

Biomethane liquefaction followed by biogas upgrading using an imidazolium-based cationic ionic liquid

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The major issue associated with biogas upgrading and subsequent biomethane liquefaction is their high energy consumption, which ultimately affords a cost-intensive process. We propose a simulation based an economical and energy efficient process for biomethane liquefaction following biogas upgrading using an ionic liquid (1-butyl-3-methylimidazolium hexafluoro phosphate [Bmim][PF₆]). As such, biogas can be upgraded at an energy expense of 1.1048kWh/kmol, while 11.26kWh/kmol of energy is used for biomethane liquefaction. The specific total annualized cost for the proposed integrated process was calculated as \$519.3/kg-biogas. This research was supported by the Basic Science Research Program Foundation of Korea (NRF) funded by the Ministry of Education (2018R1A2B6001566), the Priority Research Centers Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education (2014R1A6A1031189).