



8th ICGC 2018 Session:

Lignin First Approach

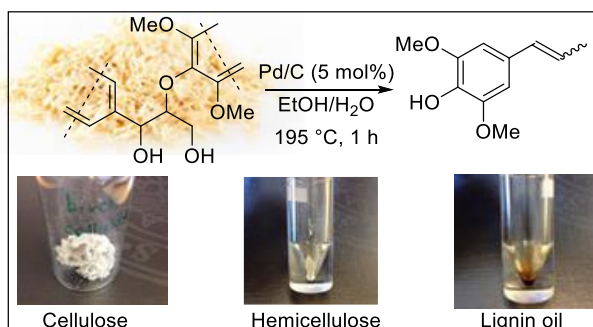
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Abstract:

Paper pulp industries fractionate up woody biomass to produce a high quality cellulosic fiber to the expense of the lignin and hemicellulose that is burnt to a low value. Thereby, modern pulp mills have a yield below 50%. Pulping was developed at a time when crude oil was easily accessible and the negative consequences with using fossil resources were not yet understood. Lignin first is an alternative method where an organosolv pulping is combined with a transition metal catalyzed transfer hydrogenolysis reaction in which the lignin is transformed into monophenolic compounds.^{1,2} Our group has developed a method in which the hemicellulose is converted to hydrogen equivalents in-situ and therefore, no external reagents are needed.^{3,4} By performing the lignin first in a continuous flow, the pulping and transfer hydrogenolysis are separated in time and space and can for the first time be studied separately.⁵ Interestingly, the organosolv pulping liberates monophenolic compounds without the action of the transition metal by peeling of end-groups from the lignin polymer. The action of the transition metal is to transform the monophenolic compounds to less reactive species and also to cleave internal ether bonds in the lignin polymer. Thereby, theoretical yields of cellulose and monophenolic compounds are formed in which energy of the hemicellulose is conserved. Other sources such as bark has also been transformed using the lignin first approach.⁶



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