

Co-Hydrothermal Gasification of Microalgae Biomass and Solid Biofuel for Biogas Production

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Abstract : Limiting global warming to 1.5°C to the pre-industrial levels urges the application of efficient and sustainable carbon dioxide removal (CDR) technologies. Microalgae based biorefineries offer scalable solutions for the biofixation of CO₂, where the produced biomass can be transformed into value added products by applying thermochemical processes. In this paper we report on the utilization of hydrochar as a blending component in hydrothermal gasification (HTG) process. The effects of blending ratio and hydrochar quality were investigated on the biogas yield and composition. It is found that co-gasifying the hydrochar and the algae biomass can increase significantly the total gas yield and influence the biogas (H₂, CH₄, CO₂, CO, C₂H₄, C₂H₆) composition. It is determined that the carbon conversion ratio, hydrogen and methane selectivity can be increased by influencing the fuel ratio of hydrochar via hydrothermal carbonization. In conclusion, it is found that increasing the synergy between hydrothermal technologies result in elevated conversion efficiency.

Keywords : biogas, CDR, Co-HTG, hydrochar, microalgae

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