

Hydrothermal Catalytic Processing of Biomass

Sergiy Popov

Abstract of the presentation at the 4th CEE Graduate Seminar, October 11, 2012

The US Energy Independence and Security Act 2007 mandates 21 billion gallons of advanced biofuels production by 2022 from lignocellulosic biomass, e.g. energy crops, agricultural residues, and forest residues. At present, the majority of biofuel production technologies are aimed at cellulosic ethanol. During those processes, a large amount of unhydrolyzed solids (UHS) is generated. This residue mostly contains lignin and unconverted sugars and cannot be utilized with the existent technologies and is therefore simply discarded. The efficient utilization of this residue would have a positive impact on cost-competitiveness of the biofuel production from lignocellulosic biomass. In this research, the effect of temperature, reaction time, and catalysts on the biocrude and biochar yields and HHVs was studied. The complete mass and heat balance of the UHS conversion was carried out and the optimal conditions for advanced biofuel production were determined. The results of this study show that hydrothermal liquefaction/carbonization of UHS may be an efficient way of utilization of lignocellulosic residues.