

Title

Organic Oxidations with Manganese Catalysts - A Total Analysis Approach to Elucidation Mechanisms and Origins of H₂O₂ Decomposition

Speaker

Prof. Wesley Browne

Stratingh Institute for Chemistry, Faculty of Science and Engineering, University of Groningen, The Netherlands

Date

1:30 PM (JST), Tuesday, January 14th, 2025

Venue

I²CNER hall, I²CNER Bldg.1, Ito campus, Kyushu University

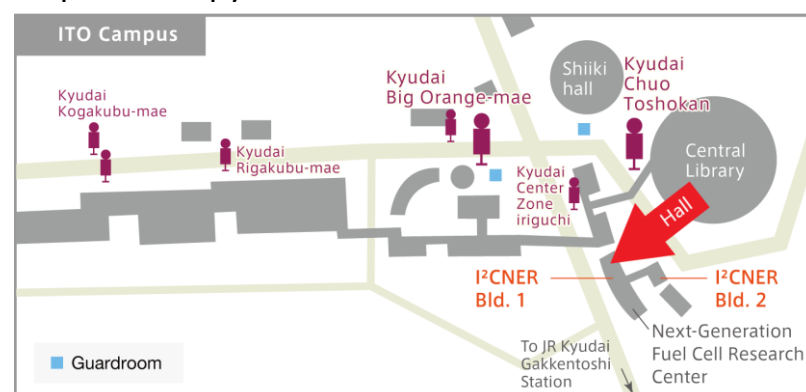
Abstract

**This seminar will be held on-site only. Please note there are no online or hybrid sessions.*

The oxidation of organic compounds and especially alkene oxidation is central to fine chemical production. H₂O₂ is the oxidation of choice for atom efficiency and minimizing environmental impact. Its activation by 1st transition metals is especially attractive but presents the challenge to suppress the wasteful and potentially hazardous decomposition of H₂O₂ to water and O₂. The species responsible for substrate oxidation and H₂O₂ decomposition can be expected to respond differently to changes in reaction conditions. Common approaches are the use of additives, and in particular carboxylic acids, as well as maintaining a low steady state concentrations of oxidant. Catalyst discovery and optimization for overall efficiency benefits from in line reaction monitoring and in this lecture we will discuss the use of combined spectroscopies in reaction monitoring with two examples to illustrate how a total analysis mechanistic approach can be used to understand why various approaches to reaction optimization work or not.

About the Speaker

Wesley Browne completed his PhD at Dublin City University (2002 Prof J.G. Vos) followed by postdocs at Queen's University Belfast (Prof J. J. McGarvey) and the University of Groningen (Prof. B.L. Feringa). In 2007 he was awarded a VIDI research grant and 2011 and ERC Starting grant. He is a faculty member at the University of Groningen since 2008 and currently full professor. His research applies spectroscopy and electrochemistry to (bio)inorganic catalysis and materials science. The research of Prof. Wesley Browne is built on expertise in spectroscopy and electrochemistry to unlock the mechanisms by which molecular catalysts and functional materials work. The research line in oxidation catalysis focuses on developing new environmentally sustainable methods for the oxidation of organic compounds. Elucidating reaction mechanisms with spectroscopy and especially Raman spectroscopy is a core task. In this field we have developed several fundamentally new methods for highly effective alkene epoxidation and dihydroxylation as well as identified and characterised first in class examples of reactive intermediates of relevance to bioinorganic chemistry also. The research line on molecular based functional materials explores novel electrochemical and photochemically driven switching mechanisms enabling new materials applications.

Registration <https://forms.office.com/r/iwcTRKjC5P>

Host Prof. Aleksandar Staykov

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