

WEBINAR SERIES ON

NMR RELAXOMETRY THEORY AND APPLICATIONS

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**NMR Relaxometry as a Tool
for Understanding Adsorption
in Heterogeneous Catalysis**

Abstract

NMR Relaxometry as a Tool for Understanding Adsorption in Heterogeneous Catalysis

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The adsorption of liquids on solid surfaces can have serious implications on reaction efficiency in heterogeneous catalysis. NMR relaxometry is one of the few techniques that can provide detailed information on this adsorption process, and is therefore a powerful tool for the rational design and optimization of heterogeneous catalytic processes. In this presentation the theory of high field NMR relaxometry techniques, and their application to catalytic systems will be discussed. In cases where the interpretation of high field NMR relaxometry is ambiguous, fast field cycling (FFC) NMR is shown to be an excellent complementary technique. A case study of different liquids imbibed within γ -alumina is used to demonstrate the sensitivity of FFC NMR to the adsorption process, and to show how FFC NMR can provide a detailed insight into the adsorption and the liquid structuring occurring within the pore space.

Author Biography

Jordan Ward-Williams is a post-doctoral researcher working at the University of Cambridge, UK in collaboration with Shell. His work focusses on the application of NMR techniques to industrial problems, including catalyst manufacturing, and enhanced oil recovery. Prior to this he worked as a research chemist for BP, evaluating new processes and helping to optimize their Fischer-Tropsch technology. In 2016 he joined the Magnetic Resonance Research Centre at the University of Cambridge to pursue a PhD under the supervision of Prof Lynn Gladden, and has remained part of the group since receiving his PhD.