

## Integrated Catalytic Process for the Bio-alkane Production from Waste Biomass

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A catalytic approach for the conversion of lignocellulose materials to gasoline-ranged hydrocarbons was studied. The strategy is to produce platform chemicals first, then, the chemicals are converted into intermediates with functional groups suitable for prolonging the carbon chain to satisfy the requirement of transportation fuel. In order to increase the carbon chain, new C-C bonds must be formed among biomass derived small molecules. We discovered that angelica lactone can be converted into dimers or trimers through addition reaction in the presence of medium strong alkali catalysts with a conversion of 100% within several minutes. After hydrogenation of carbon chain prolonged dimers/trimers, the obtained products were mainly C6-C13 alkanes. It is possible to convert about 50% carbon in cellulose or sugars into alkanes. This process can produce about 25kg alkanes from 100 kg cellulose or sugars or about 250 kg wood. This amount is similar to that of ethanol from 100kg cellulose. Unlike commonly studied cellulosic bio-ethanol production process, our process does not need complicated pretreatment for raw materials and the produced fuel does not contain oxygen and thus the heating value is higher.