

Tertiary Amine Based Ultrafiltration Membrane and Its Application in Cr(VI) Removal

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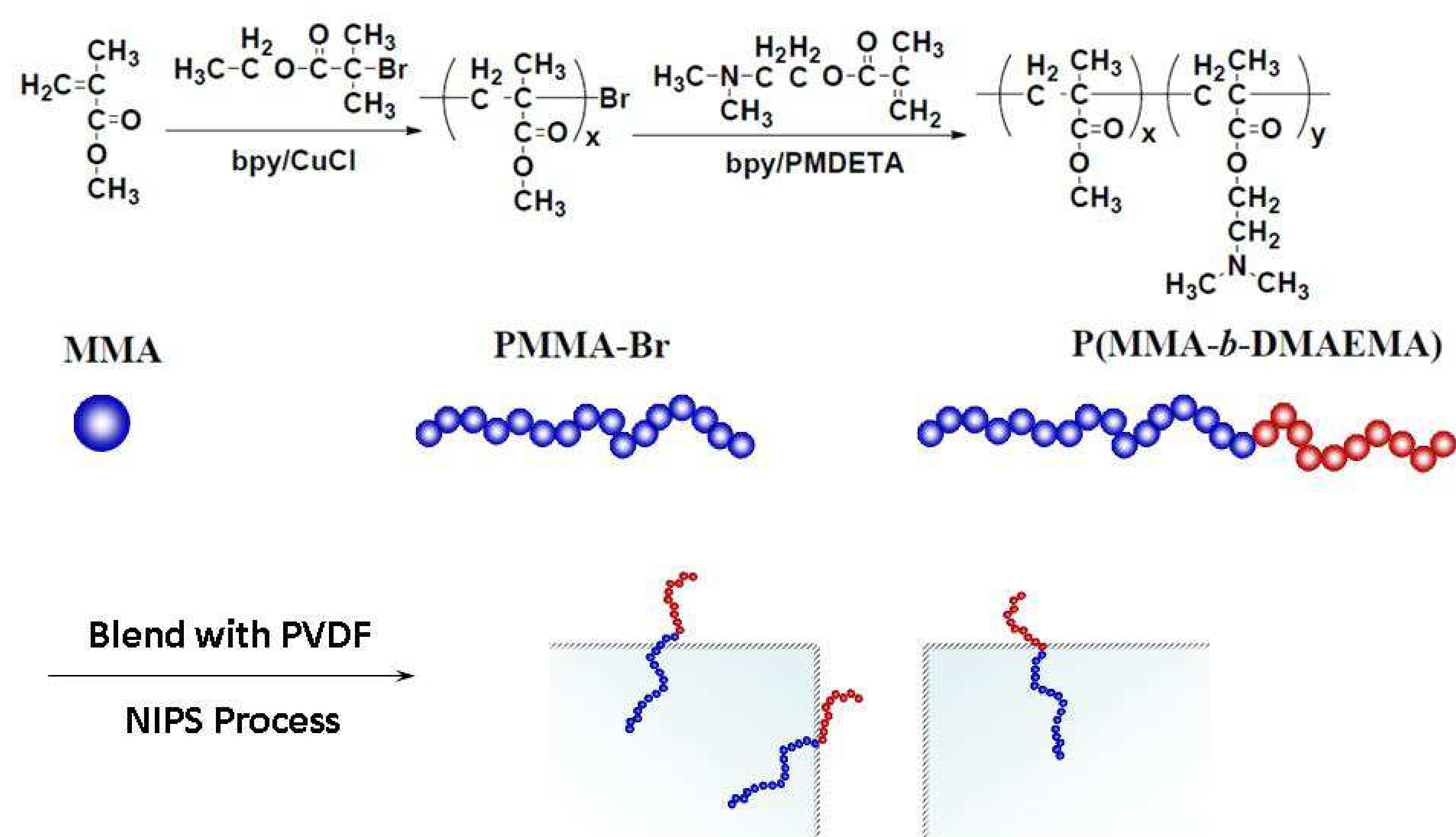


Introduction

Chromium (Cr) is one of the toxic heavy metal elements widely used in pigments production, leather tanning, electroplating and so on, which result in the large quantity of Cr(VI) ions discharged into waters [1]. Environmental Protection Agency (EPA) in US recommends that the amount of Cr(VI) in drinking water should be less than 100 $\mu\text{g/L}$. So, effective technology to remove Cr(VI) from waters have attracted much concern.

Hybrid processes of ion exchange resins and Ultrafiltration(UF) in water treatment have many potential benefits [2]. Therefore the utilizing of ion exchange resin materials in UF membrane will become the tendency in enhancing the membrane performance.

Method



Results and Discussions

1. Morphologies of the membranes

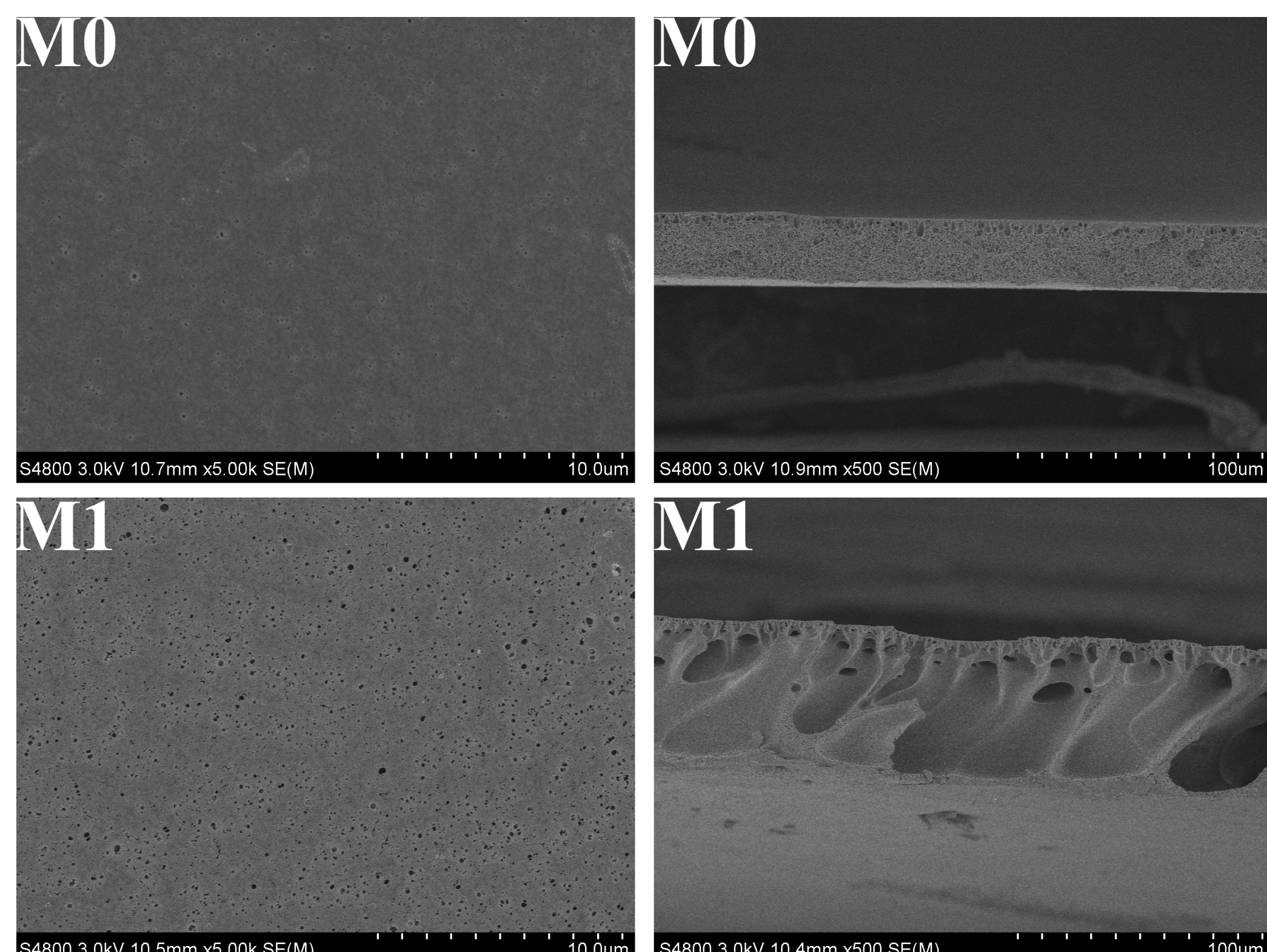


Fig. 1 SEM images of pure PVDF membrane(M0) and membranes blended with P(MMA-*b*-DMAEMA). First line: surface; second line: cross section.

2. Equilibrium Cr(VI) adsorption before and after alkali solution washing

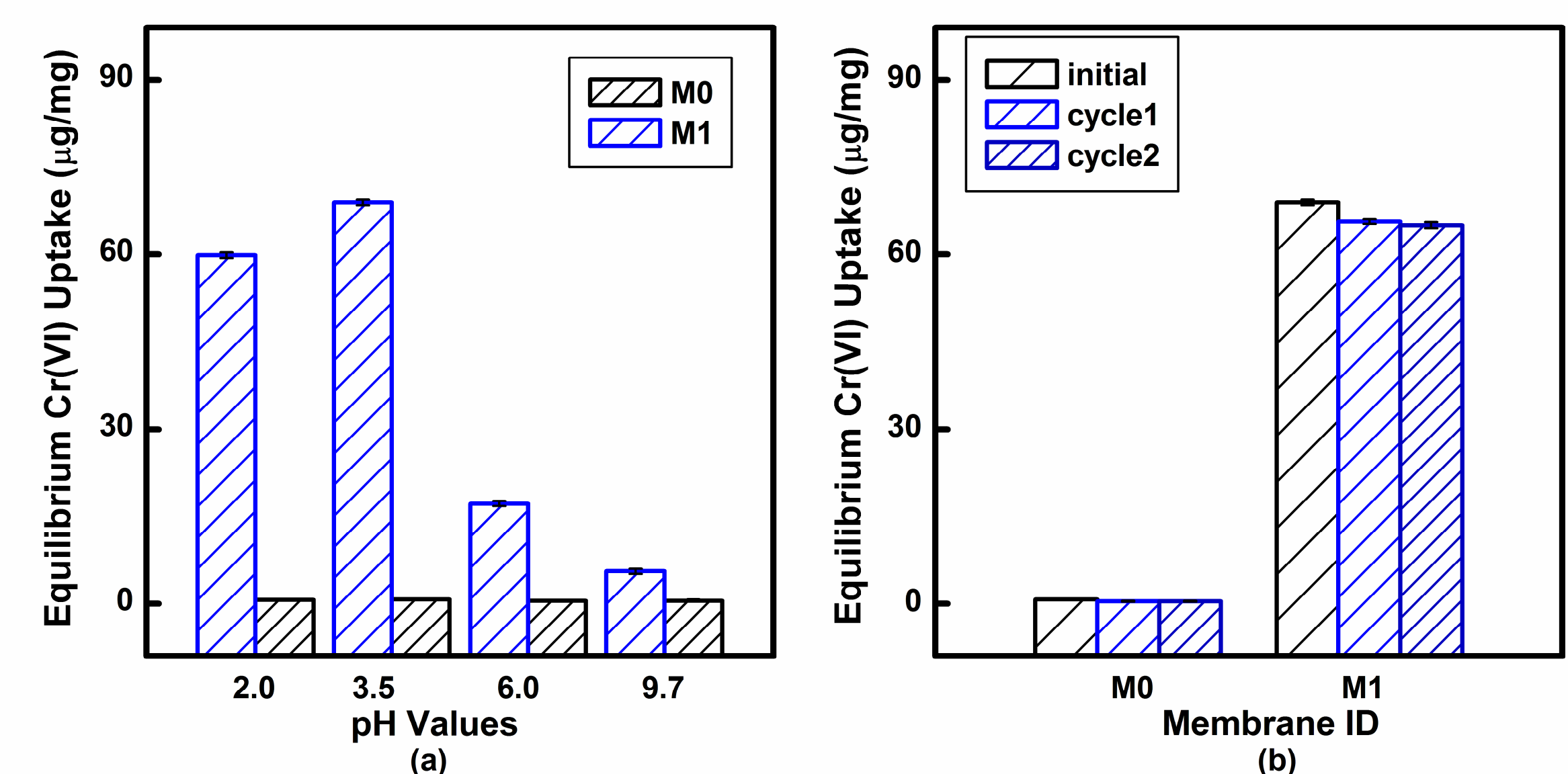


Fig.2 Cr(VI) adsorption capacity of membranes (a) at different pH, (b) after alkali solution washing

3. Cr(VI) adsorption and desorption kinetics

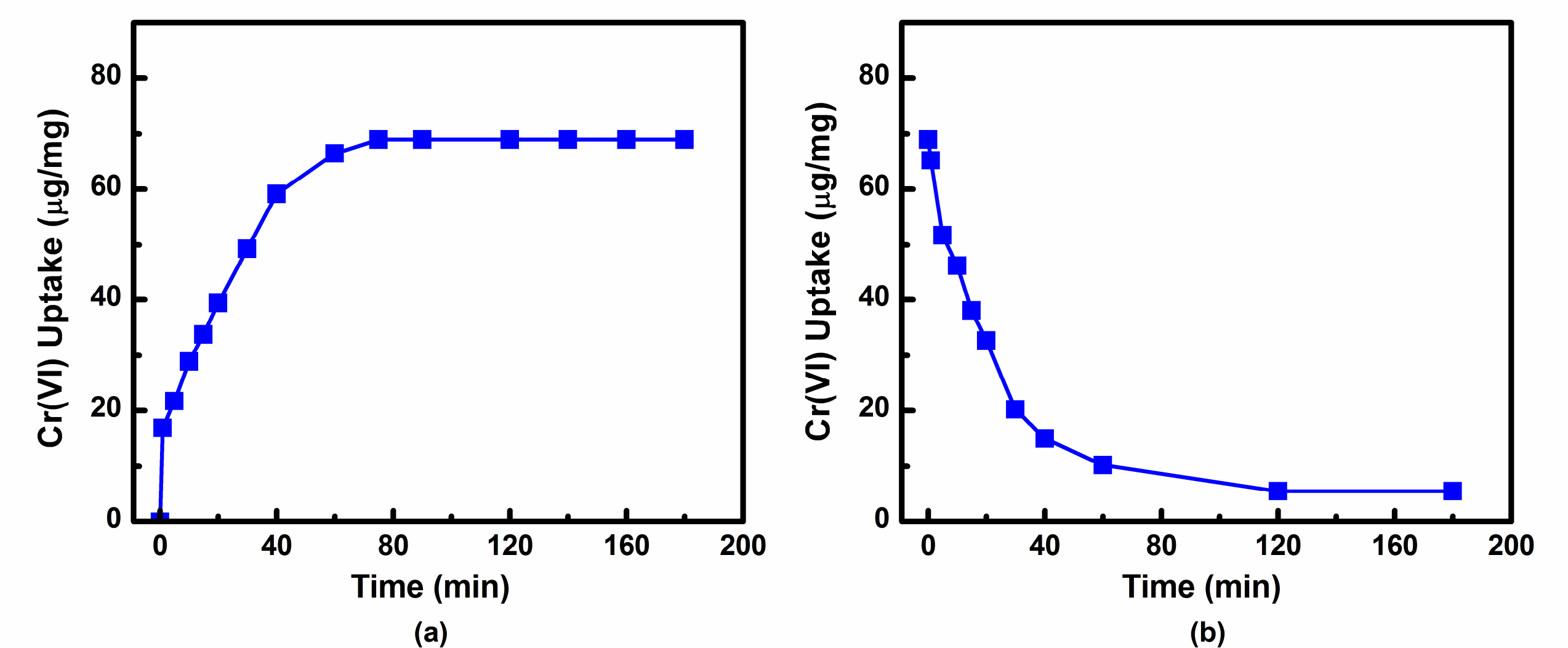


Fig.3 Adsorption kinetics of Cr(VI) in 10 mg/L solutions (a) and desorption kinetics of Cr(VI) in alkali solution (b)

4. Cr(VI) removal during filtration process

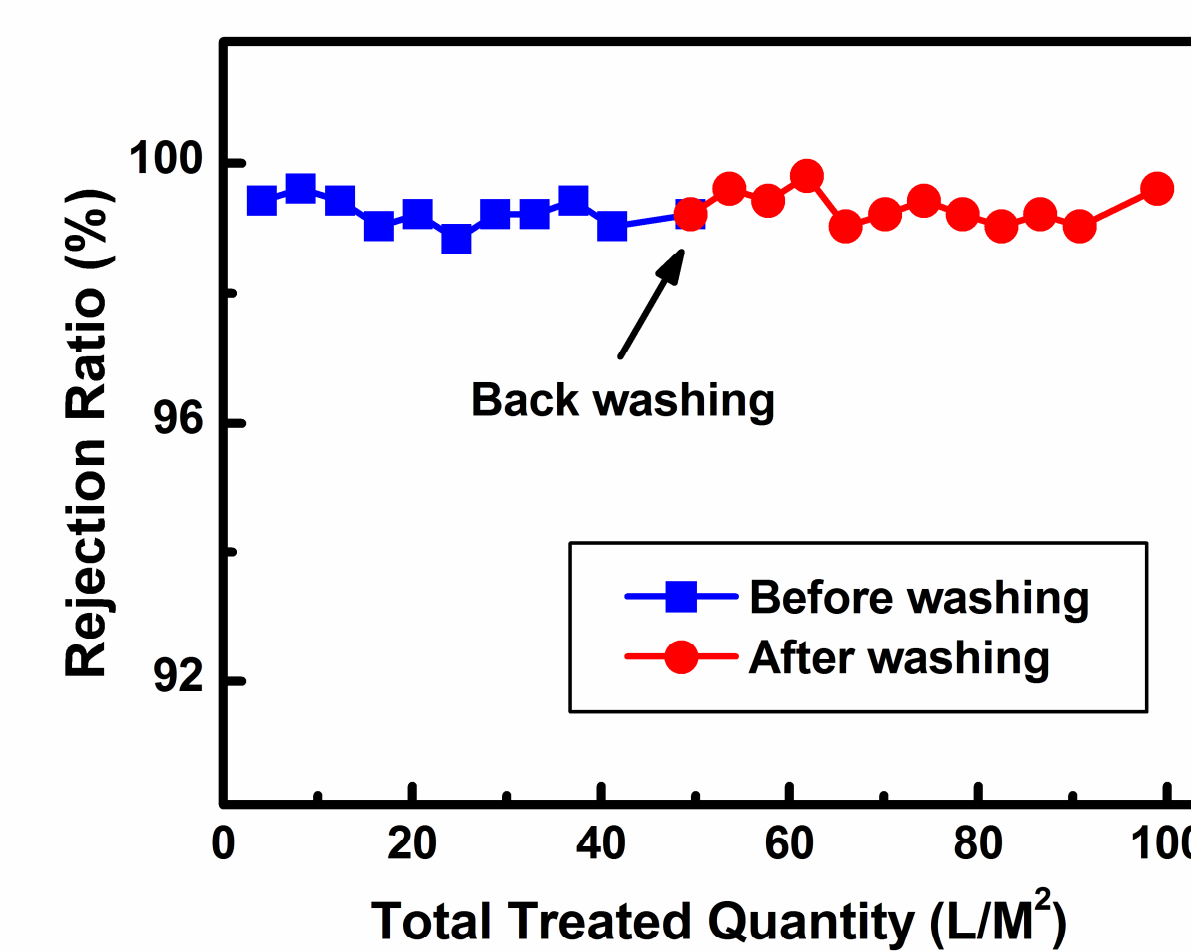


Fig.4 Cr(VI) rejection ratio during filtration progress

Conclusion

The substantial coverage of PDMAEMA on the membrane surfaces and pore channels endows the membranes with the property to remove Cr(VI) during filtration progress.

The capability to absorption Cr(VI) can be reconstructed after washing by alkali solution.

Acknowledgements

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References

1. F. Fu, Q. Wang, *J. Environ. Manage*, **2011**, 92: 407-418.
2. H.A. Abdulgader, V. Kochkodan, N. Hilal, *Sep. Purif. Technol*, **2013**, 116: 253-264.