

Phosphonium and ammonium-based ionic liquids with a thermo-responsive LCST-type phase transitions as draw solutes in forward osmosis for seawater desalination

Hana Gebreegziabher Zeweldi, Anelyn Bendoy,

Limjuco Lawrence, Hanseung Kim¹, Myoung Jun Park²,

Ho Kyong Shon², 정옥진, Grace Nisola[†]

Department of Energy Science and Technology (DEST),

명지대학교; ¹Department of Environmental and Biotechnology, 명지대학교;

²School of Civil & Environmental Engineering, University of Technology, Sydney,
Australia

(grace.nisola@gmail.com[†])

Ionic liquids (ILs) having suitable hydrophobicity can undergo LCST-type phase transition property with pure water. Herein, thermo-responsive ILs were synthesized and utilized as draw solutes in forward osmosis (FO) for seawater desalination. The ILs were evaluated through their respective FO water flux, reverse solute flux and reverse flux selectivity using deionized and simulated sea water in FO and PRO mode. The ILs were able to generate considerable water flux with negligible reverse solute flux. The ability of these ILs to phase separate from water would be beneficial for its convenient recovery and recyclability for long-term use in FO. This research was supported by the National Research Foundation of Korea (NRF) under the Ministry of Science and ICT (No. 2016R1A2B1009221 and No. 2017R1A2B2002109) and Ministry of Education (No. 2009-0093816 and 22A20130012051(BK21Plus)).