



KYOTO UNIVERSITY
Global COE Program

INTEGRATED
MATERIALS SCIENCE

グローバルCOE講演会

Prof. Marek Pruski
Iowa State University, USA

New Strategies for Improving Sensitivity and Resolution in Solid-State NMR; Applications to Catalytic Nanoscale Materials, Biomolecules and Fossil Fuels

Date: 2011. 3. 11 Fri. 15:00–16:00

Venue: Faculty of Science Bldg. No. 6 Room 571



Remarkable gains in sensitivity and resolution have been achieved in solid-state NMR spectroscopy by combining fast magic angle spinning (at ~ 40 kHz) with new multiple radiofrequency pulse sequences. The latest capabilities include 2D through-bond and through-space $^1\text{H}\{\text{X}\}$ heteronuclear correlation protocols utilizing indirect detection and homonuclear multipulse ^1H decoupling. These methods and theoretical calculations provided unique insights into the structure and dynamics of molecules bound to the surface of mesoporous silica nanoparticles. In particular, they served as a predictive tool in the design of an excellent catalyst for the esterification reaction and revealed the arrangement of surfactants inside the supramolecular-templated mesoporous materials. The new capabilities of solid-state NMR spectroscopy will also be demonstrated on a naturally abundant tripeptide (N-formyl-L-methionyl-L-leucyl-L-phenylalanine, f-MLF-OH) and a series of coals.

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