第432回触媒科学研究所コロキウム

Selective Porous Catalysts for Upcycling Waste from Petroleum and Pulping Industrials

Dr. Duangamol N. Tungasmita
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2020年3月9日（月）15:00—16:30
創成科学研究棟　5階大会議室
http://www.cat.hokudai.ac.jp/access.html

Nowadays, waste upcycling has much attentions from society due to the global warming effect and depletion of crude oil sources. Many types of waste such as PP plastic cup, natural abundant lignin, and waste from the phenol-production plant, will be used as starting materials in the upcycling transformation process to achieve more valuable chemical compounds.

In this seminar, we will discuss about the pore size-dependent transformation mechanism of polypropylene plastic cups to gasoline or gas fuels. It was found that the mesoporous Al-SBA-15 catalyst gave a major product as a liquid fraction, while microporous H-MCM-22 catalyst promoted liquified hydrocarbons. For lignin, i.e. phenolic abundant polymer in nature, it was hydrothermally depolymerized to benzenediol derivatives, and especially to catechol, compared to non-catalytic cracking. The acidity and porosity of the catalyst played an important role in the selectivity for catechol.

In case of the anisole, a by-product of polycarbonate production, it was selective alkylized to tert-butyl anisole products which can be used as antioxidants and stabilizers in polymerization processes. The ZSM-5 showed a dominating property of para-selective with a low product yield, while MCA gave a double conversion to ZSM-5 but non-selective to any isomers. The outcomes of this research exhibit the development of micro- and mesoporous hybrid materials which provide a high yield and dominate para-selective product.

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第432回触媒科学研究所コロキウム

Enzymatic transformation of sucrose for the production of polysaccharides and oligosaccharides of glucose and fructose for food and functional food applications

Dr. Rath Pichyangkura
(Department of Chemistry, Chulalongkorn University)

2020年3月9日（月）15:00—16:30

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Thailand, an agricultural country, is one of the world largest producer of food and agricultural products. Sugar is one the most important products of Thailand is the world's second largest producer of sucrose. However, sucrose is normally sold as bulk low price. Conversion of sucrose into higher value new products is of great interest. In this work we use sucrose as a substrate for the production of polysaccharides and oligosaccharides of glucose and fructose, using two groups of glycosyltranferases; glucansucrase and fructansucrase. We have engineered and expressed four glucansucrases; alternansucrase and dextrandsucrase from Leuconostoc citreum ABK-1, reuteransucrase from Lactobacillus reuteri 121 and mutansucrase from Streptococus sorbinus. They were successfully used for the production of glucans and oligosaccharides of glucan. Moreover, we have successfully engineered and expressed levansucrase and inulosucrase that catalyzes the production of fructan and fructan oligosaccharides with different product size ranges. Together with other biotechnological processes for the production of FOS from sugar, we successfully produced FOS that can be use as functional food, possessing probiotic property, with a prebiotic score equal or higher that commercialized products. In conclusion, we have generated a technology platform for enzymatic sugar transformation into polysaccharides and oligosaccharides using glucansucrase and fructansucrase, which can be used for the production of polysaccharides and oligosaccharides of glucose and fructose.

Dr.Rath Pichyangkura is a faculty member of the Department of Biochemistry, Faculty of Science, Chulalongkorn University, Bangkok, since 1996. The major focus of his laboratory is on the enzymatic transformation of carbohydrate biomass in high value products, functional polysaccharides and oligosaccharides. He has been working with chitin-chitosan and their applications in plants and animal from 1998-present. Currently, his work deals with carbohydrate engineering and enzymatic transformation of sucrose to useful products and production of functional oligosaccharide from other carbohydrate containing biomass such as copra meal and palm wastes.

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