Catalytic Conversion of Biomass-derived C_4 Compounds into Gasoline-grade Fuels

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Recently, an efficient pathway to convert renewable biomass sources into fuels has been studied in the field of catalysis. Particularly, the practically feasible approach is required to achieve lower O/C and higher H/C ratios close to those of fossil fuels. However, this ultimate goal cannot be accomplished only using direct fermentation into bio-alcohols. Indirect fermentation was hence suggested to afford about 50% improved yield of alcohols than direct fermentation. Since butyric acid can be produced through anaerobic digestion of sugars, C_4 oxygenated compounds should be dealt with in an appropriate manner in order to produce gasoline-grade compounds. In the talk, three different catalytic routes will be presented. The first two, the ester hydrogenolysis and the acid hydrogenation, are related with catalytic conversions being incorporated into indirect fermentation. The last one is a series of C–C coupling and hydrodeoxygenation reactions to form gasoline-range hydrocarbon. All catalytic activities and catalyst characterization results will be seen on-site. Consequently, the present findings will offer new possibility for converting cellulosic biomass into several types of gasoline-grade fuels.