

## CATALYSTS FOR SELECTIVE CONVERSION OF PLANT CELL WALL POLYSACCHARIDES TO FUELS AND CHEMICALS

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Selective catalytic conversion of lignocellulosic biomass to biofuels could improve the carbon efficiency of biofuel production. We report the use of mixed Brønsted and Lewis acids such as maleic acid and aluminum chloride, to catalyze the fractionation of biomass into separate soluble xylose and glucose streams along with solid lignin, followed by the conversion of the xylose to furfural and glucose to HMF and levulinic acid under higher temperature and pressure. This method achieved 80-90% yield of xylose through hydrolysis of the hemicellulose from various biomass sources (switchgrass, poplar, pine) and achieved 54-61% yield of furfural (based on original biomass). For the conversion of glucose, maleic acid in combination with aluminum chloride reduces the production of undesired humic compounds by 50% compared to hydrochloric acid. We report an analysis of this shift in selectivity levulinate and describe possible mechanisms for interactions between maleic/maleate and the reactants and intermediates.

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