

Process design for cellulosic ethanol production from lignocellulosic biomass

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Biofuels are the most promising alternative to fossil fuels and overcoming global warming, which is one of the most serious environmental problems in recent years. This paper presents a novel biorefinery design for cellulosic ethanol production from lignocellulosic biomass. For the preconcentration section, heat pump assisted distillation and double-effect heat integration were evaluated, while a combination of heat-integrated technique and intensified technique, extractive dividing wall column (EDWC), was applied to enhance the process energy and cost efficiency for the purification section. A biosolvent, glycerol, which can be produced from biodiesel production, was used as the extracting solvent in an EDWC to obtain a high degree of integration in a biorefinery context. This work was supported by the National Research Council of Science & Technology (NST) grant by the Korea government (MSIP) (No. CAP-11-04-KIST) and Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education (2015R1D1A3A01015621).