

Poly(ionic liquid) having Lower Critical Solution Temperature Property as Thermo-responsive Draw Solute for Forward Osmosis Process

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We synthesized poly(4-vinylbenzyltributylammonium hexanesulfonate) (P[VBtBA][HS]), which has lower critical solution temperature (LCST) property, via anion exchange with hexanesulfonate after free radical polymerization as using monomer ([VBtBA][Cl]) obtained by Menshutkin reaction in order to study its capability as draw solute for forward osmosis (FO) process. The FO performance and recovery method of P[VBtBA][HS] were also investigated. LCST of [VBtBA][Cl] and P[VBtBA][Cl] was not observed, while the LCST of P[VBtBA][HS] was observed to be about 17 °C at 20 wt%. This result proposes that P[VBtBA][HS] can be recovered from solution by heating them to above LCST. In an active layer facing feed solution (AL-FS) system containing 20 wt% P[VBtBA][HS] at 15 °C, the water flux and reverse solute flux of P[VBtBA][HS] were measured to be about 5.85 LMH and 1.27 gMH, respectively. Therefore, we studied availability of poly(ionic liquid) having LCST property as draw solute for FO process.