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Hydrothermal liquefaction and carbonization for fuels and materials

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Hydrothermal biomass conversion processes provide the opportunity to use feedstocks with high water content for the formation of energy carriers, materials or platform chemicals. The water plays an active role in the processes as solvent, reactant and catalyst or catalyst precursor. This paper focuses on the hydrothermal liquefaction of algae to produce fuel. Instead of lipids, here carbohydrates in algae are the resource to produce oil. A special process is the conversion of carbohydrates in plants to 2-hydroxymethylfurfural, which is an important platform application and e.g. basis of polymers. This process is now applied by the company AVA-Biochem. The hydrothermal carbonization is a process leading to a dark polymer with a heating value of coal. It is a fuel but also other applications like to improve soils are discussed. These processes are enabled by the special properties of liquid water at high temperatures. The influence of water will be discussed and how the change of water properties enables the different products. The water is necessary, on the other hand beside the wanted product a water phase with organic contaminates is formed in the hydrothermal processes. This water phase may be treated by chemical or biological gasification; results will be presented. Other, new applications are introduced as well.

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