

Highly effective and energy-efficient thermo-responsive supramolecular host-guest complex systems as draw solutes in forward osmosis

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Guest polymerized ionic liquids (PILs) were complexed with methylated- β -cyclodextrin (Rm- β -CD) host as thermo-regenerable draw solute for forward osmosis (FO). Particularly, oligo([vbim]TFSI) complexed with Rm- β -CD displayed tunable cloud-point temperature, fast LCST kinetics, and sufficient osmotic properties. It generated competitive FO water flux, low reverse solute flux, and negligible specific reverse solute flux. The DS was convenient to recover by mild heating at 30 °C. Subsequent nanofiltration finally produced non-toxic effluents. This research was supported by the National Research Foundation of Korea (NRF) under the Ministry of Science and ICT (2017R1A2B2002109 and 2020R1A2C1003560), Basic Science Research Program through the Ministry of Education (2019R1I1A1A01058207 and 2020R1A6A1A03038817).