Formation of liquid and solid products from liquid phase pyrolysis of lignocellulosic feed

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Lignocellulosic feed is expected to contribute significantly to production of liquified and solid combustibles. The aim of the project is the production of high quality biochar and a liquid energy carrier. Therefore the pyrolytic degradation of coniferous wood in liquid phase heat carrier was investigated. Pyrolysis was carried out in liquid phase heat carrier, which provides high heat capacity and high heat conductivity for optimum heat transfer.

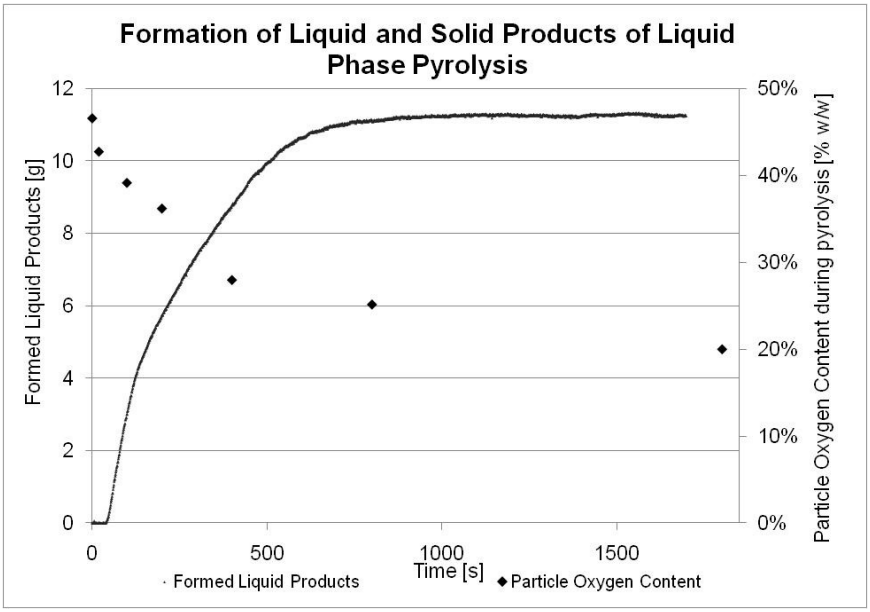

Figure 1: Formation of liquid and solid products of liquid phase Pyrolysis

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The process was carried out in a semi-batch reaction vessel under isothermal conditions. Temperature was variied. Process pressure was ambient. Liquid phase pyrolysis is an exothermic process which produces 25-28% liquid CHO products, the quality of which is widely independent of the biomass particle size within a range of 630µm and 10mm. The heat of reaction is -864±25 kJ/kg at T=350°C. Figure 1 shows the kinetics of product formation and oxygen depletion of solid residues.

Figure 2 shows biomass behavior with focus on C-O bonds, which are characteristic for carbohydrates, in the solid residue during liquid phase Pyrolysis conditions at T=350°C.

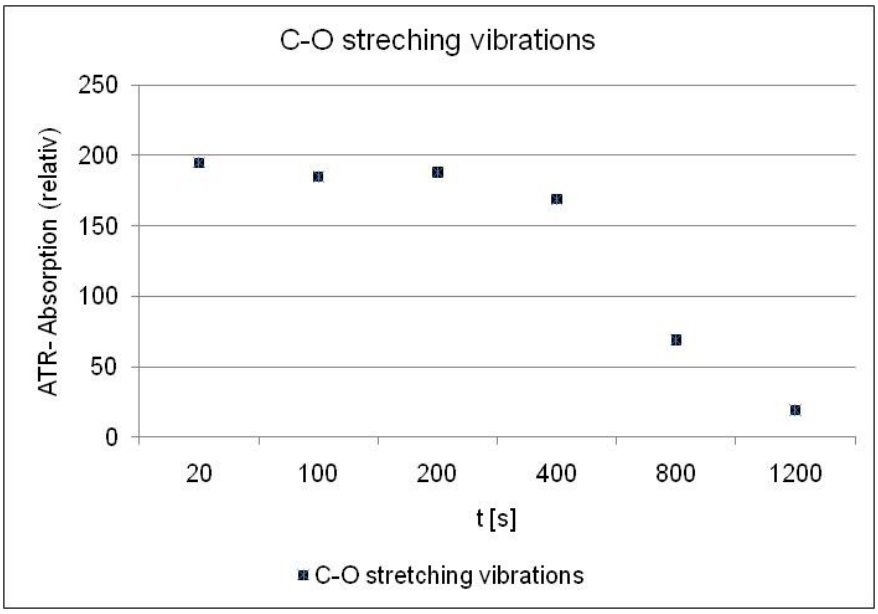

Figure 2: Decrease of C-O bonds in spruce wood during liquid phase Pyrolysis