

# “The Leading Edge of Wood Chemistry”

日時：2016年3月18日（金） 10:00～12:00

場所：静岡大学静岡キャンパス 農学部B棟 210

## “NMR analytics in wood chemistry”

Markus Bacher, Mag. Dr. (BOKU)

The knowledge about composition and structure of wood derived compounds is of great importance for the development of new materials with unique and well defined properties. NMR spectroscopy with its potential to gain information on even atomic level has been established as a powerful tool to get deep insight into molecular structures. In this presentation the different wood components will be introduced and appropriate nmr techniques for structural analysis will be discussed. So for example liquid nmr analytics of lignin samples is stressed to reveal information about different structural units with the help of 2D-nmr or after derivatization with  $^{31}\text{P}$  nmr. Also recent research projects to determine molecular weights of different lignin fractions by DOSY (diffusion ordered spectroscopy) will be presented. For insoluble compounds solid state nmr is the method of choice - for example cellulose polymorphy and crystallinity are deduced with CP/MAS technology.

## “Development of Novel Composite Materials of Nanocelluloses Designed by Living Radical Polymerization”

Keita Sakakibara, Ph.D. (Kyoto University)

For mechanically strong and lightweight materials, nanocelluloses including cellulose nanofibers (CNF) and nanocrystals (CNC) have a range of promising properties leading to fiber-reinforced thermoplastic composites. The development of CNF-reinforced hydrophobic matrices such as polyolefin is most challenging because of the hydrophilic nature of CNF surface. We have tried to prepare CNF-reinforced high-density polyethylene nanocomposite materials by the adsorption of a diblock copolymer dispersant, which relies on the strong hydrogen bonding between cellulose interactive segments and cellulose surface via multiple-point interaction. By a simple adsorption process, there are apparently less CNF aggregates in HDPE matrices. The significant increase in Young's modulus and tensile strength for dispersant-used nanocomposites was achieved. This study represents a potential approach to mediate CNF-CNF and CNF-resin interactions and to influence the CNF dispersion significantly without chemical functionalization. The following topics will also be introduced briefly in this talk: liquid crystal formation and lubrication of nanocelluloses decorated with concentrated polymer brushes (CPB).

連絡先：米田夕子（農学部環境森林科学科）  
ayyoned@ipc.shizuoka.ac.jp  
054-238-4840