東京大学グローバルCOEプログラム　機械システム・イノベーション国際拠点

東京大学 THE UNIVERSITY OF TOKYO

GMSI Global Center of Excellence for Mechanical Systems Innovation

# 第133回　GMSI公開セミナー

## Microporous Solid Lewis Acids: An Attractive Platform to Achieve Catalytic Cooperativity


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**日時：2013年3月4日（月）　15:00−16：00**

**会場：東京大学工学部5号館3階談話室(341号室)**

## 要旨


In our efforts to shift away from traditional petroleum-based raw materials to supply fuels and chemicals, biomass has emerged as an attractive renewable carbon-containing feedstock.  Its complex chemical diversity has created daunting challenges that require the implementation of robust, active, and selective catalysts to effectively transform it into useful products.  Zeolites are versatile microporous solid acids used ubiquitously in various large-scale industrial processes, including catalytic cracking and isomerization.  The uniformity of their pore structures makes them ideal to control product distribution by way of shape, transition-state, or product selectivity. In this lecture, new developments in the synthesis and use of zeolites for the conversion of biomass-derived oxygenates will be presented, emphasizing the role of framework-incorporated Lewis acid centers in reactions performed in bulk water.

In zeolites, tetrahedral framework metals capable accepting pairs of electrons by expanding their coordination shell behave as Lewis acids. Unlike traditional Lewis acids, these active centers maintain activity in the presence of water.  Recent findings on the use of  Sn- and Zr-Beta zeolites to convert carbohydrates (e.g., glucose and xylose) in the presence of bulk water will be presented.  Three focus areas will be discussed: a) the nature of the interaction between carbohydrates and the Lewis acid center; b) the use of co-catalyst to promote cooperative Lewis/Lewis or Lewis/Brønsted catalysis; and c) new synthesis protocols to create multifunctional organic-inorganic materials.



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