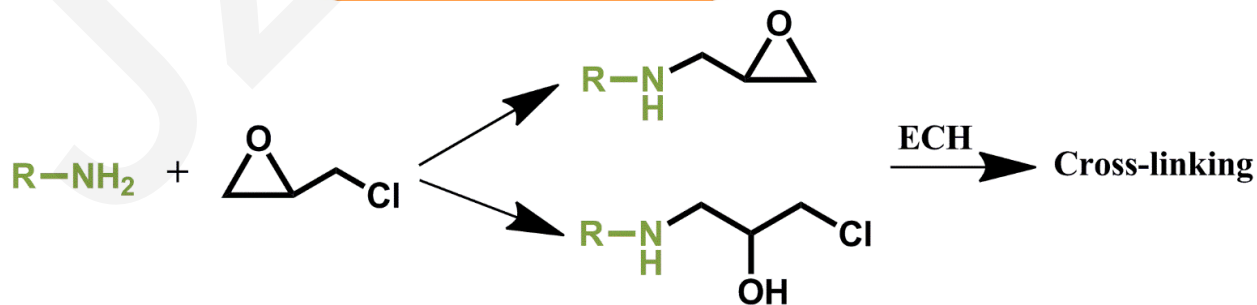
- **Preparing a positively charged nanofiltration (NF) membrane with assist of dopamine (DA) through a novel method.**
- **Enhancing the alkaline resistance of the DA modified membrane.**

Methodology

Experimental process



Cross-linking mechanism



Major results

Physicochemical properties

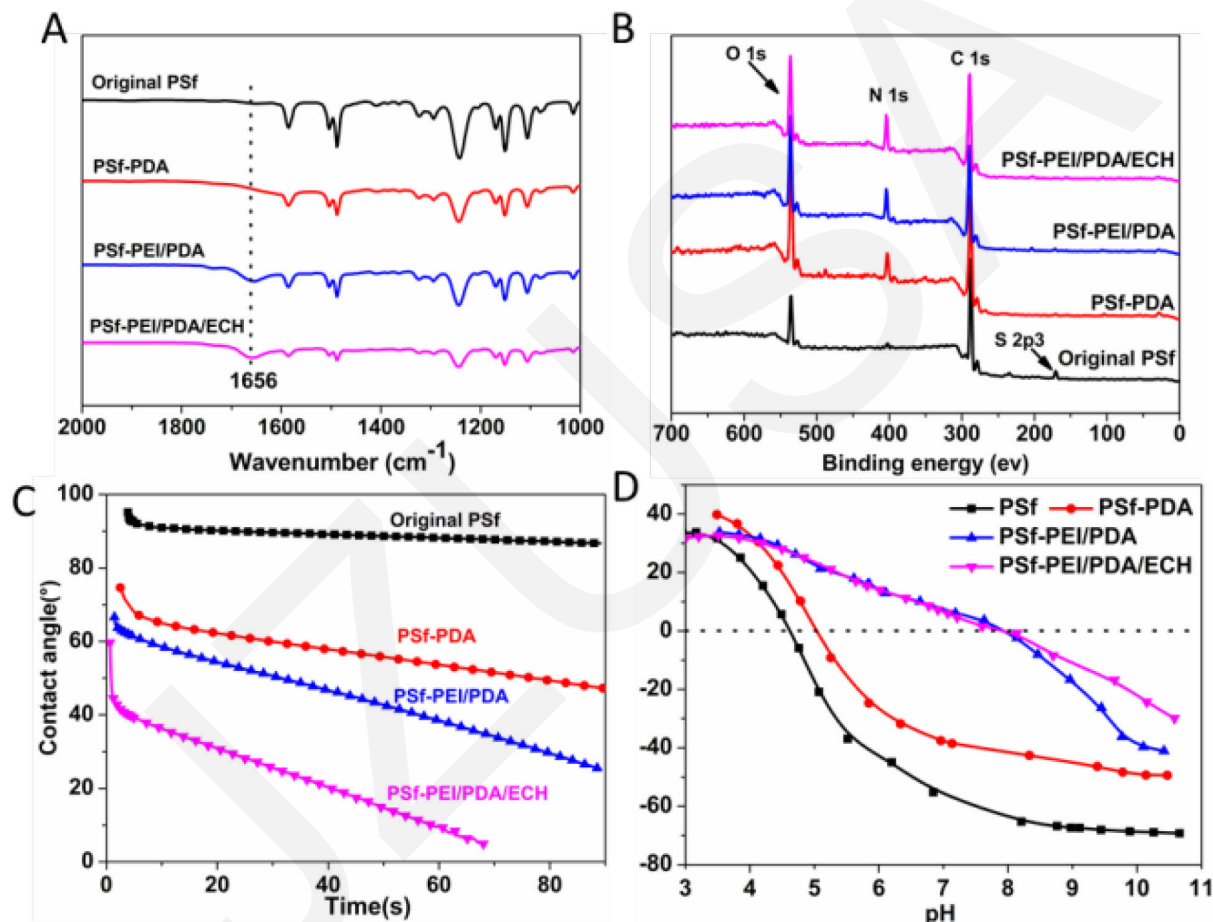


Fig. I (A) ATR-FTIR spectra of the studied membranes. (B) Typical XPS wide scans for the studied membranes. (C) Time dependence of the water contact angle of the studied membranes. (D) Zeta potential of the studied membranes at various pH values.

Major results

Separation property and durability

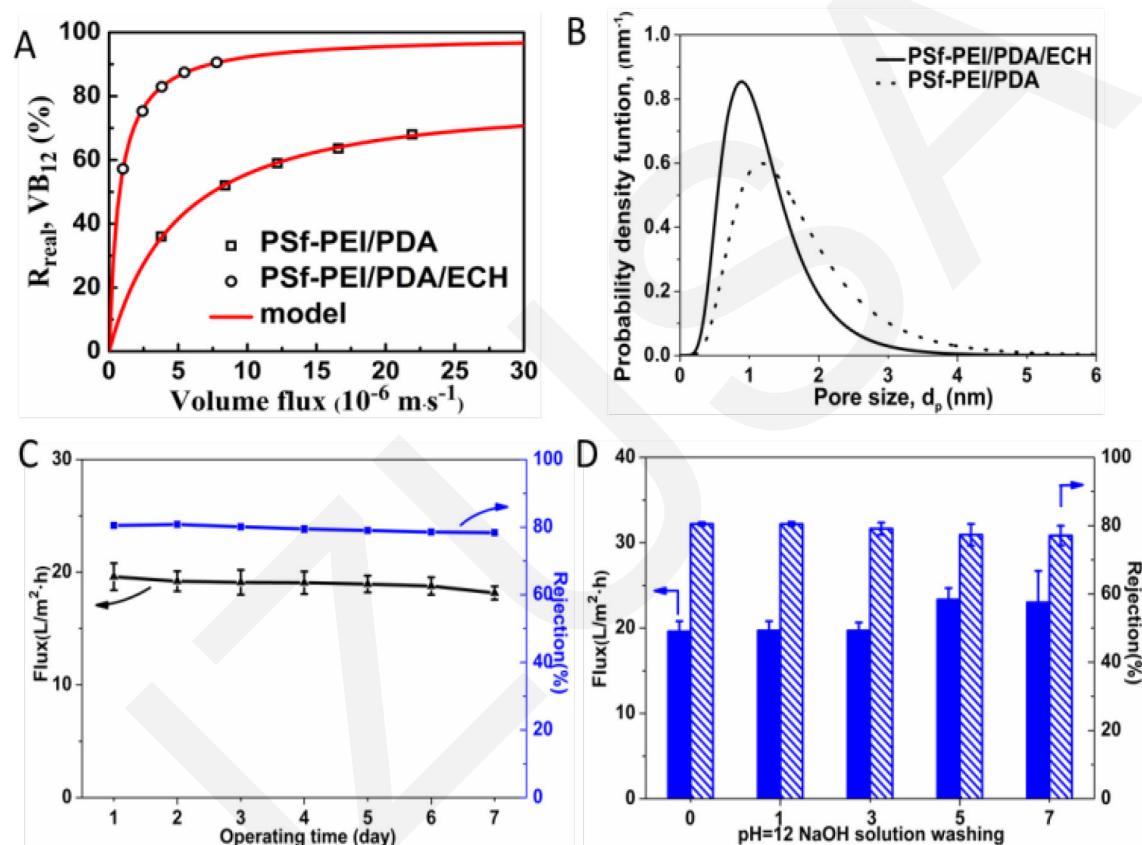


Fig. II (A) Real rejection rates for VB12 solution as a function of permeate flux for typical membranes. The solid lines represent the pore transport model predictions with the optimized parameters. (B) Pore size distribution curve using PEGs as solute for studied membranes. (C) Effect of long NF tests on $MgCl_2$ rejection and water flux of PSf-PEI/PDA/ECH membranes. (D) NF tests after long time washing with alkaline aqueous solution (pH=12).

Conclusions

- **A novel nanofiltration(NF) membrane has been developed by co-assembly of dopamine and polyethyleneimine.**
- **The membrane has good stability at long time and good durability under alkaline conditions.**