

March 29-30, 2018
Edinburgh, Scotland

Arch Chem Res 2018, Volume 2
DOI: 10.21767/2572-4657-C1-003

CATALYTIC CONVERSIONS OF BIOMASS MOLECULES TO BIOFUELS AND USEFUL CHEMICALS

Edman Tsang

University of Oxford, UK

Over the past century our society has become heavily dependent on fossil fuel sources such as coal, gas and oil to produce our daily needed energy and chemicals. The carbon dioxide produced by these non-renewable carbon sources has been significantly altering the climate on Earth and our heavy reliance makes them more expensive and less abundant. The sustainable production of liquid fuels from renewable biomass is one of the possible ways to reduce our reliance on fossil fuels and alleviate the concerns about global warming. Vegetable oils are widely available in nature and are being considered as a promising renewable energy source, with the potential to be transformed to diesel fuels. Thus, conversion of lignocellulosic biomass to renewable fuels and chemicals has attracted significant attention as a key technology to enable the replacement of petroleum.

In this conference, we will present our recent works on catalytic conversions of biomass molecules into biofuels such as alkanes and useful chemicals products over zeolites and related [1-5].

Reactions were carried out in either continuous or batch reactor under industrial applicable conditions. For example, we will show high catalytic performance for hydro-deoxygenation of biomass derived molecules to fuels (alkanes). We will discuss the importance of the hydro-deoxygenation reaction in biomass activation over catalytic surfaces [4,5]. Regarding the synthesis of valuable chemicals, we will present the efficient catalytic conversion of bio-derived dimethylfuran (DMF) to aromatics from using in-situ ethylene produced by the dehydration of ethanol over acid or basic sites of the zeolites, etc. Although one would expect slower kinetics in the conversion of DMF using ethanol instead of ethylene in typical Diels-Alder reactions due to the competition for the active sites (e.g. ethanol dehydration also takes place on acid sites). In contrast, we achieve much higher rates and lower activation barriers due to hitherto unreported facilitated fundamental steps for the coupling of ethanol and furan to form aromatics.

edman.tsang@chem.ox.ac.uk