

Development of pore filling ion-exchange membranes for electro dialysis

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Performance of ion-exchange membrane is important for the electro dialysis. Especially, ionic conductivity and selectivity are important. To develop a suitable ion-exchange membrane, ion exchange capacity and dissociation constant must be high. When ion-exchange membrane having high ion-exchange capacity is developed, the membrane will have poor mechanical strength because of high swollen state. In this study, pore filling type ion-exchange membrane was proposed, and the membrane was developed by the plasma-graft polymerization technique. The ion exchange polymer was fixed on pore surface of porous substrate, and fill them. The filling ion exchange polymer shows ion conductivity, and porous substrate matrix will show mechanical strength. The filling polymer is linear chain, and it will show high mobility, and results in high ion conducting. The filling polymer covalently bonded with pores, and the structure will show durable properties. Porous Teflon film was employed as the porous substrate, and acrylic acid and allyl sulfonic acid were used as the filling polymer. The membranes were prepared by plasma-graft polymerization, and the morphology, ion-exchange capacity and ionic conductivity were investigated.