

Development of surface modified ion-exchange membranes for efficient reverse electro dialysis

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Ion-exchange membranes (IEMs) have been widely used in various electro-membrane processes for desalination and energy conversions. Separation performances of IEMs are highly dependent upon the surface characteristics, and therefore proper modification of the membrane surface properties is very important. In particular, the monovalent ion selectivity of IEMs is known as the key factor dominating the efficiency of electro-membrane processes. Therefore, this study aims to optimize the monovalent ion selectivity by physically and chemically modifying the IEM surface. Several organic and inorganic materials were investigated to control the membrane surface properties such as the free volume, polarity, hydrophilicity, etc. In addition, the surface modified IEMs were tested for the application to reverse electro dialysis for power generation. This work was supported in part by the Technology Innovation Program funded by the MOTIE (No. 2001049) and by the NRF grant funded by the MSIT (No. 2019R1A2C1089286).