

Development of thermochemical conversion of microalgal biomass for biofuel production

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Abstract

The development of renewable energy technology has attracted a great deal of attention and has a remarkable progress over the past several decades. The application of renewable energy can lessen the fossil fuel consumption, abate greenhouse gas emissions, and mitigating atmospheric greenhouse effect and climate change. Currently bioenergy accounts for the largest share among the renewable energies. Biofuels derived from biomass pertain to carbon-neutral fuels and can be used as alternatives to fossil fuels. Compared to terrestrial plants, microalgal biomass cultivation uses much less land to produce an equivalent amount of biomass. Microalgae are characterized by their rapid growth and high carbon fixing efficiency; accordingly, carbon capture and storage are achieved while they grow and are harvested. From the aspect of biofuels, microalgae can be converted in solid, liquid, and gas biofuels, depending on the thermochemical conversion processes. In this talk, the progress in microalgae torrefaction for biochar production, pyrolysis for bio-oil production, and gasification for syngas production will be addressed. The advanced kinetic models accounting for the thermal degradation of microalgae will also be underlined to show the potential of microalgae as feedstocks for biofuel production.