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Abstract:

Monovalent cations permselective membranes (MCPMs) which can selectively transport monovalent and reject the multivalent cations are key materials for waste water treatment, mining of valuable seawater metal ions, acid recovery in hydrometallurgy etc. High flux and good selectivity are desired characteristics for practical applications of MCPMs. In this study, we have synthesized functionalized MCPMs containing zwitterionic side chain comprising two quaternary ammonium groups and one sulfonic acid group. Distinct nano-phase separation between aromatic main chain and the ionic side chains was observed by the atomic force microscopy. The resulting MCPMs showed excellent H^+ flux (16.92 mol $h^{-1}m^{-2}$) in electrodialysis (ED) process. Because the electrostatic repulsive effect of zwitterionic structure, the synthesized MCPM exhibits excellent Na^+/Mg^{2+} selectivity of 7.4 and remarkably good H^+/Zn^{2+} selectivity of 23.5.

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